

2021-2022

**Oregon** **TECH**

GENERAL CATALOG

# Catalog Home

## Oregon Institute of Technology

University Catalog  
© 2021-22

www.oit.edu  
(541) 885-1000

3201 Campus Drive, Klamath Falls, OR 97601-8801

*Hands-on education for real-world achievement.*

## Welcome to Oregon Tech

### General Information

Welcome new and returning students to Oregon Institute of Technology, or Oregon Tech! Below is information that will help you on your educational journey at our university. We're here to help, so please contact us with any questions you may have so we can make your time at Oregon Tech successful and enjoyable.

### Admissions Office

The Oregon Tech Admissions Office is located on the first floor of the College Union on the Klamath Falls campus; and in the Student Services area at the Portland-Metro Campus on the first floor. It is open weekdays from 8am to 5pm (9am to 5pm at Portland-Metro) to serve prospective students, applicants and their families, as well as high school guidance counselors, college-transfer advisors and teachers.

If you are interested in seeing the Klamath Falls campus, the Admissions Office's visit coordinator can arrange for you to meet with a faculty member and an admissions counselor, tour the residence halls and the rest of the campus, sit in on a class and/ or talk with one of our coaches. To set up a campus visit, call (800) 422-2017 or (541) 885-1150. Hearing-impaired persons may call the TTY number: (541) 885-1072. You also can request a campus visit at [www.oit.edu](http://www.oit.edu) or by emailing [oit@oit.edu](mailto:oit@oit.edu). If you wish to visit one of Oregon Tech's other campuses, such as the Portland-metro campus, the Admissions Office can provide you with a contact person who can make arrangements for you.

### Non-Discrimination Policy

Oregon Tech does not discriminate on the basis of race, color, ethnicity, national origin, gender, disability, age, religion, marital status, sexual orientation or gender identity in its programs and activities. The following individuals are designated to handle inquiries and complaints regarding this non-discrimination policy: Civil Rights Officer, Title IX Coordinator (sex-based and gender-based discrimination) (541) 885-1108; email: [oithr@oit.edu](mailto:oithr@oit.edu).

### Students with Disabilities

Oregon Tech is committed to accommodating the academic and programmatic needs of qualified students with disabilities. Students with disabilities who anticipate needing accommodations should contact Disability Services, LRC 229C, as soon as possible in advance of enrollment, to ensure timely provision of services. Questions may be directed to: Disability Services, Oregon Tech, 3201 Campus Dr., Klamath Falls, OR 97601-8801. (541) 851-5227.

### Alternate Format

This publication is available in an alternate format for persons with disabilities. Please contact Disability Services at (541) 851-5227.

### Accreditation

Oregon Tech is accredited by the Northwest Commission on Colleges and Universities (NWCCU), 8060 165th Avenue, N.E., Suite 100, Redmond, WA 98052-3981. NWCCU is an institutional accrediting body recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education. Accreditation, licensure or approval of individual programs are listed in departmental sections. Copies of accreditation documents are available in the Office of the Vice President for Academic Affairs/Provost, Oregon Tech, 3201 Campus Dr., Klamath Falls, OR 97601-8801.

## **General Catalog Production**

The 2021-22 General Catalog was produced by the Registrar's Office: Wendy Ivie, University Registrar, and Grace Ernst, Administrative Program Specialist. Information in this catalog was accurate at the time of publication, but is subject to change without notice and does not constitute a contract between Oregon Tech and the student or applicant. The general catalog is published annually and available on the web at [www.oit.edu](http://www.oit.edu).

## History at a Glance

- 1947 – July 14, under the direction of first president, Winston Purvine, the first classes at Oregon Vocational School were held in a deactivated World War II Marine Corps hospital three miles northeast of Klamath Falls.
- 1948 – In a vote by the State Board of Education, the University's name was changed to Oregon Technical Institute – also known as OTI or Oregon Tech.
- 1950 – KTEC radio went on the air, broadcasting from Oregon Tech's campus.
- 1953 – Associate degree programs in the Surveying and Structural Engineering Technologies were first accredited by the Engineers' Council for Professional Development.
- 1956 – KOTI television opened and went operational on campus.
- 1957 – Oregon Tech was made a separate division of the State Board of Education and an engineering study was begun to determine whether to repair or rebuild the facilities.
- 1960 – Oregon Tech was transferred to the jurisdiction of the State Board of Higher Education.
- 1962 – Oregon Tech was accredited by the Northwest Association of Secondary and Higher Schools.
- 1964 – Oregon Tech moved to its newly constructed campus on a geothermal site overlooking Upper Klamath Lake.
- 1966 – Oregon Tech received authorization to grant bachelor's degrees.
- 1970 – Bachelor's degree programs first accredited by ABET.
- 1973 – OTI name changed to Oregon Institute of Technology or OIT; Oregon Tech continues in use as well.
- 1975 – Geo-Heat Center established.
- 1976 – Kenneth Light appointed 2<sup>nd</sup> President of Oregon Tech upon Purvine's retirement.
- 1983 – Larry Blake appointed 3<sup>rd</sup> President of Oregon Tech. Metro Center established in Portland to offer in-demand degrees.
- 1984 – Small Business Development Center established.
- 1988 – Portland Metro Center moved to its first permanent facilities on Southeast Harmony Road in Clackamas.
- 1989 – State Board of Higher Education authorized Oregon Tech to grant master's degrees.
- 1991 – Lawrence J. Wolf appointed 4<sup>th</sup> President of Oregon Tech.
- 1995 – First Master's degree offered.
- 1997 – First online degrees offered.
- 1998 – Martha Anne Dow appointed 5<sup>th</sup> President of Oregon Tech.
- 2001 – Oregon Renewable Energy Center (OREC) established in law by the Oregon legislature.
- 2005 – Oregon Center for Health Professions established.
- 2008 – Christopher G. Maples appointed 6<sup>th</sup> President of Oregon Tech. Martha Anne Dow Center for Health Professions opens.
- 2012 – Oregon Tech's Portland-Metro presence expands with the opening of the Portland-Metro Campus in Wilsonville, and broadens degree options.

2015 – Oregon Institute of Technology became an independent public body governed by its own Board of Trustees.

2017 – Nagi G. Naganathan appointed 7<sup>th</sup> President of Oregon Tech.

2018 – Oregon Tech becomes the landlord and operations host of the Oregon Manufacturing Innovation Center Research and Development (OMIC R&D) in Scappoose, Oregon, and becomes a member of the industry/higher education advanced manufacturing R&D partnership organization.

## Welcome

Welcome to Oregon Tech! You have chosen a university that will challenge you, excite you, and provide many opportunities for you to learn, innovate and grow in a unique polytechnic university environment. Oregon Tech graduates are known for their ability to excel immediately in their careers as well as in graduate and professional schools. This means that, on average, Oregon Tech graduates earn some of the highest starting salaries in the nation – an average of \$60,000 per year.

The small class size and hands-on, applied approach to education at Oregon Tech is perfectly tailored to an experiential learning environment that encourages communication, collaboration, and engaging in professional practice. Oregon Tech is focused on providing high value to students, and a high return on investment to our graduates who excel across many industries and in-demand fields, making us *Industry's University*. Faculty members bring their real-world problem-solving experiences into the classroom, and Oregon Tech students have numerous opportunities to gain professional experience outside the classroom through externships, internships, field work, cooperative programs, and capstone projects.

By attending Oregon Tech, you have chosen rigor, quality, and relevance. You are now part of our focus on excellence, innovation, and professional preparation that has served Oregon Tech's graduates well and has continuously increased our reputation and rankings in Oregon, the Pacific Northwest, and nationally. Welcome to the Oregon Tech Family – we're glad you're here and we very much look forward to helping you achieve your own personal and professional success.

## Mission Statement, Vision, Values, and Pillars

### Mission Statement

Oregon Institute of Technology ("Oregon Tech"), Oregon's public polytechnic university, offers innovative, professionally-focused undergraduate and graduate degree programs in the areas of engineering, health, business, technology, and applied arts and sciences. To foster student and graduate success, the university provides a hands-on, project-based learning environment and emphasizes innovation, scholarship, and applied research. With a commitment to diversity and leadership development, Oregon Tech offers statewide educational opportunities and technical expertise to meet current and emerging needs of Oregonians as well as other national and international constituents.

### Vision

Oregon Tech will be a student-centered, world-class polytechnic university that aspires students to become tomorrow's leaders.

### Institutional Student Learning Outcomes

Institutional Learning Outcomes (ISLOs), also referred to as Oregon Tech's Essential Student Learning Outcomes (ESLOs), support Oregon Tech's institutional mission and are in alignment with the Northwest Commission on Colleges and Universities (NWCCU) standards.

The ESLOs reflect the common expectations about the general knowledge, skills, and abilities that all Oregon Tech graduates will acquire by the time of graduation regardless of the degree program. They define the Oregon Tech learning experience that lay the foundation upon which each major program builds. The ESLOs may be achieved in many ways depending on the unique curriculum of each degree program, supporting graduates in developing the habits of mind and behaviors of professionals and lifelong learners.

Oregon Tech Student Learning Outcomes:

#### Communication, Teamwork and Ethical Reasoning

Oregon Tech graduates will:

- communicate effectively orally and in writing
- collaborate effectively in teams or groups, working to accomplish group tasks and resolve conflict within groups and teams
- recognize decisions requiring ethical judgments, determine potential reasonable courses of action, and select the course of action best supported.

#### Diverse Perspectives

Oregon Tech graduates will demonstrate:

- an ability to identify and explain diverse perspectives which requires the self-awareness, intellectual flexibility, and broad knowledge that enables perception of the world through the eyes of others. This includes perspective of diverse cultures and personalities, with consideration of varied places, histories, and technologies.
- cultural sensitivity through the knowledge, awareness, and acceptance of other cultures, along with awareness of differences without promoting hierarchy within those differences

- global awareness through ability to view the world from a global perspective, competently and perceptively navigate the challenges and opportunities of a globalized world, demonstrate willingness to suspend own cultural biases in order to appreciate multiple global perspectives, and identify and appreciate the relevance of historical, demographic, social, cultural, political, economic, and/or environmental factors to a global issue(s).

### **Inquiry and Analysis**

Oregon Tech graduates will demonstrate an ability to:

- analyze and explain how they process cognitively toward a goal when the problem solver does not initially know a solution method.
- maintain information literacy, identifying when information is needed and having the ability to locate, evaluate, and use the needed information ethically and effectively.
- identify and explain critical analysis of the problem/question/issue; recognize stakeholders and contexts; identify and evaluate assumptions; identify and evaluate evidence; formulate personal responses and/or acknowledge other perspectives, and identify and evaluate implications, conclusions, and consequences.
- analyze and explain logical thinking skills through logical extrapolation, reflecting an informed evaluation and ability to place substantial evidence and perspectives in priority order that lead to a conclusion or other outcome.
- appropriately extract, interpret, evaluate, construct, communicate, quantitative literacy and reasoning skills by applying quantitative information and methods to solve problems, evaluate claims, and apply and analyze quantitative data.
- analyze and explain inquiry and analysis skills which consists of posing meaningful questions about situations and systems, gathering and evaluating relevant evidence, and articulating how that the evidence justifies decisions and contributes to students' understanding of how the world works.

## **About Oregon Tech**

For nearly 75 years, Oregon Institute of Technology (Oregon Tech) has focused on changing the lives of Oregonians by preparing them to meet the technology, innovation and management needs of industry. Oregon Tech is accredited by the Northwest Commission on Colleges and Universities, and individual programs are also accredited by the appropriate professional organizations. Today, Oregon Tech offers more than 45 Bachelor of Science and Master's degree programs in engineering, technology, health technologies, management, communication and the applied sciences. These include a growing number of bachelor degrees and degree-completion programs offered online, and bachelor's and master's degree programs that can be entirely completed at Oregon Tech's Portland-Metro campus in Wilsonville.

With a mission to deliver technology education throughout the Pacific Northwest and to students from other parts of the country and world, we partner with industry leaders to ensure our programs adapt to new technologies and workforce demands. Oregon Tech's focus on professional practice gives our students a competitive edge: nearly 96 percent are employed or in graduate school within six months of graduation. Year after year, our graduates garner the highest starting salaries in Oregon and among the highest in the nation.

Our applied approach to teaching, which blends theory and practice, is the main reason our graduates and alumni are so avidly recruited. Oregon Tech students have amazing opportunities to apply what they learn in lab-based classes, clinics, externships and workplaces; and in clubs and special activities. Oregon Tech's faculty and staff, who come to Oregon Tech with relevant industry experience, reinforce this practical focus in the classroom. And in every program, a relevant interdisciplinary core underscores major studies, broadening students' understanding of the world and teaching them to communicate effectively, solve problems, and think for themselves. This student-focused approach to teaching and learning engages students in professional practice throughout their time at Oregon Tech.

### **One Oregon Tech, Three Primary Campuses, and Program-Specific Sites**

Oregon Tech is one institution with multiple locations. Established in 1947, Oregon Tech offers bachelor's and master's degree programs at locations throughout Oregon and beyond to meet the needs of students seeking a top quality, professionally-focused education.

Oregon Tech's residential campus is located in **Klamath Falls** in beautiful Southern Oregon, and is nestled on the eastern slope of the Cascade Mountains. The 190-acre campus offers spectacular views of Upper Klamath Lake, pine-studded knolls and snow-capped peaks from nearly every building. Klamath Falls, a city of about 22,000 residents (67,000 in the entire county), is located in Klamath County in south-central Oregon, about 20 miles from the California border and in the same county that boasts Crater Lake National Park. Known as Oregon's "City of Sunshine," Klamath Falls enjoys about 300 days of blue skies each year.

Oregon Tech's **Portland-Metro** campus in Wilsonville, located just south of Portland, offers 21 bachelor's and master's degree programs in a state-of-the-art facility designed to provide an industry-focused, urban university experience in the heart of Oregon's "Silicon Forest". The campus offers high-demand degree programs, and is easily accessible to students of all ages and backgrounds, including business professionals, transfer students and new freshman just out of high school. Oregon Tech provides excellent opportunities for students seeking internships and employment while completing their degrees.

Oregon Tech also offers a growing number of **Online** programs for working professionals or returning students who are busy and ready to advance their education as quickly and conveniently as possible. Oregon Tech Online allows students to finish certificate, associate's, or bachelor's degrees without leaving home or the office, and without the hassles of travel, childcare or giving up their current job. The primary mission of Oregon Tech Online is to offer convenient programs and courses to both students seeking a degree, and those wishing to skill-up by taking just a course or two.

Oregon Tech also offers a bachelor's program in dental hygiene in **Salem** through a partnership with Chemeketa Community College. The classrooms and dental hygiene clinic are located in Chemeketa's new, state-of-the-art Health & Sciences Building. The program requires one year of prerequisite (pre-dental hygiene) coursework prior to acceptance.

Oregon Tech **Seattle at Boeing** offers a Bachelor of Science Degree in Manufacturing Engineering Technology, Mechanical Engineering, or Mechanical Engineering Technology and a Master of Science Degree in Manufacturing Engineering Technology to employees of Boeing at sites in the Puget Sound area. Also offered are review classes for the Society of Manufacturing Engineers' CMfgT and CMfgE exams and three Certificates of Completion in Composites.

Oregon Tech is accredited by the Northwest Commission on Colleges and Universities. Additional accreditations, licensure and approvals of individual programs are listed in the appropriate program sections of this catalog. Copies of accreditation documents are available in the Office of the Vice President for Academic Affairs/Provost, Oregon Institute of Technology, 3201 Campus Dr., Klamath Falls, OR 97601-8801.

Oregon Tech Online is an approved institutional participant in the National Council for State Authorization Reciprocity Agreements (NC-SARA) initiative, which allows for increased access to online courses for many out of state students. Oregon Tech Online is authorized by the Washington Student Achievement Council and meets the requirements and minimum educational standards established for degree-granting institutions under the Degree-Granting Institutions Act. This authorization is subject to periodic review and authorizes Oregon Institute of Technology to offer field placement components for specific degree programs. The Council may be contacted for a list of currently authorized programs. Authorization by the Council does not carry with it an endorsement by the Council of the institution or its programs. Any person desiring information about the requirements of the act or the applicability of those requirements to the institution may contact the Council at P.O. Box 43430, Olympia, WA 98504-3430.



# Programs by Campus

## Klamath Falls

### Master of Science

- Applied Behavior Analysis
- Civil Engineering
- Marriage and Family Therapy
- Renewable Energy Engineering

### Master of Science/Bachelor of Science

- Electrical Engineering, BS/Renewable Energy Engineering, MS
- Electrical Engineering, BS/MSE
- Renewable Energy Engineering, BS/MS
- Renewable Energy Engineering, BS/MSE

### Bachelor of Applied Science

- Technology and Management

### Bachelor of Science

- Accounting
- Applied Mathematics
- Applied Psychology
- Biology-Health Sciences
- Business, with options in:
  - Management
  - Marketing
- Civil Engineering
- Communication Studies
- Computer Engineering Technology
- Cybersecurity
- Data Science
- Dental Hygiene
- Diagnostic Medical Sonography
- Echocardiography
- Electrical Engineering, with emphasis in:
  - Electrical Power
  - Microelectronics
  - Renewable Energy
  - Robotics, Autonomous Systems, and Control Engineering
- Embedded Systems Engineering Technology
- Environmental Sciences
- Geomatics, with options in:
  - Geographic Information Systems
  - Surveying
- Health Care Management, with options in:

- Administration
- Clinical

- Health Informatics
- Information Technology
- Manufacturing Engineering Technology
- Mechanical Engineering
- Mechanical Engineering Technology
- Nuclear Medicine and Molecular Imaging Technology
- Nursing (through OHSU School of Nursing)
- Operations Management
- Population Health Management
- Professional Writing
- Radiologic Science
- Renewable Energy Engineering
- Respiratory Care
- Software Engineering Technology
- Vascular Technology

### Minors

- Arts, Literature, and Philosophy (ALPs)
- Applied Mathematics
- Applied Physics
- Applied Statistics
- Biology
- Business
- Chemistry
- Coaching
- Geographic Information Systems
- Health Informatics
- Human Interaction
- Information Technology
- Innovation & Entrepreneurship
- International Business
- Medical Sociology
- Professional Writing and Technical Communication
- Psychology
- Surveying
- Sustainability

### Specializations

- Accounting
- Entrepreneur/Small Business
- Management
- Marketing

## Certificates

- Accounting (Post Baccalaureate)
- Applied Behavior Analysis (Graduate)
- Dispute Resolution
- Magnetic Resonance Imaging (MRI)
- Picture Archiving and Communication Systems (PACS)

# Portland-Metro

## Master of Science

- Applied Behavior Analysis
- Engineering - Specialties
  - Electrical Engineering
  - Embedded Engineering
  - Optical Engineering
  - Power Engineering
  - Robotics, Autonomous Systems and Control Engineering
  - Systems Engineering
- Renewable Energy Engineering

## Master of Science/Bachelor of Science

- Electrical Engineering, BS/Renewable Energy Engineering, MS
- Renewable Energy Engineering

## Bachelor of Applied Science

- Technology and Management

## Bachelor of Science

- Applied Psychology
- Cybersecurity
- Electrical Engineering, with emphasis in:
  - Electrical Power
  - Microelectronics
  - Optical Engineering
  - Renewable Energy

- Robotics, Autonomous Systems, and Control Engineering

- Electronics Engineering Technology
- Embedded Systems Engineering Technology
- Emergency Medical Services Management (joint degree with OHSU)
- Health Informatics
- Information Technology
- Manufacturing Engineering Technology
- Mechanical Engineering
- Mechanical Engineering Technology
- Medical Laboratory Science (joint degree with OHSU)
- Operations Management
- Renewable Energy Engineering
- Software Engineering Technology

## Associate of Applied Science

- Emergency Medical Technology Paramedic

## Minors

- Applied Mathematics
- Business
- Health Informatics
- Information Technology
- Psychology
- Surveying

## Certificates

- Applied Behavior Analysis (Graduate)

## Online

### Master of Science

- Allied Health
- Applied Behavior Analysis
- Engineering - Specialties
  - Electrical Engineering
  - Embedded Engineering
  - Optical Engineering
  - Power Engineering
  - Robotics, Autonomous Systems and Control Engineering
  - Systems Engineering

### Bachelor of Applied Science

- Technology and Management

### Bachelor of Science

- Applied Psychology
- Business , with option in:
  - Management
- Dental Hygiene (degree completion)
- Diagnostic Medical Sonography (degree completion)
- Echocardiography (degree completion)
- Health Care Management (degree completion), with options in:
  - Administration
  - Clinical
  - Radiologic Science
- Health Informatics
- Information Technology
- Operations Management
- Radiologic Science (degree completion)
- Respiratory Care (degree completion)
- Vascular Technology (degree completion)

### Associate of Applied Science

- Sleep Health, with options in:

- Clinical Sleep Health
- Polysomnographic Technology

### Minors

- Business
- Health Informatics
- Information Technology
- Psychology

### Certificates

- Applied Behavior Analysis (Graduate)
- Clinical Sleep Health
- Magnetic Resonance Imaging (MRI)
- Picture Archiving and Communication Systems (PACS)
- Polysomnographic Technology

## Seattle at Boeing

### Master of Science

- Manufacturing Engineering Technology

### Bachelor of Science

- Manufacturing Engineering Technology
- Mechanical Engineering
- Mechanical Engineering Technology

## Chemeketa Community College

### Bachelor of Science

- Dental Hygiene

# Admissions and Financial Aid

## Office of Admissions

College Union, 1st Floor  
800-422-2017 (toll free)  
(541) 885-1150  
(541) 885-1024 (fax)  
oit@oit.edu  
www.oit.edu/admissions

The Oregon Tech Admissions Office is located on the first floor of the College Union on the Klamath Falls campus. Open weekdays from 8 am to 5 pm, its primary functions are to help prospective students investigate and evaluate Oregon Tech, to manage applications for admission and to assist applicants with the enrollment process. The Admissions Office operates with the cooperation and support of the entire campus community.

Admissions welcomes visiting students and their families for daily tours, and sessions with admissions counselors, coaches, and other staff. Oregon Tech hosts several campus preview events annually. For event dates or to register for an event, please visit [www.oit.edu/visit](http://www.oit.edu/visit) or call (541) 885-1150 or (800) 422-2017. Oregon Tech Portland-Metro visits can be scheduled by calling (503) 821-1250. For the hearing impaired please call the TTY number (541) 885-1072.

Admission requirements apply to all applicants of Oregon Tech. All students who wish to enroll in more than eight credits in a term, receive financial aid and/or graduate from Oregon Tech must apply and be accepted for admission. Applications for general admission are processed on the Klamath Falls campus regardless of the campus location for the student.

## Application Deadlines

The priority application deadline for maximum scholarship and financial aid consideration each fall term is March 1<sup>st</sup>. Oregon Tech accepts applications on a rolling basis, but students must have a complete application on file in Admissions three weeks prior to the first day of classes as follows:

<b>2021-2022</b>	<b>Application Deadlines</b>
Fall Term	September 7, 2021
Winter Term	December 13, 2021
Spring Term	March 7, 2022
Summer Term	May 30, 2022

## Applications

Applications for admission are available online at [www.oit.edu/apply](http://www.oit.edu/apply). A complete application consists of an application for admission, application fee, official transcripts, and other required documentation depending on the type of applicant (see Admission Eligibility Requirements).

Students who were previously enrolled but have stopped out more than four terms must submit an application for re-admission. Previously admitted students that did not enroll need to submit a new application. Applications can be found at [www.oit.edu/apply](http://www.oit.edu/apply).

Students who have not yet registered for classes who wish to change their entry term, major, or campus can do so by contacting the Admissions Office at [oit@oit.edu](mailto:oit@oit.edu).

Students who wish to take eight credits or less per term need to submit a Non-Degree Seeking application; however, students must be fully admitted to qualify for financial aid. Applications are available online at [www.oit.edu/apply](http://www.oit.edu/apply).

International students must complete an application for admission at [www.oit.edu/apply](http://www.oit.edu/apply). Students seeking enrollment through an approved exchange program must complete the International Exchange Application. For more information about Oregon Tech's international exchange program please go to [www.oit.edu/international](http://www.oit.edu/international).

The following majors require a secondary application process after students are granted general admission to Oregon Tech.

- Medical Laboratory Science (OHSU/Portland-Metro)
- Diagnostic Medical Sonography
- Dental Hygiene (Klamath Falls, Salem)
- Echocardiography
- Nuclear Medicine and Molecular Imaging Technology
- Nursing (with OHSU/Klamath Falls)
- Paramedic/EMT (OHSU/Portland-Metro)
- Radiologic Science
- Respiratory Care
- Vascular Technology

Each program has its own application process, requirements, and deadlines. Details are outlined on the departmental pages of this catalog.

## Application Procedures

Every applicant must complete the following steps to be considered for Admission to Oregon Tech:

\*All offers of admission are contingent upon submission of satisfactory final official transcripts prior to enrollment\*

1. Complete the appropriate application found at [www.oit.edu/apply](http://www.oit.edu/apply)
2. Pay the \$50 non-refundable application fee. Some students may qualify for an application fee waiver. Please visit [www.oit.edu/apply](http://www.oit.edu/apply) for more information.
3. Send official transcripts from all post-secondary institutions attended or received credit from if applying as a transfer student. A final high school transcript is not required if a student has received more than 24 transferable semester credits or 36 transferable quarter credits from a regionally accredited institution. Students who have less than 24 semester credits or 36 quarter credits must submit their final high school transcript or GED scores.
4. First year applicants do not need to submit official high school transcripts when submitting the application, but will be required to provide an official high school transcript upon graduating from high school, and before enrolling at Oregon Tech. GED students will need to submit official GED test results.
5. If applicable, Advanced Placement (AP) or International Baccalaureate (IB) score reports.

\*All official documents must be sent to the Oregon Tech Admissions Office and become property of Oregon Tech\*

Admission and registration may be cancelled if a student fails to submit required documentation in a complete and satisfactory order.

Some online degree completion programs have additional eligibility requirements. Please visit [www.oit.edu/online/evf](http://www.oit.edu/online/evf) to determine your eligibility.

Some Oregon Tech programs do not have sufficient space to enroll all qualified applicants. Oregon Tech reserves the right to offer the most qualified applicants on a first-come, first-served basis, or through a combination of these two strategies.

Upon admission, but prior to registration, all students must have a complete health form showing adequate immunizations on file with the Student Health Center. For more information, please see the Student Health section of this catalog. Students enrolled in 6 credits or less per term are exempt.

## Social Security Number Disclosure and Consent Statement

Students are requested to provide, voluntarily, a Social Security Number (SSN) to assist Oregon Tech in developing, validating, or administering predictive tests and assessments; administering student aid programs; improving instruction; internal identification of students; student parking; collection of student debts; or comparing student educational experiences with subsequent workforce experiences. By providing a Social Security Number, students consent to the uses identified above. This request is made pursuant to ORS 351.070 and 351.085. Provision of a Social Security Number and consent to its use is not required and, if a student chooses so, will not be denied any right, benefit or privilege provided by applicants may enter a series of zeros (000-00-0000) on their admission application in place of their actual SSN. Students should be aware, by not providing their SSN they will not be eligible to receive federal student aid or some university scholarships.

Additionally, applicants should be aware that Oregon Tech is required to obtain a Social Security Number to file certain returns with the Internal Revenue Service (IRS) for the applicant to receive a 1098T and to furnish a statement. The returns that Oregon Tech must file contain information about qualified tuition and related expenses. Privacy Act Notice: Section 6109 of the Internal Revenue Code requires students to give a correct SSN to persons who must file information returns with the IRS to report certain information. The IRS uses the SSN for identification purposes and to help verify the accuracy of tax returns. For more information, refer to IRS code 6050S.

# Admission Requirements

## First-Year Admission

Effective 2021-2022, Oregon Tech will admit first year applicants based on an unweighted College-Preparatory GPA with no requirement to submit standardized test scores such as the ACT, SAT, AP, or IB. The college-prep GPA will be recalculated based upon 15 courses, including a required fourth year of math that uses Algebra II as a prerequisite. Students may be deficient in no more than two courses, unless the two courses are combined in Math and Lab Science. While there is no minimum ACT or SAT score, nor are score submissions required for admission review, scores may be used to meet course deficiencies and for placement purposes at the time of enrollment. Deficiencies are courses not taken or courses in which a grade of D or F was earned. Repeat courses may be used to replace grades. Applicants older than 22 are exempt from the college-prep course requirements as well as students who have taken the GED. Merit-based scholarships awarded at the time of admission will use cumulative high school GPA.

For first-year admission, students must meet entrance requirements adopted by the State Board of Higher Education in Oregon. Applicants who are enrolled in or who have graduated from regionally accredited high schools must:

1. All first-year applicants must report subjects and grades on the application. Unless requested to do so by the Admissions Office, please do not submit transcripts. An official, final high school transcript with the graduation date will be required before registering for classes.
2. Applicants may report test scores on the application.
3. Applicants must satisfactorily (grade of C- or above) complete at least 15 units (one year is equal to one unit) of college preparatory work in the following areas unless they graduated from high school prior to spring 1985.
  - English (4 units). Shall meet one of the following: four years of high school English (composition/literacy-based) or one transferable three-credit college English course.
  - Mathematics (4 units). Shall meet one of the following: four years of high school math courses, including one year each of Algebra I, geometry, Algebra II, and an advanced class for which Algebra II is a prerequisite.
  - Social Science (2 units). Shall meet two of the following from: History/Social Studies (one year high school American History, or one transferable three-credit college American History course); One year high school social science (such as European history, world history, economics, sociology, geography, government, psychology, or anthropology); or one transferable three-credit college social science course.
  - Laboratory Science (3 units). Shall meet one of the following: three years of high school laboratory science (one year each of biology, chemistry, earth science, or physics. An integrated science class may be substituted for one required course); two-year high school laboratory science (biology, chemistry, earth science or physics); three transferable four-credit college lab sciences courses (one semester each of biology, chemistry, earth science, and physics). An integrated science or advanced level science class may be substituted for one required course.
  - Career and Technical Education or Fine Art (1 unit). One year or a combination of high school fine arts or Career and Technical Education (CTE) or one transferable three-credit college fine arts course.
  - Academic Elective (1 unit). Shall meet one of the following: courses such as computer science, STEM, engineering, or other college prep-course that may fall within any of the above subjects.
4. Applicants who are applying based on GED scores must submit official GED test scores. A minimum overall score of 680 with scores of 170 or higher in each subject is required for admission. Special admission may be offered to those scoring no less than 150 on the Reasoning Through Language Arts and Social Studies test; no lower than 160 on the Science test; and no lower than 170 on the Mathematics Reasoning test. GED tests taken between 2002 and 2014 must have a minimum composite score of 500 with a minimum score of 410 in each subject. Tests taken prior to 2002 must have a minimum composite score of 50 with a minimum score of 41 in each subject. GED applicants can request official test scores from the Department of Education from the state in which the test was taken, Test scores must be sent to the Admissions Office.

## Transfer Admission

A transfer student is one who has previously earned credits at another regionally accredited college or university. A student must have earned at least 36 college-level credit hours (24 semester credits) to be admitted based on his/her college record alone.

1. Transfer applicants must have a cumulative 2.25 GPA or better in college level classes unless they hold an Oregon Transfer Module (OTM) or an associate or bachelor's degree, in which case, a cumulative GPA of 2.0 is required.
2. To be admitted to Oregon Tech, transfer applicants must demonstrate proficiency in English and Math by completing the equivalent of Math 95 (Intermediate Algebra) or higher and WRI 115 (Introduction to Writing) or higher with grades of "C-" or better.
3. Applicants who do not have an associate's or a bachelor's degree must have at least 36 college-level credits. If more than 10 percent of an applicant's credits are in Physical Education, credits beyond the 10 percent threshold will not be counted toward meeting GPA requirements.
4. Applicants must be eligible to re-enroll in the previously attended institution(s).

Official transcripts from all post-secondary institutions must be submitted for consideration.

Applicants who have earned fewer than 36 quarter or 24 semester hours of college-level work must also provide high school transcripts or GED scores. Admission will be based on both high school and transfer GPA and subject requirements. Students who have completed fewer than 12 transferable quarter credits (8 semester) must meet freshman admission requirements. Students who have not completed 12 college credits within six months of graduating high school must submit the first-year application for admission.

Acceptance of vocational/technical courses may be granted after registration if the student's administering department finds that vocational/technical courses have satisfied certain bachelor's degree requirements. In all cases, course and/or department prerequisites will be enforced.

The transferability of credits earned at Oregon Tech is at the discretion of the receiving college, university, or other educational institution. Students considering transferring to any institution should not assume that credits earned at Oregon Tech will be accepted by the receiving institution. Similarly, the ability of a degree, certificate, diploma, or other academic credential earned at Oregon Tech to satisfy an admission requirement of another institution is at the discretion of the receiving institution. Accreditation does not guarantee credentials or credits earned at Oregon Tech will be accepted by or transferred to another institution. To minimize the risk of having to repeat coursework, students should contact the receiving institution for evaluation and determination of transferability of credits and/or acceptability of degrees, diplomas, or certificates earned.

## **Transfer Articulation Agreements**

Oregon Tech is dedicated to enhancing partnerships with regional community colleges. One important way of doing this is by forming articulation agreements. An articulation agreement is an officially approved agreement that matches coursework between schools. These agreements are designed to help students make a seamless transition when transferring to Oregon Tech. Articulation agreements give students a clear understanding of what courses will transfer to Oregon Tech and satisfy requirements for their major while minimizing overlap or repeat of courses. Some agreements accept an associate degree in its entirety while other agreements outline specific courses to take as a student plans for transfer. Students should inform the Admissions Office and their academic department advisor when they are utilizing an articulation agreement.

A list of articulation agreements can be found online at [www.oit.edu/articulations](http://www.oit.edu/articulations); students may search by Oregon Tech major or by transfer institution. Questions regarding these agreements may be directed to the students' academic department or the Office of Academic Agreements.

## **Non-Degree Seeking Students**

A non-degree seeking student may not enroll in more than eight credits per term at Oregon Tech at the graduate and undergraduate level, have not previously enrolled as a degree seeking student, and is not eligible for financial aid. Out-of-state residents are subject to non-resident tuition and fees if enrolling in more than 6 credits. A tuition and fee schedule can be viewed online ([www.oit.edu/college-costs/tuition-fees](http://www.oit.edu/college-costs/tuition-fees)). College-level classes taken as a non-degree seeking student may be used toward Oregon Tech graduation requirements upon completion of the admission as a degree-seeking undergraduate or graduate student. Credits may be transferred to other institutions. Enrollment as a non-degree seeking student does not guarantee future admission to Oregon Tech. To enroll at Oregon Tech as a non-degree seeking student, submit the Non-Degree Seeking Application ([www.oit.edu/apply](http://www.oit.edu/apply)) at least one week prior to enrollment. Oregon Tech reserves the right to deny enrollment to those who seek non-degree seeking status.

## **Admission to Programs with Clinical or Practicum Requirements**

It is important that prospective students understand that admission to those programs that have clinical or practicum requirements:

1. Is selective.
2. Will be granted after consideration of an applicant's ability to assume professional responsibility for clients, patients or students served by the program; and may be denied to any student with a record of past criminal behavior or psychiatric illness, which bears upon the student's ability to fulfill clinical or practicum responsibilities.

Students seeking admission to online degree completion programs in Radiologic Science, Vascular Technology, Echocardiography, Diagnostic Medical Sonography, or Respiratory Care, must meet all regular admission requirements and be registered professionals working in their chosen field. This will ensure access to clinical sites as required in these programs. For more information, contact the Online Education Office.

## **International Student Admission**

Oregon Tech welcomes international students as applicants and as vital members of our campus community. In addition to the application and \$50 application fee, the following documents must be sent to the Admissions Office:

1. Official transcripts, in English or with an accompanying official translation, of all high school and post-high school institutions attended.
2. An official credential evaluation from an Oregon Tech-approved credential service for all coursework completed at a post-secondary institution outside the United States. Examples include the Association of Collegiate Registrars and Admissions Officers ([www.aacrao.org/resources/transfer-articulation](http://www.aacrao.org/resources/transfer-articulation)) and World Education Services ([www.wes.org](http://www.wes.org)).
3. Official English proficiency test scores from one listed:
  1. Test of English as a Foreign Language (TOEFL) with a minimum internet-based score of 68
  2. English Language Testing System exam (IELTS) with a minimum score of 6



3. Duolingo English Test ([www.englishtest.duolingo.com](http://www.englishtest.duolingo.com)) with a minimum score of 95.
4. A completed *Statement of Financial Responsibility* form, indicating the necessary financial resources in U.S. dollars to support yourself while enrolled.
5. A letter, if appropriate, from parents and/or sponsors indicating the amount of financial support they will provide in U.S. dollars.
6. Documentation showing that you, your parents and/or your sponsors have adequate financial resources to meet your expenses while enrolled at Oregon Tech. Examples include official bank statements, tax forms and letters of employment showing annual earnings.

A completed health history and immunization form must be submitted. In addition to the health requirements that need to be fulfilled before registration; international students must have at least one documented MMR vaccine on file at the Integrated Student Health Center prior to the student attending any classes (per OAR 333-050-0130). Also, students from countries identified as high risk for tuberculosis (most countries in Latin America and the Caribbean, Africa, Asia, Eastern Europe and Russia) are required to complete a TB screening upon entrance to Oregon Tech. This may include a TB skin test and/or a chest x-ray. This can be done at the Integrated Student Health Center if records are not available. Please refer to the Integrated Student Health Center section of this catalog for health history and immunization requirements and questions.

## **Exchange Student Admission**

Oregon Tech welcomes exchange students through multiple exchange partnership agreements. Students at partner institutions work with an advisor at their "home" campus to meet the requirements of Oregon Tech's international exchange application process. It is recommended that exchange students begin the exchange application process at least nine months prior to the planned date of entry. This allows ample time for submission of documents that the U.S. Bureau of Citizenship and Immigration Services requires Oregon Tech to collect before we can issue the I-20 form used to secure a F-1 visa.

## **Admission Exceptions**

The Admissions Committee and Director of Admissions retain the right to make exceptions to the specified requirements for admission or add stipulations to certain offers of admission. For additional information, contact the Director of Admissions.

## **Bring Your Own Device**

Both the Klamath Falls and Portland-Metro campuses are now designated as Bring Your Own Device (BYOD) campuses. This allows students the flexibility to use Oregon Tech licensed applications on their own laptops rather than from stationary computers in computer labs. Investments have been made in remote technologies to give students the freedom to work with Oregon Tech applications from their own computer in class, outside of the class, on-campus or off-campus.

## **Registration**

Registration Events for new students occur prior to the start of each term. All students new to the Klamath Falls campus must participate in a Klamath Falls Registration program and all students new to the Portland-Metro campus must participate in Portland-Metro's Orientation & Registration program. In addition to placement, students will have the opportunity to meet with an advisor to plan their academic schedule, register for classes, set up Oregon Tech computer and email accounts, receive their university ID card and learn how to make a successful transition to Oregon Tech. Students are encouraged to attend an early registration event rather than waiting to register at the beginning of a term. Visit [www.oit.edu/newwings](http://www.oit.edu/newwings) or contact the Admissions Office at (541) 885-1150 or [oit@oit.edu](mailto:oit@oit.edu) for more information.

## **Placement Testing**

Oregon Tech's Student Success Center (SSC) administers all placement testing. Student admission records are examined to determine placement requirements. Students transferring in math credit for calculus or beyond, or who have transferred in math credits to fulfill all math requirements for their major, are exempt from the math placement requirement. Transfer students with more than 36 transferable college credits are exempt from the reading placement requirement. Students transferring in college-level writing are exempt from the writing placement requirement. Students entering a health program requiring Human Anatomy and Physiology with transferable college credit for this course are exempt from the entry assessment for the Human Anatomy and Physiology course sequence. Placement tests are available prior to the term of entry and in conjunction with new student registration. Visit [www.oit.edu/newwings](http://www.oit.edu/newwings) or contact (541) 885-1791 or [testing@oit.edu](mailto:testing@oit.edu) for more information.

## **Western Undergraduate Exchange**

The Western Undergraduate Exchange Program (WUE) is a tuition reduction program sponsored by the Western Interstate Commission for Higher Education (WICHE). Students from WUE eligible states can save students thousands of tuition dollars each year. Students that are accepted to WUE eligible majors pay just 150 percent of the in-state tuition rate. There is no application to receive WUE. Applicants from WUE eligible states who apply for eligible programs are automatically reviewed upon admission.

## **WUE Eligible States and Programs**

Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, South Dakota, Utah, Washington, Wyoming, the Federal States of Micronesia, and the Commonwealth of the Northern Mariana Islands.

All majors in the College of Engineering, Technology and Management, and the College of Health, Arts and Sciences are eligible apart from:

- Medical Laboratory Sciences (Pre-Medical Laboratory Science is eligible)
- Pre-Dental Hygiene and Dental Hygiene
- Pre-Medical Imaging Technology and Medical Imaging Technology (Diagnostic Medical Sonography, Echocardiography, Nuclear Medicine Technology, Radiologic Science, and Vascular Technology)
- Nursing after acceptance by Oregon Health Sciences University (OHSU) (Pre-Nursing is eligible)
- Pre-Paramedic and Paramedic Education Program
- Oregon Tech Online Education Programs

First-year freshman WUE eligible students are eligible to receive Presidential Scholarships upon review of their application. Transfer WUE students are not eligible.

To maintain WUE eligibility, students must be seeking their first bachelor's degree, remain enrolled throughout Fall, Winter, and Spring terms of the academic year. Summer term is not required to keep eligibility. Students must also be enrolled in at least 12 credits per term and maintain satisfactory academic standing. If dually enrolled with Oregon Tech and a community college, 9 of the 12-credit minimum must be from Oregon Tech. GPA and completed credits are monitored each academic year.

If a student wishes to 'stop-out' a term, a written request must be submitted to the Office of the Registrar before the start of the term. Requests are granted at the discretion of the university.

# Financial Aid Programs and Application Process

College Union, 1st Floor  
Klamath Falls  
(541) 885-1280  
dollars@oit.edu  
www.oit.edu/faid

The Financial Aid Office is committed to providing high-quality service to all Oregon Tech students, and their families. Our office strives to provide information on a complex topic that enables students to make decisions regarding their educational funding.

The information contained in this catalog is general in nature and is not meant to serve as notification of students' rights and responsibilities as financial aid recipients. Oregon Tech's Financial Aid Award Guide serves that purpose. The *Award Guide* is available on our website at [www.oit.edu/faid](http://www.oit.edu/faid). Additional questions regarding the application process should be directed to the Financial Aid Office.

All students applying for federal financial aid must complete the *Free Application for Federal Student Aid* (FAFSA) available at [www.fafsa.gov](http://www.fafsa.gov). A federally approved needs-analysis methodology is applied consistently to information provided by all applicants. The philosophy behind financial aid is that parents and students have the primary financial responsibility for funding the student's education.

If there are unusual financial circumstances that are not accurately reflected on the FAFSA, the student should contact the Financial Aid Office. Under certain conditions, professional judgment may be used and aid eligibility recalculated. The Financial Aid Office will always take the student's best interest into consideration while, at the same time, upholding federal regulations.

## Veterans

Located in the Financial Aid Office in Klamath Falls, and the Student Services Office in Portland-Metro, the V.A. Certifying Officials process enrollment certifications through the Veterans Affairs Regional Processing Center for students receiving education benefits. Oregon Tech complies with the Veterans Access, Choice, and Accountability Act of 2014 ("Choice Act") requirements for covered individuals and PL 115-251, section 301. These benefits allows eligible out-of-state veterans to receive in-state tuition rates.

Any student receiving G.I. Bill education benefits while attending Oregon Tech is required to obtain transcripts from all previously attended schools and submit them to the school for review of prior credit. This includes, but is not limited to: Joint Services Transcripts (JST), ACE-approved credits, DANTES, CLEP, CCAS, Service Members Opportunity Credit, etc. Refer to the Military Credit section of our catalog for more details. Good standing is an additional V.A. requirement. Any student that falls below satisfactory progress for more than one term will lose all veteran benefits until academic standing is improved to good standing. Please see Academic Suspension Policy.

In compliance with the Veterans Benefits and Transition Act of 2018, section 3679 of title 38, Oregon Tech has the following policies in place to support "covered individuals" utilizing VA benefits.

Note: A "**Covered Individual**" is any individual who is entitled to educational assistance under Chapter 31, Vocational Rehabilitation and Employment (now referred to as Vocational Readiness and Employment) or chapter 33, Post-9/11 GI Bill Benefits.

Oregon Institute of Technology permits any covered individual to attend or participate in the course of education during the period beginning on the date on which the individual provides to the educational institution a certificate of eligibility for entitlement to educational assistance under Chapter 31 or 33 (a "certificate of eligibility" can also include a "Statement of Benefits" obtained from the Department of Veterans Affairs' (VA) website – eBenefits, or a VAF 28-1905 form for Chapter 31 authorization purposes) and ending on the earlier of the following dates:

1. The date on which VA payment is made to the institution.
2. 90 days after the date the institution certified tuition and fees following the receipt of the certificate of eligibility.

Oregon Institute of Technology ensures that the university will not impose any penalty, including the assessment of late fees, the denial of access to classes, libraries, or other institutional facilities, or the requirement that a covered individual borrow additional funds, on any covered individual because of the individual's inability to meet his or her financial obligations to the institution due to the delayed disbursement funding from VA under Chapter 31 or 33.

Veterans and dependents receiving education benefits, and military members who submit appropriate documentation have priority registration in order to achieve timely program completion. Veterans and military members who are not receiving education benefits must submit a copy of one of the following pieces of documentation to receive priority registration:

US Armed Forces Active Duty Orders

DD214 under honorable or general conditions

For additional resources and information, please email [veterans@oit.edu](mailto:veterans@oit.edu) or visit <https://www.oit.edu/college-costs/financial-aid/veterans>

## Application Procedures/Priority Deadlines

All students applying for federal and state aid must complete the *Free Application for Federal Student Aid* (FAFSA) and list Oregon Tech's school code (003211). We encourage you to file as soon after October 1st as possible to be considered for your maximum eligibility. Some funds are very limited and are expended early.

Once the FAFSA information is received and reviewed by the Financial Aid Office, new students will receive a letter instructing them on how to log into "Tech Web" and their "Web for Student" to view their award notification and the federally mandated shopping sheet online. Students may accept their aid online and request changes. Returning students will receive an email to their Oregon Tech email account when their award notification is ready to view online. *After accepting aid students must log back in to web for student and answer the Title IV authorization questions (24 hours later)*. The Financial Aid Award Guide is located on our website at [www.oit.edu/faith](http://www.oit.edu/faith). It is important that students read the guide and follow the instructions on the letter they are sent.

Any updates/changes to award notification letters will result in an email to the student's Oregon Tech email account. If additional information is requested, such as tax transcripts or worksheets, students should return the documents as soon as possible to receive a *Financial Aid notification letter*. The award notification letter will list all types of aid for which the student is eligible. The *Award Guide* is a detailed booklet explaining programs, disbursement procedures and student rights and responsibilities, as well as cost estimates and other miscellaneous information. It is the student's responsibility as a financial aid recipient to become familiar with the contents of the *Award Guide* and contact the Financial Aid Office if additional questions or concerns arise. Additionally, students should check their **Oregon Tech email accounts** for announcements and notifications from Financial Aid regularly.

The *FAFSA must be filed for each year* a student wishes to be considered for financial aid eligibility.

## Types of Aid

All federal and state programs are need-based with the exception of the Unsubsidized Stafford Loan and the Parent Loan for Undergraduate Students (PLUS). Students receiving federal aid are allowed to receive at maximum, the cost of attendance as determined by the Financial Aid Office through all aid programs, including outside benefits such as third-party payments. Individual financial-aid packages will vary based on determined cost of attendance, expected family contributions and outside resources.

### Federal Pell Grants

The estimated maximum annual Pell Grant for 2021-2022 is expected to be \$6,495. Students may receive Pell Grants for less than full-time, but the grant will be prorated accordingly. Pell Grant eligibility is limited to those students who have not yet obtained a bachelor's degree or reached the lifetime limit of 600%. All students will be considered for Pell Grant eligibility if they file a FAFSA. Awards are granted based on the federally calculated expected family contribution (EFC).

### Oregon Opportunity Grant

The annual Oregon Opportunity Grant award for 2020-2021 was \$3,600. This grant program provides funding to Oregon residents in undergraduate programs attending Oregon schools. The Oregon Opportunity Grant is awarded by the Office of Student Access and Completion. Students not enrolled full-time (at least 12 credits) may be eligible for a prorated part-time award if attending half-time. By filing a FAFSA, students are applying for this grant. Funds are available on a first come, first-served basis and are limited. A student can receive an Oregon Opportunity Grant for a maximum of 12 terms. More information is available at [www.oregonstudentaid.gov](http://www.oregonstudentaid.gov).

### Federal Supplemental Educational Opportunity Grants (SEOG)

SEOG funds are very limited at Oregon Tech, although priority for SEOG funds is given to zero EFC students. The typical award is \$500 for an academic year. Only students who have not yet completed a bachelor's degree and are eligible to receive a Pell Grant will be considered for this grant.

### Federal Work-Study Program

The Federal Work-Study Program allows students to earn money by working part-time on campus or at an off-campus community service site. Information regarding available jobs and application procedures are located in the Career Services Office and on the Oregon Tech website. Awards are usually \$2,000 per year, which can be earned at any time during the academic year provided the student is enrolled at least half-time. Awards can be increased, if needed, and if money is remaining.

## **Direct Lending**

Federal Stafford Loans (subsidized and unsubsidized) are available to most students through the federal government Direct Loan Program. Loan amounts vary based on student need and grade level in a declared major at Oregon Tech. A fee for guarantee and origination will be taken at the time of disbursement. Contact the Oregon Tech Financial Aid Office for current interest rates. The interest rates for 2020-2021 was 2.75%. The difference between a subsidized and an unsubsidized loan is that the federal government pays the interest on subsidized loans while the student is in school. Students who wish to borrow through the unsubsidized loan program should remember that interest is accruing on the loan. Interest payments can be made while in school and during the grace period, but are not required. Any interest that has accrued at the time of repayment will be capitalized. Students must complete entrance counseling and fill out a promissory note before funds will be disbursed. To complete these items go to [www.studentaid.gov](http://www.studentaid.gov).

## **Matthews Loan, YATES Loan, and Oregon Tech Long Term Loan**

The Matthews Loan, YATES Loan, and Oregon Tech Long Term Loan are loans offered by Oregon Institute of Technology. These institutional loans offer no origination fee, and repayment begins six months (Matthews Loan, and YATES Loan), and nine months (Oregon Tech Long Term Loan) after students cease to be enrolled at least half-time. The interest rates for the Matthew Loan and Oregon Tech Long Term Loan is 5% and the interest rate for YATES Loan is 4%.

Students must complete a promissory note to receive the funds.

## **Federal Parent Loans for Undergraduate Students (PLUS)**

Parents of dependent students can apply for funds through Parent Loans for undergraduate students. These loans are available for up to the cost of attendance minus other financial aid and resources each year. Interest begins to accrue immediately. The interest rate for 2020-2021 was 5.30%. An origination and guarantee fee will be taken at the time of each disbursement. Loan repayment begins 60 days after the final disbursement of the academic year. If you're a parent PLUS borrower, you can defer repayment of Direct PLUS Loans while the student for whom you obtained the loan is enrolled at least half-time, and for an additional 6 months after the student graduates or drops below half-time enrollment (half-time enrollment status is determined by your child's school). You must separately request each deferment period. This can now be set up in the application process.

## **Presidential Scholarships**

First-time first-year applicants and transfers will receive consideration for Presidential Scholarships by applying and being accepted for admission by March 1<sup>st</sup> for the following fall term and meeting the minimum scholarship requirements. These scholarships are for full-time students, can be pro-rated if student is attending less than full-time, and may be renewed for up to four years. Award levels vary depending on each recipient's academic record. For more information, go to [www.oit.edu/scholarships](http://www.oit.edu/scholarships).

## **Engineering Honors Scholarship**

Students eligible for any of the four presidential scholarship awards and majoring in engineering are also eligible for the Engineering Honors Scholarship of \$1,000 a year, renewable for four years. Students must maintain a 3.0 GPA to keep their scholarship. The Engineering Honors Scholarship is automatically awarded to any applicant majoring in engineering who will attend Oregon Tech starting fall term after graduation from high school, and who is able to meet the Presidential Scholarship criteria. Students must apply for admission, meet all admission requirements, and be accepted for admission by March 1<sup>st</sup> for enrollment fall term. Recipients must be new, full-time undergraduate students at Oregon Tech.

## **Klamath County Scholarship**

The Klamath County Scholarship is automatically awarded to any applicant living in Klamath County who will attend Oregon Tech starting fall term after graduation from high school and who is able to meet the Presidential Scholarship criteria. Students must apply for admission, meet all admission requirements and be accepted for admission by March 1<sup>st</sup> for enrollment fall term. Recipients must be new full-time undergraduate students at Oregon Tech. This scholarship is valued at \$1,000 and is NOT renewable.

## **Oregon Tech Foundation Scholarships**

More than 200 new and returning students annually receive funding from scholarships administered by the Oregon Tech Foundation. Alumni, businesses, industry, and friends of Oregon Tech generously fund these awards. To receive consideration, students must be currently enrolled at Oregon Tech, or accepted for admission for the following fall term. Application forms and deadlines are available on the Oregon Tech Web site at [www.oit.edu/scholarships](http://www.oit.edu/scholarships). The online scholarship application process is seamless for students and automatically generates a list of scholarships the student is eligible to apply for. The winter application process opens in early December and has a deadline of March 1<sup>st</sup>. There is a smaller process in the summer. Please contact Financial Aid for more information.

## **Leadership and Diversity Scholarships (LAD)**

Oregon Tech awards Leadership and Diversity (LAD) Scholarships each year to students who meet the application criteria. Whether the applicant brings a diverse perspective to the Oregon Tech community and the applicant's history of involvement and leadership are two of the criteria

considered when awarding this scholarship. LAD scholarship recipients are expected to fulfill ten service hours each term, providing leadership and/or promoting diversity in some way at Oregon Tech or in the community.

Leadership and Diversity Scholarships are \$2,000 per year for Oregon residents or those attending under the Western Undergraduate Exchange, and \$3,000 per year for non-residents.

Applicants must be accepted for admission by the Oregon Tech priority deadline and apply through the Oregon Tech Foundation scholarship application by March 1<sup>st</sup>. For more information visit [www.oit.edu/scholarships](http://www.oit.edu/scholarships).

### **Owls Scholarship**

Any incoming first-year student who achieves eight (8) or more college credits in a science, technology, engineering or math course, with a grade of B or better, may apply for the Oregon Tech OWLS program. Applicants must have just finished high school and are applying for fall term admission; transfer students are NOT eligible. Scholarship award is \$1,500 when college credits have been completed at Oregon Tech, and \$1,000 if completed elsewhere.

Students must be fully admitted and complete the scholarship application by March 1<sup>st</sup>. For more information visit [www.oit.edu/scholarships](http://www.oit.edu/scholarships).

### **Estimated Financial-Aid Budgets for 2021-2022 Academic Year**

Financial aid budgets can include amounts for tuition and fees, books and supplies, room and board, technology, and miscellaneous expenses. Please remember that these are **estimated average costs for students**, and student spending habits will vary. On a very limited, case-by-case basis, the Financial Aid Office may be able to adjust a student's budget as permitted by federal regulations.

### **Students with Disabilities**

Under certain circumstances, a student's aid package may be adjusted to reflect additional expenses. Please contact the Financial Aid Office if you would like additional information or to schedule an appointment.

### **Consortium Agreement Information**

In some cases Oregon Tech's Financial Aid Office will process a paper consortium agreement with another school in order to allow a student taking courses at another institution to receive aid from one school for all eligible classes. The school must be one with which Oregon Tech does not have a dual enrollment agreement. The institution that will be awarding the degree and awarding financial aid is defined as the "home institution"; the "host institution" is defined as the institution from which the student is taking additional courses. Consortia must be submitted before the end of the second week of the term.

When Oregon Tech is serving as the "home institution," the following criteria must be met to have classes at a "host institution" apply toward financial aid:

1. The student must be fully admitted to one of Oregon Tech's degree-granting programs and eligible for financial aid.
2. The student must be enrolled at least half-time (6 credits) at Oregon Tech
3. The classes taken at the host institution must be 100-level or higher.
4. The classes at the host institution must apply toward the student's Oregon Tech degree.
5. The classes taken at the host institution must not be offered by Oregon Tech during the term of enrollment.
6. The paper consortium must be received within the first two weeks of the term.

It is the student's responsibility to ensure that both the "host" and the "home" institutions complete the appropriate consortium agreement.

Consortium-agreement forms are available at [www.oit.edu/college-costs/financial-aid/resources/forms](http://www.oit.edu/college-costs/financial-aid/resources/forms). Students must provide Oregon Tech's Financial Aid Office with a final grade report from the "host institution" within 30 days of completing the course.

### **Dual Enrolled Students**

Oregon Tech has formal dual enroll partnerships with multiple community colleges throughout the state. Please go online [www.oit.edu/prospective-students/academic-agreements/dual-enrollment](http://www.oit.edu/prospective-students/academic-agreements/dual-enrollment) to view them.

Students who are dually enrolled may be able to combine credits at both schools for full-time enrollment. If Oregon Tech is the home school (giving aid) **the student must be enrolled in six credits at Oregon Tech**. Enrollment and grade information will be transmitted electronically. Credits at the host school need to be applicable to the Oregon Tech degree.

### **Air Force ROTC**

Portland Metro partners with the University of Portland to offer Air Force Reserve Officer Training Corps (AFROTC) to educate and train young men and women to become Officers in the United States Air Force or Space Force. You can pursue the degree of your choice at Oregon Institute of

Technology – Portland Metro while simultaneously taking classes at the University of Portland to fulfill your AFROTC requirement. In this program, students will grow mentally and physically while acquiring the leadership skills to be successful commissioned officers. AFROTC is a three or four-year program for full-time undergraduate students where members participate in Aerospace Studies courses, leadership laboratory, and physical training. In the first two years of AFROTC, students are enrolled in the General Military Course; where they learn about the Air and Space Force heritage, values, and build a foundation of leadership and team building. The summer between sophomore and junior year, students will attend a two-week training and evaluation known as Field Training. Upon completion of Field Training, cadets enter the Professional Officer Course; where they enhance their leadership and communication skills in addition to learning about their role as a military officer in the Armed Forces. AFROTC offers a variety of scholarships that vary from high school and incollege programs. Visit <https://www.afrotc.com/scholarships> for more information on scholarships and a list of the Air Force's highly desired majors. For further information about the academic program and cadet life visit the University of Portland AFROTC site <https://www.up.edu/afrotc> or contact the Aerospace Studies Program, University of Portland, 5000 N. Willamette Blvd., Portland, Oregon 97203-5798. [rotc695@up.edu](mailto:rotc695@up.edu) and (503) 943-7216 or toll free (800) 227-4568, ext. 7216.

AS 101 - Heritage and Values (1) Fall

AS 102 - Heritage and Values (1) Spring

AS 111 - Leadership Laboratory (2) Fall

AS 112 - Leadership Laboratory (2) Spring

AS 201 - Team and Leadership Fundamentals (1) Fall

AS 202 - Team and Leadership Fundamentals (1) Spring

AS 211 - Leadership Laboratory (2) Fall

AS 212 - Leadership Laboratory (2) Spring

AS 215 - Leadership Laboratory (2) Fall

AS 216 - Leadership Laboratory (2) Spring

AS 301 - Leading People and Effective Communication (3) Fall

AS 302 - Leading People and Effective Communication (3) Spring

AS 311 - Leadership Laboratory (2) Fall

AS 312 - Leadership Laboratory (2) Spring

AS 401 - National Security/Leadership Responsibilities/Commissioning Preparation (3) Fall

AS 402 - National Security/Leadership Responsibilities/Commissioning Preparation (3) Spring

AS 411 - Leadership Laboratory (2) Fall

AS 412 - Leadership Laboratory (2) Spring

AS 415 - Leadership Laboratory (2) Fall

AS 416 - Leadership Laboratory (2) Spring

## Residency

In Oregon, as in all other states, tuition at publicly supported four-year universities is higher for non-resident students than for resident students.

The rules used in determining residency seek to ensure that only bona fide Oregon residents are assessed the resident fee. Please see [www.oit.edu/registrar](http://www.oit.edu/registrar) for the latest version of the residency policy.

## Reciprocity Agreements

Students from some Northern California counties may be eligible to attend Oregon Tech under reciprocity agreements with College of the Siskiyous, College of the Redwoods, and Shasta College. Reciprocity can allow selected students to attend Oregon Tech at in-state tuition rates. Each

participating college has certain restrictions, which may include the county of the student's residence, required enrollment for a period of time first at the community college, the student's major, and how many reciprocity permits the college issues. Please contact the California colleges for more information.

## **Tuition and Fees**

*Snell 116*

(541) 885-1202

Fees and deposits at Oregon Tech are charged according to a uniform plan, varying on the nature of coursework offered. Oregon Tech reserves the right to make changes in fee schedules without notice.

Below is a partial list of the estimated fees paid by students regularly enrolled for undergraduate and graduate study.

For a list of on-campus fees (Building Fee, Incidental Fee, Health Service Fee, Student Recreation Center Fee, and International Insurance) that are dependent on number of credits enrolled and are charged on a term-by-term basis, see the "Tuition and Fees by Program" PDF on the Oregon Tech website (<https://www.oit.edu/college-costs/tuition-fees>). Payment of full-time fees entitles students to use the library. Students may receive medical attention from the Student Health Center, use the fitness center (TechRec) and other student services. No reduction in fees is made for students who do not wish to access these services.

The estimated fee schedule for the 2020-21 academic years is provided for planning purposes only. Fees are subject to change. The current fee schedule is available from the Business Affairs Office or on the Oregon Tech website.

## **Special Fees**

All special fees are subject to change without notice.

### **Application Fee (Non-refundable) - \$50**

Must be paid at the time of application submission for admission to Oregon Tech.

### **Differential Tuition - Allied Health**

Tuition is assessed as the base tuition rate plus 30 percent for students enrolled in Allied Health programs.

### **Differential Tuition - Engineering and Technology**

Tuition is assessed as the base tuition rate plus 30 percent for students enrolled in Engineering and Technology programs

Interest - Annual rate of 12%

Periodic rate of interest is one percent per month, or fraction thereof, of the unpaid balance remaining on the account at the time statements are ran (around the middle of each month - see the Cashier's Calendar at <https://www.oit.edu/faculty-staff/ba/ar/cashiers-office> for exact statement dates).

### **Late Payment Fee - \$99**

Students paying fees after scheduled payment due dates for any term will be charged a late fee of \$99.

### **Late Registration Fee - \$20**

A fee of \$20 is charged to students registering for classes after the second week of each term.

### **Transcripts - \$12/copy**

Official transcripts are \$12 per copy and charged by Parchment.

### **PDF Transcript - \$16.75**

A fee of \$16.75 is charged by Parchment for each electronic PDF official transcript requested.

### **Malpractice Fee - \$6**

A malpractice fee of \$6 is charged to all on-campus students that are in majors in the following departments: Medical Lab Sciences, Emergency Medical Services, Respiratory Care, Dental Hygiene, and Medical Imaging Technology. This fee covers malpractice insurance.



## **Matriculation Fee (Non-refundable) - Undergraduate \$315; Graduate \$165**

A one-time fee assessed to all new on campus Oregon Tech students. The Matriculation Fee covers orientation, testing, first-year experience and peer consulting for all students.

## **Matriculation Distance Education Fee (Non-refundable) - \$50**

A one-time fee assessed to all new Oregon Tech Distance Education students.

## **Online Tech Fee - \$65**

Fee of \$65 charged per distance education or hybrid course. This fee covers the cost of technology to deliver a course online or partly online.

## **Parking Fees**

All student, staff and faculty vehicles for the Klamath Falls campus must be registered with Parking Services and operated in compliance with *Regulations Governing Traffic Control*. At the time of vehicle registration, a parking fee will be assessed in accordance with a schedule approved by the President of the University and approved by the Oregon Tech Board of Trustees. Parking permits may be purchased online via TECHweb. Vehicles must be registered by the first day of classes. Parking Fees for 2021-22 are:

<b>Students</b>	<b>Faculty/Staff</b>	<b>Permits - Additional Vehicles</b>
\$109/year	\$172/year	\$10 fee for additional vehicles for one-term and full year permits
\$54.50/term	\$86/term	(This fee allows up to four vehicles per permit. Only one vehicle is allowed on campus at a time.)

## **Petition to Graduate Fee - \$56**

A fee of \$56 is charged on the Oregon Tech student account after the student has submitted the Petition to Graduate form. Please contact the Registrar's Office with questions regarding this fee.

## **Returned Check or Electronic Payment Fee - \$25**

If payments to a student account are made by check or electronic payment and are returned because of any irregularity, the student becomes responsible for a \$25 Returned Check or Electronic Payment Fee that will be charged on their student account. A Late Payment Fee will also be added to the student account for unpaid balances resulting from a returned check or electronic payment.

## **Room and Board Costs**

The 2021-22 estimated annual room-and-board costs range from \$9,231 to \$10,530 depending on room type and meal plan purchased. Room-and-board charges are assessed by term. Fees are due in accordance with the same fee payment schedule as exists for tuition. Payments are due at the end of the second week of the term (unless a payment plan has been arranged with the Cashier's Office – please see detail and due dates on the Oregon Tech Cashier's webpage).

## **Senior Citizen Instruction Fee**

Senior citizens are persons age 65 or older. Such persons are authorized to attend classes on a space available basis. Charges for special materials (any extra class fees), if any, do apply. The senior-citizen privilege is extended to persons auditing classes only (not seeking credit or working toward a degree).

Per-credit hour: There is no charge for tuition and on-campus fees (Incidental, Health Service, Building, and Student Recreational Center Fees), therefore incidental fee privileges are not provided.

## **Service Charge - Payment Plan - \$10**

A \$10 service charge per term is assessed on accounts using the payment plan. See the Student Financial Responsibility Agreement (found on the Cashier's webpage <https://www.oit.edu/faculty-staff/ba/ar/cashiers-office>) for more details on payment plan requirements.

## **Special Course Fees, per course**

Special Course Fees, fees in addition to regular tuition, are assigned for some courses. These fees are noted in the *Schedule of Classes* for each term. These fees cover required consumable materials for the course that the institution purchases for students for more competitive pricing or because of better availability to the institution than to individuals.

## Special Examination Fee, per credit - \$50

Examination for credit.

## Tuition and Fee Refunds

Students who withdraw from the university and who have complied with the regulations governing academic withdrawals may be entitled to certain refunds of tuition and fees assessed, depending on the time of withdrawal. The refund schedule has been established by the Oregon Tech Board of Trustees and is on file in the Business Office. Included with the refund schedule is the mandated order in which financial aid must be returned to the appropriate programs for students receiving financial aid. All refunds are subject to the following regulations:

- Tuition and Fee Refund Appeal forms must be submitted to the Business Affairs Office no later than 90 days after the last day of the term in which the course(s) was dropped.
- An official notice of withdrawal must be completed and necessary clearance signatures filed with the Registrar's Office.

Refunds in all cases are calculated from the date of receipt of the application for refund or date of withdrawal, and not from the date when the student ceased attending classes, except in unusual cases when formal withdrawal has been delayed through cause beyond the student's control.

## Library Fines and Charges

The following regulations govern library fines and charges:

1. **Books**—A fine of 25 cents per day is charged for each item overdue other than reserve books. No charges are made for the first three days late, but a charge of \$1 is assessed on the fourth day, plus 25 cents per day thereafter (maximum, \$10 each item). Separate charges apply to books borrowed from other libraries.
2. **Billing**—Borrowers failing to return materials within 40 days of the due date will be charged the replacement cost of the items plus the amount of fine (maximum fine-\$10 each item) incurred up to the time the item is reported missing. In addition, the borrower will be assessed a service charge of \$10.
3. **Refunds**—When a lost item for which the borrower has been billed is returned before replacement has been ordered, a refund not exceeding the replacement cost may be made at the discretion of the librarian. In cases where replacement has been ordered, no refunds to the borrower will be made.
4. For Alliance and ILL items, fines accrue until the item is returned, with no set maximum. Replacement charges for Alliance items are \$75, plus a \$20.00 processing charge, plus a \$15.00 billing charge for a total of \$110.00 for each Alliance item not returned. Replacement charges for ILL items are established by the lending library, and will include a \$20.00 processing charge, plus \$15.00 billing charge, for each ILL item not returned.

## 38 U.S.C. 3679(c). Veterans Access, Choice, and Accountability Act of 2014

A student is entitled to pay tuition and fees at Oregon Institute of Technology at the rates provided for Oregon residents without regard to the length of time the person has resided in this state if the student resides in this state while enrolled in the institution and the student:

1. Is receiving Chapter 30: Montgomery OR Chapter 33: Post-9/11 GI Bill® educational assistance; and
  - Enrolls within 3 years of discharge after serving 90 days or more on active duty; or
  - Anyone using transferred entitlement within 3 years of the transferor's discharge after serving 90 days or more on active duty; or
  - Surviving Spouses or Children under the Fry Scholarship who enroll within 3 years of an active duty Service member's death in the line of duty after serving 90 days or more; or
2. Students who remain continuously enrolled after initially meeting the requirements and are using Montgomery and Post-9/11 GI Bill® educational assistance.

*GI Bill® is a registered trademark of the United States Department of Veterans Affairs (VA).*

# Academic Policies and Procedures

## Procedures, Policies and Regulations

### Student Rights and Responsibilities

Students are responsible for knowing and understanding Oregon Institute of Technology's requirements relating to registration, academic standards, student activities and student organizations as well as adhering to the Student Code of Conduct found on the website. Students are encouraged to meet regularly with their departmental advisors and to contact the Registrar's Office with questions about academic procedures, policies or regulations. More information can be found [here](#).

### Academic Advising

Students are assigned faculty advisors from their academic programs. Advisors maintain a file on students' progress and help them plan course loads. If a student should change programs, a new advisor will be assigned. Degree-seeking students are generally required to meet with their advisors prior to registration.

### Student Classification

Students are classified according to the number of college-credit hours earned as follows: 0-44, freshman; 45-89, sophomore; 90-134 junior; 135 and above, senior. Transfer credits are included in determining classification.

### Quarter System

Oregon Institute of Technology operates on an academic year consisting of three quarters (or terms) of approximately 11 weeks each (10 weeks of classes and 1 week of final examinations) and a summer session of eight weeks.

### Policies

- Credit for Prior Learning
- Dead Week
- Final Examinations
- Graduation
- Academic Forgiveness
- Academic Grievance
- Academic Integrity

### Academic Progress and Petitions Committee

Administration of the regulations governing academic performance is vested in the Academic Progress and Petitions (AP&P) Committee. This committee also has authority to assess probation or to suspend any student from the university when it appears that the student's work is at such a level that the student cannot benefit by continued attendance. The university requires that students make substantial progress toward meeting graduation requirements, including maintaining a minimum 2.0 GPA. Any cumulative GPA below 2.0 is considered unsatisfactory and will bring the student's record under review. Courses transferred in from other institutions are not included in institutional cumulative GPA.

The AP&P Committee also serves as an advisory group to the Registrar's Office regarding academic appeals. For information regarding appeals to this committee, students may contact the Registrar's Office.

### Admissions with Special Conditions

If a student is admitted with one or more stipulations and fails to meet any of the prescribed condition(s), that student may be referred to the AP&P Committee for possible academic disciplinary action, up to and including probation and suspension from the university. The request for review by AP&P can be made by any member of the Admission Committee.

### Academic Warning

An academic warning is a caution to the student that there is a lack of satisfactory academic progress. Students, including first term freshmen, who do not achieve a 2.0 in any given term will receive an Academic Warning. Students who have no earned credits, withdrawals (i.e., all Fs, withdrawals (W) and/or incompletes (I)), for two consecutive terms will also receive an Academic Warning.

## Academic Probation

Students who have attempted two or more terms at Oregon Tech and have an Oregon Tech cumulative GPA below 2.0 will be placed on Academic Probation. Students who have no earned credits, (i.e. all Fs, withdrawals (W) and/or incompletes (I)), for three or more consecutive terms will also be placed on Academic Probation. Students placed on probation will receive notification that they are on Academic Probation as well as instructions on how to proceed. Once placed on probation, students are advised to limit their course load to 13 credits. Courses transferred in from other institutions are not included in institutional cumulative GPA.

## Academic Suspension

Students on academic probation for one term who do not meet the 2.0 cumulative GPA requirement in the successive term of enrollment will be placed on Academic Suspension for at least one term. To re-enroll, a student must complete the prescribed procedures and appeal to the Academic Progress and Petitions Committee for reinstatement. Students should contact the Registrar's Office for re-enrollment information. Students who have been suspended are denied all privileges of the institution.

Veteran students receiving benefits will lose all benefits until academic standing is improved to good standing.

*NOTE: When a student is placed on academic warning, probation or suspension both the student and their advisor will be notified.*

## Academic Forgiveness

The Academic Forgiveness policy allows undergraduates with an unsatisfactory GPA to drop a maximum of three consecutive terms of work from consideration in their GPA. Academic forgiveness applies to terms only. Students are not allowed to select courses within terms for forgiveness.

Academic forgiveness is granted on a case-by-case basis by the Academic Progress and Petitions Committee. It is an extreme measure; it may be granted only once and only when a student provides clear and convincing evidence of a renewed commitment to advancing his or her education. Once forgiveness is granted, it may not be revoked. Forgiveness can be applied only to credits earned at Oregon Tech.

If the petition is approved, the student's transcript will have a notation stating, "Academic Forgiveness Granted" above each term in which forgiveness was granted. Forgiven courses and grades are no longer calculated in the GPA and do not apply toward graduation. However, a record of all coursework will remain on the transcript.

### Eligibility

To apply for consideration for academic forgiveness a student must:

1. Have earned less than a 1.0 term GPA for the term(s) being considered for forgiveness. The term(s) for which forgiveness is being requested must have been taken at least seven years prior to the request
2. Have had at least a two-year lapse in enrollment at Oregon Tech
3. Be currently enrolled at Oregon Tech
4. Have completed a minimum of 30 graded credits at Oregon Tech with minimum cumulative GPA of 3.0 or better since resuming studies at Oregon Tech
5. Apply for forgiveness with the Academic Progress and Petitions Committee before degree completion

### Procedure

To apply for academic forgiveness, a student must submit a formal letter of request to the University Registrar, which must include:

1. Specific term(s) (maximum of three consecutive) for which forgiveness is being requested
2. Statement of academic goals and a term-by-term plan for degree completion signed by the student's academic advisor
3. Rationale for the request

The University Registrar will forward the application to the Academic Progress and Petitions Committee for review and will notify the student of the Committee's decision.

## Student Academic Grievance

### Academic Disputes Covered by Policy

1. Student claims that final course grade resulted from unfair or prejudicial treatment by instructor or unusual or irregular procedures that impacted an individual student's grade in a disproportionate manner.
2. Student is dismissed from a professional program because of failure to meet prerequisite or sequential course requirements.
3. Student is dismissed from a professional externship component because of failure to meet standards of conduct or performance as required by the professional program and/or the externship site, as published in the Student Handbook for that program.

### Academic and Related Disputes Not Covered by Policy

1. Grades assigned to tests, quizzes, homework, papers, projects, or other components of a course.
2. Final grades based on failure to meet published (via syllabus) standards for the course, in which no unusual or prejudicial treatment is claimed.
3. Disciplinary or other student conduct matters not specifically covered above.
4. Challenges to the instructor's grading system or components thereof, as long as the system was made available to students at the beginning of the academic term.

### Procedure

1. Student reads policy to determine if the grievance can be appealed.
2. Student makes appointment to dispute with course instructor. Since reconciliation of the dispute at this level is in the best interests of all parties, instructors and students are urged to engage in an honest and open-minded effort to resolve the problem.
3. Failing to resolve the dispute with the instructor, the student makes an appointment with either the program director (if one exists) or department chair, as appropriate.
  - a. The student and the instructor document the dispute in writing.
  - b. The department chair should confer with the instructor, either before (preferred) or after consultation with the student.
  - c. The department chair refers the matter back to the instructor for resolution or decides the dispute based on information that is available.
4. If disagreement with the department chair decision results, the student may request an appointment with the dean of the appropriate school (HAS or ETM). The student should indicate that the appointment concerns a grade dispute and the department, course, and instructor involved.
  - a. Students will not be seen by the dean unless the preceding steps have been followed. An exception to this is when the course instructor is the department chair. Then, the second level of appeal is the dean.
  - b. The dean contacts the department chair and, when appropriate, the course instructor to obtain information on the dispute.
  - c. After consultation with the department and the student, the dean offers the student the choice of a summary decision by the dean or the opportunity for a hearing by the Student Conduct Review Commission.

## **Summer Term**

Anyone may enroll in summer term. Formal admission to the university is not necessary and there are no GPA or high school diploma requirements. High school students who want to take college courses are invited to attend. Potential students who have not met the college entrance requirements may take appropriate courses during the summer to correct these deficiencies. Students may register from early May through the first day of summer school. Tuition is on a per-credit basis.

The eight-week term begins in mid-June and ends in mid-August. Four-week sessions begin in mid-June and mid-July. Classes meet Monday through Thursday and are scheduled either during day or evening hours. Many summer classes are offered online via Oregon Tech Online.

A separate summer term class schedule is available on the web in April. This schedule provides a listing of courses, fees, registration and housing information.

# Advanced Standing

## Credit for Prior Learning

Credit for prior learning by a student admitted to Oregon Tech may be granted through a number of independent processes. These include:

- A. Transfer Credit
- B. Military Credit
- C. College Level Examination Programs (CLEP) and Advanced Placement credit (AP)
- D. Credit for National Registry or Licensure Exams
- E. Credit by Examination and
- F. Credit for Prior Experiential Learning

A number of these categories are for credit that is awarded for educational accomplishments attained outside of accredited post-secondary institutions.

These procedures describe the process used to grant the student appropriate academic credit by each of these methods as follows:

### A. Transfer Credit

Oregon Tech makes every effort to give maximum consideration to the transfer work presented by enrolling students. To ensure that the student has the requisite knowledge, Oregon Tech follows these policies in determining credit:

#### Accreditation Status of Institution

The institution where the transfer credit was earned must be accredited by a regional accrediting body recognized by the Council for Higher Education (CHEA).

Students transferring work from an institution that is not regionally accredited by a CHEA-recognized accrediting body may receive transfer credit by:

1. demonstrating prior experiential learning with a portfolio
2. applying for credit after demonstrating competencies in advanced coursework in the same subject area or
3. challenging courses by exam

#### International Institutions

Students seeking transfer credit from international institutions must provide Oregon Tech with a credential evaluation from an Oregon Tech-approved credential evaluation service. Credential evaluation information may be obtained from the Office of Admissions. The credential evaluation must include course titles, credits and grades. Students must also provide course descriptions in English from the international institution. Any associated costs are the responsibility of the student.

#### Official Transcripts

Prior to the formal awarding of transfer credit, the transfer student must provide an official transcript of coursework completed at all other higher education institutions. Failure to list all colleges attended on the Application for Admission may result in denial of admission or transfer credit.

Admitted transfer students must submit official transcripts at least one term prior to enrollment to ensure timely evaluation of transfer credits.

Any student receiving GI Bill® education benefits while attending Oregon Tech is required to obtain transcripts from all previously attended schools and submit them to the school for review of prior credit.

GI Bill® is a registered trademark of the United States Department of Veterans Affairs (VA).

#### Determination of Transfer Credit

The Oregon Tech Registrar's Office determines the transfer equivalency of general education courses using articulation agreements, course descriptions, course outlines, and course syllabi. The student's major department determines the transfer equivalency for technical or major courses using similar resources.

#### Articulation Agreements

Oregon Institute of Technology is dedicated to enhancing partnerships with regional community colleges. One important way of doing this is by forming articulation agreements. An articulation agreement is an officially approved agreement that matches coursework between schools. These agreements are designed to help students make a seamless transition when transferring to Oregon Tech. Articulation agreements give students a clear

understanding of what courses will transfer to Oregon Tech and satisfy requirements for their major with the least overlap or repeat of courses. Some agreements accept an associate degree in its entirety while other agreements outline specific courses to take as a student plans for transfer. Students should inform the Admissions Office, their academic department advisor, and Registrar's Office when they are utilizing an articulation agreement.

A list of articulation agreements can be found online at [www.oit.edu/articulations](http://www.oit.edu/articulations); students may search by Oregon Tech major or by transfer institution. Questions regarding these agreements may be directed to the students' academic department or the Office of Academic Agreements.

### **Applicability of Transfer Credit**

Oregon Tech provides a report upon the admission of the student, prior to the planned term of enrollment. The evaluation delineates the transfer credit on a course-by-course basis and specifies direct course equivalencies, courses which may be used towards general-education requirements, elective credits and courses which do not receive credit.

At the time of admission, Oregon Tech's report may include elective credits that do not apply towards a specific degree. These credits will be recorded as transfer credit for registration purposes, allowing the student an earlier registration appointment based on total earned credit hours.

Some transfer work, which may not be directly equivalent to Oregon Tech courses, may be appropriately substituted to meet Oregon Tech requirements. Students may seek course substitution approval by completing the Course Substitution form and obtaining the signature of the advisor, department chair and University Registrar.

### **Credit for Alternative-Delivery Courses**

Courses taken by alternative delivery from other accredited institutions will be evaluated as transfer credit.

### **Minimum Grade Standards**

Oregon Tech considers for transfer those courses that carry a grade of D or better from an accredited institution. However, many Oregon Tech departments require C or better course grades for prerequisite and graduation purposes.

### **Pre-College Level Transfer Credit**

Oregon Tech students who plan to enroll at other institutions during the summer or to complete coursework for the degree in absentia are encouraged to obtain written pre-approval of transfer credit to ensure transfer equivalency for degree purposes.

### **Pre-Approval of Transfer Credit**

Oregon Tech students who plan to enroll at other institutions during the summer or to complete coursework for the degree in absentia are encouraged to obtain written pre-approval of transfer credit to ensure transfer equivalency for degree purposes.

## **B. Military Credit**

Oregon Tech will grant credit for military courses and experiences based on American Council of Education (ACE) guidelines (found in the Guide to the Evaluation of Educational Experience in the Armed Forces) and faculty recommendations. Credit is awarded in accordance with transfer credit policies at Oregon Tech. Students may request evaluation of military credit by furnishing an official AARTS or SMART transcript.

## **C. College-Level Examination Programs and Advanced Placement: College Level Examination Program (CLEP)**

Oregon Tech will award credit for several college-level examination programs. These examinations must be completed with a satisfactory score and an original copy of test results must be forwarded to the Registrar's Office from the testing service. In order to receive such credit, the student must be admitted to an Oregon Tech degree program and registered for classes during the term in which the request is made. Oregon Tech awards credit for College-Level Examination Program (CLEP) subject examinations, but not for CLEP general examinations. Information on CLEP course equivalencies and minimum scores may be obtained from the Oregon Tech Registrar's Office.

### **Advanced Placement (AP)**

Students who complete college-level work in high school under the Advanced Placement (AP) program must achieve a minimum score of three to be granted credit on their Oregon Tech transcript. AP course equivalencies may be obtained from the Office of Admissions or Registrar's Office.

A maximum of 25 percent of the credits used toward the degree may be CLEP and AP.

### **International Baccalaureate**

Oregon Tech evaluates IB test scores much in the same way it evaluates AP scores. Students must have official test scores sent to the Office of

Admissions. Oregon Tech may award credit to students who receive a 5 or higher on any Higher Level IB examination. For more information, please contact the Registrar's Office at (541) 885-1300.

## **D. Credit for National Registry or Licensure Exams**

Oregon Tech will award a pre-approved block of credit to fully admitted and enrolled students who have passed a national registry or licensure exam in majors offered by the institution. This award of credit is based on the academic department's annual review of the national exam questions in comparison to the curriculum taught on campus. Full information is maintained in the Registrar's Office and via Oregon Tech Online, which coordinates online degree-completion programs offered by Oregon Tech.

## **Credit by Examination and Credit for Prior Experiential Learning**

Oregon Tech awards credit for educational accomplishments attained outside of accredited post-secondary institutions.

## **E. Credit by Examination**

Students currently enrolled at Oregon Tech may request credit for a course by special examination. This process is called a course challenge and the provisions are:

1. Credit by examination (course challenge) is available to students who are fully admitted in degree-granting programs
2. Students may not challenge a course which they have previously taken for credit and received a grade other than an audit, nor may they challenge the same course more than once. If students register for a course they wish to challenge, they must drop and challenge the course before the last day to drop without a "W"
3. No more than 25 percent of the credits submitted for graduation may be credit by examination
4. Examinations receive either a "P" (pass) or "F" (fail). A pass suggests the student has mastered the material comparable to a grade of "C" or better in the course being challenged. The University Registrar records "P" grades on the student transcript, but does not count the P in grade point average calculations. The University Registrar does not record "F" grades
5. Students must pay a non-refundable per-credit fee, as published by the Office of Business Affairs, prior to the examination
6. Departments are responsible for preparing an appropriate examination, evaluating the student's response and submitting results to the Registrar's Office. Departments reserve the right to declare any course offering as non-challengeable

Further procedures and general guidelines for course challenges may be obtained from the Registrar's Office.

## **F. Credit for Prior Experiential Learning**

Oregon Institute of Technology recognizes that students learn outside the classroom through experiences on the job, vocational education, professional development courses, workshops, and independent study. Oregon Tech may grant credit for experiential learning when it is judged that learning outcomes are equivalent to those of college-level courses in the Oregon Tech curriculum. This process is only appropriate for students who wish to demonstrate learning for more than one required course. Typically, credit for experiential learning will be a substitute for a series of major specific courses.

## **Level of Credit**

Oregon Tech grants credit for prior experiential learning at the undergraduate level only. Credit will be awarded only for documented prior learning that has a balance, appropriate to the subject, between theory and practical application, and not just for prior experience. Credit should be appropriate to the academic context in which it is accepted.

## **Eligibility Requirements**

The student must be fully admitted and enrolled at Oregon Tech. Credit will not be granted until the student has successfully completed the procedure outlined. Credit for prior experiential learning will not be granted if the student has already received credit for the same course. No more than 25 percent of the credits needed for a degree or certificate may be from credit for prior experiential learning. Credit may only be granted for courses offered by Oregon Tech and the university reserves the right to declare any course offering as inappropriate for prior experiential learning credit.

## **Awarding of Credit**

Completion of the institution's review process does not guarantee a student will receive credit for prior experiential learning. If the student successfully demonstrates evidence of college-level learning, credit will be identified on the student's transcript as credit for prior learning. This credit will not be graded or counted in the student's grade point average. Students wishing to appeal the award of credit should appeal to the Provost, whose decision is final.

## **Tuition and Fees**

Fees charged for portfolio assessment are based on the services performed. The application fee for a specified course is published by the Office of



Business Affairs. This non-refundable fee must be paid prior to submitting the portfolio for assessment. Proof of payment must accompany the student's Credit for Prior Experiential Learning Application.

## Transfer of Prior Experiential Learning Credit

Oregon Tech accepts credit for prior learning from other institutions, provided that the transfer institution awards such credit on the basis of standards similar to those outlined by the Northwest Association of Colleges and Universities (NWCCU).

## Faculty Evaluator Qualifications

Credit is awarded based on the recommendation of teaching faculty who are qualified in the subject area and who are on regular appointment with the university on a continuing basis.

## Procedure

Students seeking credit for prior experiential learning should first confer with their advisor to help assess if their experience and learning are appropriate for this process. If it is determined that experiential learning assessment is appropriate, the student should contact the University Registrar.

The University Registrar will determine whether the student has met the eligibility requirements outlined in this procedure. If so, the University Registrar and the Department Chair will sign the student's Credit for Prior Experiential Learning Application. The student must then complete a prior experiential learning documentation course. This course may be utilized for curricular requirements by the major department if appropriate.

Upon completion of the documentation course, the student will submit his/her Credit for Prior Experiential Learning Application and completed portfolio to the department chair. At the department chair's discretion a faculty member will review the portfolio and if necessary will interview the student. When appropriate, the faculty member may choose to consult with others who have expertise in the subject matter before making a decision as to whether or not to grant credit. The final decision is recorded on the student's Credit for Prior Experiential Learning Application and will be forwarded to the University Registrar. The Credit for Prior Experiential Learning Application will be included in the student's permanent academic record. The portfolio will be retained in accordance with Oregon Tech's archive guidelines.

## Grading System

Student academic achievement is evaluated and reported in accordance with a system of letter grades assigned at the end of each course. These grades become part of the student's transcript, a permanent academic record. A summary statement of a student's total academic record is expressed as a cumulative grade point average (GPA). The academic grievance procedure can be found [here](#).

## Grading Policy

Oregon Tech uses a 4.0 grading scale to evaluate student performance. Upon completion of a course or upon termination of attendance in the course, a student's performance will be graded by the instructor and reported to the University Registrar as follows:

Letter Grade	Meaning	Points Per Credit Hour	Used to Calculate GPA
A	Exceptional	4	Yes
B	Superior	3	Yes
C	Average	2	Yes
D	Inferior	1	Yes
F	Failed	0	Yes
I	Incomplete	0	No
IP	In Progress	0	No
N	Audit	0	No
NP	No Pass: Equated to a "D" or "F"	0	No
P	Pass: Equated to a "C" or better	0	No
W	Withdrawn	0	No
Z	No Grade Assigned	0	No

## Grade Point Average

A student's GPA is computed by assigning a numerical point value to each grade: "A," 4 points per credit; "B," 3 points per credit; "C," 2 points per credit; "D," 1 point per credit; "F," 0 points per credit. GPA at Oregon tech is truncated. GPA is the quotient obtained by dividing total grade points by total hours attempted. Grades of "I", "P", "NP", "W" and "N" are disregarded in calculating GPA; however, a "P" is equivalent to a "C" or better. For example:

Class #	Title	Credits	Grade	Point Value for Credits	Earned Grade
WRI 121	English Composition	3	B	3	9
ECO 201	Economics	3	C	2	6
MATH 111	College Algebra	4	A	4	16
CHE 101	Elementary Chemistry	3	B	3	9
CHE 104	Elementary Chemistry Lab	1	B	3	3
HED 250	Contemporary Health Issues	2	A	4	8
PHED 190	Racquetball	1	B	3	3
<b>Total</b>					<b>54</b>

GPA = Sum of earned grade points =  $\frac{54}{17}$  = 3.1764 or 3.17; credits attempted: 17

## Grade Change Policy

All grades except for 'I', 'IP' and 'Z' are considered final when filed by the instructor during grade processing each term. Thereafter, a grade change may be made only in the case of clerical, procedural or calculation error although a student's grade may be changed following a student's appeal through Academic Grievance Procedures.

No grade other than 'I' or 'IP', once reported, may be revised by re-testing, or by completing additional work. A student's grade cannot be changed by any person other than the instructor of record, Department Chair, College Dean or Provost. Any grade change by the instructor of record must take place within one year subsequent to the term in which the grade was reported. Any grade change that is to be filed later than one year must be approved by the appropriate College Dean and the University Registrar.

## Non-Standard Grading

Courses may be graded on the pass (P)/no pass (NP) basis at the discretion of the department and the University Registrar. Courses may include, but are not limited to seminars, externships, co-ops, independent study, certificate classes, and physical education.

## Class Drop/Withdrawal Policy

A student may drop/withdraw from a course through Friday of the seventh week of the term. Although teaching faculty may drop a student during the first two weeks of the term, according to the Faculty Initiated Withdrawal Policy, they are not required to do so. Students will be notified of instructor initiated drops in writing.

## Faculty-Initiated Withdrawal Policy

Teaching faculty can drop a student during the first two weeks of the term from a class if the student has not attended by the second regularly scheduled meeting of that class. The student will be notified of the withdrawal in writing by the Registrar's Office.

## Student Initiated Drops/Withdrawals

1. During the first 10 days of the term, a student may drop one or more courses with no record. However, if a student withdraws from all courses, the student's transcript will note "Complete Withdrawal"
2. After the first 10 days of the term, a student who withdraws from one or more courses will receive a "W" for those courses. Students may withdraw from individual courses through Friday of the seventh week of the term
3. After Friday of the seventh week, students will receive a letter grade ("A", "B", "C", "D", "F", "P", "NP", "I" or "IP") from the instructor
4. Complete withdrawals from the university may be processed through Friday of the week prior to final-exam week. Depending on the time of the term, a complete withdrawal will result in a notation of a "complete withdrawal" or "W's" on the student's transcript
5. Students requesting to withdraw from a course(s) after the published withdraw dates that have medical documentation supporting the withdraw should contact the **Dean of Student's Office**

*NOTE: The deadlines for dropping/withdrawing from a course are listed in the Academic Calendar.*

## Incompletes

When the quality of a student's work is satisfactory, but some essential requirement of the course has not been completed for reasons acceptable to the instructor, a grade of Incomplete (I) may be assigned and additional time granted for completion. The instructor is responsible for submitting an "I" grade and completing the Request for Incomplete form and submitting it to the Registrar's Office.

An "I" grade must be removed by the end of the next term (summer session not included). An "I" may only be extended under the most extenuating circumstances and then only for one additional term. If an "I" is not removed within the allotted time, the "I" then reverts to the alternate grade assigned by the instructor on the incomplete form.

Incompletes received in the anticipated term of graduation must be finished and the grades recorded in the Registrar's Office within three weeks after the end of the final term. Otherwise, the diploma will be delayed until the term during which all degree requirements are met.

## In Progress (IP) Grade

The "In Progress" grade is used for classes with coursework that continues past the end of the term in which the student is registered. Examples include externship, co-op, clinical and project classes. The "IP" grade may be retained over multiple terms. "IP" grades that are not changed during the allotted time revert to a grade of "F" for undergraduate and graduate courses.

"IP" grades given at the undergraduate level will be retained for a maximum of four terms. The "IP" grade for a specific graduate level course is maintained by the Registrar's Office for a maximum of five years. Each year the student should file a progress report with the Graduate Council signed by the student and the student advisor. After five years, the student can appeal to the Graduate Council to request a grade change beyond this five-year limit. The Graduate Council has the authority to approve or deny the student's petition.

## No Grade Assigned (Z) Grade

The "No Grade Assigned" grade is a grade assigned by the Registrar's Office when no grade is reported by the instructor. A "Z" grade should be changed by the instructor as soon as possible. If a "Z" is not removed by the completion of the following term, the "Z" reverts to a grade of "F".

## Repeat Policy

The following restrictions apply for course-repeat situations:

1. Students may attempt the same course (for a "W" or a letter grade) a total of four times
2. Each withdrawal ("W") is considered an attempt. Withdrawals, however, are not included in GPA calculations
3. The new grade earned will replace the previous grade(s) when computing GPA. Only the first two earned grades will be excluded for GPA calculations. The last grade earned will be used on the application for degree
4. All grades and credits remain on the student's official transcript

*NOTE: Students should consult with their financial aid counselor to determine financial eligibility for repeat courses.*

## Auditing Policy

A student has the option to enroll in a class for informational purposes only. This enrollment is classified as an audit and is regulated by the following procedures:

1. Audit classes are charged at regular tuition rates as printed in the class schedule
2. The only grade an audit class may be granted is "N" (audit). The "N" grade is disregarded in the GPA and is not valid toward graduation requirements
3. Class attendance shall be in accordance with the instructor's attendance policy for all students in the class
4. Instructors having audit students have no obligation to grade or record the audit student's work
5. An audit option may be requested during the registration period. Changes "to" or "from" the audit option may be requested no later than the 10th academic day of the term
6. Students auditing a course may, at a later term:
  - a. Register for the same course for credit
  - b. Challenge the course by examination

## Excessive Course Load

Admitted students are allowed to register for 21 credit hours (including audits) during an academic term without special permission. Fifteen credits are the maximum for summer session. Students wishing to register for an overload must have a 3.0 cumulative GPA and receive special approval from the advisor and the University Registrar. Appeals may be considered for special circumstances. The class schedule will provide associated tuition costs each term.

Non-admitted students are restricted to eight credits per term, with the exception of summer where 15 credit hours are the maximum.

### **Substitution Within the Curriculum**

Students desiring to depart from the curriculum prescribed in the catalog should contact their departmental advisor to begin the process. It is the responsibility of the student to file a petition with the Registrar's Office for such changes. Substitution forms must be approved and filed prior to or with the application for degree in order to assure acceptability toward meeting graduation requirements.

### **Dead Week Policy**

Dead Week (the period of Monday morning prior to finals week until the Monday morning of finals week) is the last week of regularly scheduled activities for the term. As such, Dead Week includes routine activities (e.g., lectures, discussions, laboratories, quizzes, assignments, appropriate course reviews, etc.).

1. Final examinations, when utilized, must be given at the scheduled time during finals week
2. No student activities or athletic events will be scheduled during Dead Week
3. Projects and/or examinations due Dead Week may not exceed 20 percent of the final course grade without giving students at least three weeks prior notice

The Provost and Vice-President for Academic Affairs must approve any exceptions to this policy.

### **Final Exams**

All teaching faculty will meet their classes during finals week at the final-examination time designated in the official class schedule issued at the beginning of each term.

1. No student activities or athletic events will be scheduled during finals week
2. Methods of evaluation are at the discretion of the instructor. The methods of evaluation of student achievement and grading standards should be specified in the course syllabus and distributed to students the first week of class
3. Faculty who use a final examination will administer that exam at the time designated in the official class final examination schedule. Finals times are designed not to conflict

Individual students may request exceptions to this policy. These must be approved in advance by the instructor.

Course instructors may request exceptions to this policy. The exception must be approved by the dean of the college and students should be given at least three weeks prior notice of the change.

# Graduation

## Application for Degree

Students must file an *Application for Degree* at least two terms prior to the term of graduation. These forms are available in TECHweb, at the Registrar's Office, in the Portland-Metro Programs offices and in academic departments. They are submitted to the Registrar's Office for evaluation.

Oregon Tech Portland-Metro students must schedule a graduation degree-check appointment with their major's program director at least two terms prior to graduation. The final graduation check is completed by the Registrar's Office at the Klamath Falls campus.

## Monitoring Degree Progress

DegreeWorks is a web-based degree audit and advising tool that is utilized by students and advisors. The software identifies courses students have completed and courses still needed to fulfill requirements. Students and Advisor access this tool through Web for Student or Web for Faculty. The Office of the Registrar works with faculty and department chairs annually to maintain an accurate degree audit that is used to clear graduation requirements.

## Sealing of a Degree

All grade changes, removals of incompletes, and transfer work necessary for completion of degree requirements must be on file in the Office of the Registrar by the Friday following the end of the term of graduation. Academic records are sealed ninety days after the conferral of a degree: no changes to the record will be made following that date.

## Grade Point Requirement

Oregon Tech requires a minimum cumulative GPA of 2.0 for graduation.

## Graduation Residency Requirements

All degrees require students to take a minimum number of Oregon Tech courses. For an associate degree, a minimum of 30 term-credit hours must be taken from Oregon Tech. For a bachelor's, a minimum of 45 term-credit hours must be taken from Oregon Tech. Credits earned through Oregon Tech course challenge or the Oregon Tech Credit-for-Prior-Learning program are considered resident credits toward graduation requirements. All other credits granted by examination (CLEP or AP) or other methods are non-resident credits. Students desiring to complete course requirements for graduation from Oregon Tech at another college or university must receive prior approval from the Registrar's Office.

## Catalog of Graduation

Students must meet all degree requirements from one Oregon Tech catalog. The catalog may be chosen from the year the student is first admitted and enrolled or from any subsequent year. However, at the time of graduation, all students, including transfer students, must use a catalog that is no more than seven years old.

Transfer students may select their catalog of graduation prior to full admission to Oregon Tech by obtaining written approval from their Oregon Tech major department and the University Registrar. The agreed upon catalog will be the one a student uses when he/she transfers to Oregon Tech. Students must enroll at Oregon Tech within two years of this approval.

Departments periodically review their curriculum for technical currency. As a result, significant program changes may occur. Courses previously required in the curriculum can no longer be offered. The major department will provide a transition plan for students to fulfill degree requirements.

Programs discontinued by the university may have specific entrance and graduation limits that override the catalog of graduation.

## Baccalaureate Upper-Division Credit Requirement

Baccalaureate students must complete a minimum of 60 credits of upper-division work before a degree will be awarded. Upper-division work is defined as 300- and 400-level classes at a bachelor's-degree-granting institution.

## Multiple Majors

An undergraduate student may earn multiple majors if all the degree requirements for each major are met. All successfully completed majors will be listed on both the transcript and diploma.

## Concurrent Degrees

Students may be granted a second bachelor's degree provided they meet the requirements for both degrees and complete an additional 36 credits beyond the requirements of the first degree. 45 credits are required if the first degree was not granted by Oregon Tech and students must meet the general-education requirements as outlined in their catalog of graduation. If the first bachelor's degree was granted by Oregon Tech, the general education requirements are waived for the second degree.

## Curricular Requirements

Curricular requirements are determined by, and vary with, the departments involved. Major requirements are published in this catalog.

## Minors

A minor consists of a minimum of 18 credits in a subject field outside the student's major. The total credits required for a minor depend on the academic discipline, the prerequisites of the required courses and the student's starting level in the discipline. Requirements for approved minors are listed by department in this catalog. Minors will only be granted at the time students receive their baccalaureate degrees. Application for a minor must be submitted to the University Registrar with the student's application for degree.

## Graduation in Absentia

Students wishing to complete the Oregon Tech degree by attending another college and transferring work after the minimum residency credits have been met (30 for associate and 45 for bachelor's degree) must complete an *Application for Degree* and have the final transferring classes approved for their degree by the transcript evaluator in the Oregon Tech Registrar's Office. This should be done prior to leaving Oregon Tech and beginning at the other college.

## Commencement

Oregon Tech's main graduation ceremony is held in Klamath Falls, Oregon in June each year. We encourage earlier graduates of the academic year (Summer, Fall, and Winter), and the graduating candidates for Spring and Summer to participate. Graduates from all Oregon Tech campuses are also invited to participate. Academic honors are calculated for the June ceremony and based on Winter term grades and honors are estimated. Summer graduates will not receive academic honors at the spring commencement.

## Diplomas

Diplomas are not issued at Commencement, regardless of graduation term. Students officially graduate when grades are finalized and it is verified that all degree requirements have been successfully completed. Please allow 4-6 weeks for the degree to be officially awarded to student records and mailed.

*NOTE: Diplomas are held if there is an outstanding balance on student accounts and/or if required loan Exit Interviews have not been completed.*

## Academic Honors

At each Commencement, Oregon Tech recognizes academically outstanding students who will receive their bachelor's degree with academic honors. This honor is based on all Oregon Tech courses. *To be eligible for honors a student must complete a minimum of 75 Oregon Tech GPA hours/credits.*

Academic honors are based on the following criteria:

### Cum Laude

Graduation with honors 3.50-3.74 GPA

### Magna Cum Laude

Graduation with high honors 3.75-3.89 GPA

### Summa Cum Laude

Graduation with highest honors 3.90-4.00 GPA.

*NOTE: Students who do not have 75 Oregon Tech credits and who are graduating from a Degree Completion program must complete a minimum of 45 graded Oregon Tech credits to be eligible for honors. For Degree Completion students, who fall into this category, honors are based on all Oregon Tech courses and transfer courses used for the degree.*

Honors recognized at the graduation ceremony do not include grades from the term immediately preceding Commencement. After final grades are posted, the honors standing of some students may change. These students will be notified. A student's final honors standing will be posted on the official transcript. Summer graduates will not receive academic honors at the spring commencement.

Only past and spring honors are recognized at commencement, both in the program and with honor cords. Summer graduates will have honors listed on their diploma and official transcripts upon completion.

## **Academic Term Honors**

*President's List* (Applicable to full-time undergraduate students only)

Each term, students with a GPA of 3.70 or better are included on the President's List.

*Dean's List* (Applicable to full-time undergraduate students only)

Each term, students with a GPA of 3.30-3.69 are included on the Dean's List.

## **Honors**

*Special Recognition*

Each spring a number of Oregon Tech graduates will be selected for membership in national honor societies. Honor society members can be identified by a distinctive honor cord worn over the shoulder at Commencement.

Alpha Chi, which selects members from baccalaureate programs, identifies its honor society graduates with a white cord. Tau Alpha Pi, which selects members from the sophomore, junior and senior classes of engineering-technology majors, identifies its graduates with a crimson cord. Lambda Phi Eta selects from juniors and seniors in Communication Studies. Members are identified by a gold cord. Lambda Nu selects from juniors and seniors in Medical Imaging. Members are identified by a cord that is green, gold and maroon. Sigma Theta Tau, who wear gold and maroon cords, includes Nursing students in the top third of the class.

# Baccalaureate General Education Requirements

## General Education Requirements

Oregon Tech's General Education requirements provide breadth and depth to the Oregon Tech educational experience. The requirements are designed to help students widen perspectives, explore relationships between subjects and develop critical and analytical thinking skills in areas integrated with a student's major. General education provides the core of an undergraduate university education. These courses help students make progress toward becoming educated persons and provide a foundation for lifelong learning.

Through general education at Oregon Tech, students study broad topics, principles, theories and disciplines. The courses are organized within the curriculum in such a manner that students will acquire knowledge, abilities and appreciation as integrated elements of the educational experience. In addition, general education courses teach students to communicate clearly, think critically and globally, define and solve problems within and across disciplines, calculate logically and apply scientific reasoning. No matter what their major, students will benefit from studying areas of knowledge that help them become competent, well-rounded professionals as well as well-educated human beings and citizens.

Oregon Tech's faculty review the general education curriculum regularly. Oregon Tech's goal for General Education is to help students become literate, informed, critical participants in a diverse and rapidly changing global society.

All students must complete the university general education requirements as listed in the curriculum map for the major and in this catalog. If a student holds a baccalaureate degree or higher from a recognized, accredited institution, as determined by Oregon Tech, the Oregon Tech general education requirements for the Oregon Tech baccalaureate may be substituted subject to departmental accreditation requirements.

Transfer students entering Oregon Tech who have earned either an Associate of Arts Oregon Transfer degree (AAOT) or an Associate of Science in Business degree (ASOTB) from an Oregon community college will be considered as having met Oregon Tech's lower division general education requirements. Please see the Oregon Tech website for updated list of courses granted.

*\* Developmental courses, including MATH 100 and WRI 115, cannot be used for graduation.*

## Communication

- SPE 111 - Public Speaking
- WRI 121 - English Composition
- WRI 122 - Argumentative Writing OR WRI 227 - Technical Report Writing
- Plus 6 credits from the following list:
  - COM 205 - Intercultural Comm
  - COM 225 - Interspers Communication
  - COM 320 - Advanced Intercultural Comm
  - COM 347 - Negotiation & Conflict Resol'n
  - COM 401 - Civil Engineering Project I
  - SPE 314 - Argumentation
  - SPE 321 - Small Group/Team Comm
  - WRI 123 - Research Writing
  - WRI 214 - Business Correspondence
  - WRI 227 - Technical Report Writing
  - WRI 327 - Advanced Tech Writing
  - WRI 328 - Style
  - WRI 345 - Science Writing
  - WRI 350 - Documentation Develop
  - WRI 410 - Proposal & Grant Writing

## Humanities

9 credits selected by student or specified by a major department from the following:

- ART - Art
- HUM - Humanities
- LIT - Literature
- MUS - Music
- PHIL - Philosophy
- Languages (second year)



Other transfer courses, defined as "humanities" by the Registrar's Office, may be used in this category. No more than three credits of activity or performance-based courses may be used in this category.

## Social Science

12 credits selected by student or specified by major department from the following:

- ANTH - Anthropology
- ECO - Economics
- GEOG - Geography
- HIST - History
- PSCI - Political Science
- PSY - Psychology
- SOC - Sociology

Other transfer courses, defined as "social science" by the Registrar's Office, may be used in this category.

\* ANTH 101 may not be used to satisfy both Social Science and Science credits

\* GEOG 105 may not be used to satisfy Social Science credits

## Technology

Specific requirements for demonstrating computer proficiency may be established by the academic department.

## Science/Mathematics

One, four credit college-level mathematics course for which at least intermediate algebra is the course prerequisite.

Plus 12 credits selected by student or specified by major department from:

- biological sciences (BIO, CHE, ENV 111)
- mathematics (MATH)
- statistics (STAT 412, STAT 413, STAT 415, or STAT 431)
- physical sciences (PHY)
- physical geography (GEOG 105) or geology (GEOL)
- physical anthropology (ANTH 101)

Other transfer courses, defined as "Science/Mathematics" by the Registrar's Office, may be used in this category. At least four credits must be completed from a laboratory-based science course in BIO, CHE, GEOG, GEOL or PHY.

## Baccalaureate Upper-Division Requirement

Baccalaureate students must complete a minimum of 60 credits of upper-division work before a degree will be awarded. Upper-division work is defined as 300- and 400-level classes at a bachelor's-degree-granting institution.

## Bachelor of Science Degree

The Bachelor of Science degree requires the student to opt between completion of 36 credits in mathematics and science or 45 credits in mathematics, science and social science. Students placed at a higher beginning level of mathematics than is published in the curriculum of their major may choose to substitute those mathematics credits surpassed by their accelerated level of placement with electives from any department to attain the required number of general education credits required by the university for graduation.

## Intercultural Studies

Students are encouraged to select at least one class from the following lists of intercultural courses. These courses also satisfy general education requirements:

- **Humanities:**
  - LIT 266 - Native American Lit & Film
  - LIT 235 - American Multicultural Lit
  - LIT 381 - Contemporary World Lit
  - HUM 147 - West Cult in the Classical Age
  - HUM 148 - West Cult in the Medieval Age
  - HUM 149 - West Cult in the Modern Age
- **Social Science:**
  - ANTH 103 - Intro to Cultural Anthropology
  - GEOG 106 - Cultural Geography I
  - GEOG 107 - Cultural Geography II
  - GEOG 108 - Cultural Geography III
  - HIST 392 - Modern Asia

# University Departments and Programs

## Oregon Institute of Technology

### Health, Arts and Sciences

#### Applied Mathematics Department

Tiernan Fogarty, *Department Chair*

*Professors:* J. Fischer, T. Fogarty, C. Negoita, R. Paul, T. Torres

*Associate Professors:* D. Deb, D. Hammond, J. Reid

*Assistant Professors:* K. Davis, P. Overholser, R. Overholser

#### General Education

Courses offered by the Department of Applied Mathematics are designed to satisfy the needs of majors and non-majors interested in mathematics primarily as part of a broad technical education. A major emphasis is on development of skills required to solve applied problems.

Success in mathematics requires that entering students begin their study in the course which best matches their ability and background. Accordingly, all entering students must pass a placement examination at the appropriate level before being allowed to register for their initial mathematics course.

#### Degrees Offered

- Bachelor of Science in Applied Mathematics
- Bachelor of Science in Data Science

#### Minors Offered

- Applied Mathematics
- Applied Statistics

### Applied Mathematics

#### Program Learning Outcomes

Graduates will be able to:

1. Apply mathematical concepts and principles to perform computations
2. Apply mathematics to solve problems
3. Create, use and analyze graphical representations of mathematical relationships
4. Communicate mathematical knowledge and understanding
5. Apply technology tools to solve problems
6. Perform abstract mathematical reasoning
7. Learn independently

#### Career Opportunities

Upon completing the requirements for the Applied Mathematics degree students will be prepared for a variety of jobs in industry including numerical modeling, signal processing, data analysis, and many others. The degree also provides students a solid foundation to further their education by entering a Masters or Ph.D. program in Mathematics or Applied Mathematics.

#### Student Preparation

Students entering the Applied Mathematics Program from high school should have a minimum of two years of algebra, one year of pre-calculus, one year of geometry, and two years of physical science (physics or chemistry preferred). Additional courses in mathematics, science, English and computer programming will be very helpful. Students entering the Applied Mathematics Program by transfer are requested to contact the Mathematics Department concerning transfer of technical course work.

## Data Science

Data scientists use computation and applied mathematics to extract insights from data. In addition to technical duties, they work as part of a team, must communicate effectively, and account for ethical and context-specific considerations. The B.S. in Data Science degree at Oregon Tech prepares students for these roles by combining coursework from five departments: Applied Mathematics (the program host), Computer Systems Engineering Technology, Communication, Management and Geomatics.

A key element of the program is extensive hands-on experience. In their junior year, students work in small teams to design or implement applications of material from previous classes. In their senior year, each student completes a capstone project to develop a data driven solution for an outside group, such as a local business or national organization.

The mathematical and programming skills gained in the program enable students to go beyond off-the-shelf solutions for machine learning and data processing. Students are introduced to advanced methods for large and/or complex data, such as time-series, geospatial or text. A special emphasis is placed on using transparent statistical methods, in which assumptions for mathematical models can be clearly communicated to and understood by a non-technical audience who are then better equipped to rate the value of conclusions drawn from such models.

After graduation, students are ready for immediate employment as data scientists or for advanced coursework.

### Program Learning Outcomes

Graduates will have the technical skills necessary to gain actionable insights from data, the ability to effectively communicate these insights as a member of an interdisciplinary team, and the necessary foundation in ethics, mathematics, and computer science to thrive in the evolving field of data science.

Graduates will:

1. Be prepared for the professional practice of data science or acceptance into a graduate program,
2. Have an appropriate foundation in mathematics, statistics, and computer science in order to thrive in an evolving field,
3. Be able to identify and incorporate ethical considerations in their work,
4. Be able to identify, collect and analyze the data necessary for actionable insights, and
5. Be able to effectively communicate findings.

### Career Opportunities

Data scientists work in a wide variety of contexts. For example, a data scientist might help design a survey to inform the marketing strategy for a new product, analyze data from electronic health records or gather large amounts of data from websites or government databases.

Graduates may obtain employment under a variety of job titles, which may include data scientist, data analyst, business intelligence analyst, research analyst, and statistician.

Many people currently working as data scientists hold advanced degrees but this trend may change as undergraduate programs begin to produce graduates with appropriate skill sets.

### Student Preparation and Admissions

Students must meet the standard Oregon Tech admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech and are requested to contact the Applied Mathematics Department concerning transfer of technical course work.

### Program Curriculum

Students looking to work within a specific context or apply for a specific graduate program should work closely with their advisor to choose a relevant application for their senior year project and to pursue an appropriate minor or other additional coursework.

## Applied Mathematics Minor

The minor in Applied Mathematics provides formal recognition of mathematical proficiency. It is composed of a core of required courses and upper-division electives related to the student's major. The minor consists of 29 credits, 19 from required courses and 10 from elective courses.

This minor is open to all majors and is especially recommended for students with an interest in pursuing a career related to mathematics. It will enhance their employability and improve graduate school possibilities.

## Curriculum

A passing grade in all courses and a cumulative GPA of 2.0 or better is required to be awarded the minor.

At least 12 credits must be taken at Oregon Tech.

### Required Courses:

MATH 251 - Differential Calculus Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
MATH 253 - Sequences and Series Credit Hours: 4  
MATH 254 - Vector Calculus I Credit Hours: 4  
MATH 341 - Linear Algebra I Credit Hours: 4  
Plus 10 additional upper-division mathematics credits selected from the list below.

### Upper-Division Electives:

Students are required to consult an advisor from the Mathematics Department to select upper-division mathematics courses that would be most applicable to their major and/or career goals.

MATH 311 - Introduction to Real Analysis Credit Hours: 4  
MATH 321 - Appl Diff Equation I Credit Hours: 4

MATH 322 - Appl Diff Equation II Credit Hours: 4  
MATH 327 - Discrete Mathematics Credit Hours: 4  
MATH 342 - Linear Algebra II Credit Hours: 4  
MATH 346 - Number Theory Credit Hours: 4  
MATH 347 - Fundmntls of Abstract Algebra Credit Hours: 4  
MATH 354 - Vector Calculus II Credit Hours: 4  
MATH 362 - Statistical Methods II Credit Hours: 4  
MATH 421 - Applied Partial Diff Equations Credit Hours: 4  
MATH 422 - Applied Partial Diff Equtns II Credit Hours: 4  
MATH 423 - Applied Partial Diff Equ III Credit Hours: 4  
MATH 451 - Numerical Methods I Credit Hours: 4  
MATH 452 - Numerical Methods II Credit Hours: 4  
MATH 453 - Numerical Methods III Credit Hours: 4  
MATH 465 - Mathematical Statistics Credit Hours: 4

**Note:** Not all courses are offered every term or every year

# Applied Mathematics, BS

## Degree Requirements

In addition to the mathematics requirements listed below, students will be required to complete the 200 level calculus-based general physics sequence as well as other general education requirements and Electives necessary to bring the total credit hours to 182. Please see the recommended curriculum map below. All mathematics courses must be completed with a grade "C" or better. Transfer students should consult the Admissions Office and the Mathematics Department to determine which of their courses will satisfy Oregon Tech course requirements.

### Lower-Division Required Courses (18 credits)

MATH 221 - Intro to Computational Software Credit Hours: 2

MATH 251 - Differential Calculus Credit Hours: 4

MATH 252 - Integral Calculus Credit Hours: 4

MATH 253 - Sequences and Series Credit Hours: 4

MATH 254 - Vector Calculus I Credit Hours: 4

### Upper-Division Core Requirements (44 credits)

MATH 310 - Mathematical Structures Credit Hours: 4

MATH 311 - Introduction to Real Analysis Credit Hours: 4

MATH 321 - Appl Diff Equation I Credit Hours: 4

MATH 322 - Appl Diff Equation II Credit Hours: 4

MATH 341 - Linear Algebra I Credit Hours: 4

MATH 354 - Vector Calculus II Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4

MATH 421 - Applied Partial Diff Equations Credit Hours: 4

MATH 451 - Numerical Methods I Credit Hours: 4

### Plus two additional courses chosen from:

MATH 422 - Applied Partial Diff Equtns II Credit Hours: 4

MATH 423 - Applied Partial Diff Equ III Credit Hours: 4

MATH 452 - Numerical Methods II Credit Hours: 4

MATH 453 - Numerical Methods III Credit Hours: 4

### Upper-Division Math/Physics Electives (At least 7 credits)

Students will choose 2 upper-level mathematics or physics courses with the approval of a mathematics advisor. No more than 3 credits can be MATH 407.

### Focused Electives (16 credits)

Students will choose appropriate electives from outside of mathematics. These courses should support the program objectives and must be approved by a mathematics advisor. The focused electives must total at least 16 credits at least 9 of which are from a 3 course sequence; see below for examples.

### Examples of Focused Electives Sequences

CST 116, CST 126, CST 223 Programming Languages

CHE 221, CHE 222, CHE 223 General Chemistry

ENGR 211, ENGR 212, ENGR 213 Engineering Mechanics: Statics, Dynamics, Strength of Materials

PHY 311, PHY 312, PHY 313 Introduction to Modern Physics

### Examples of Focused Electives

CHE 331, CHE 332, CHE 333 Organic Chemistry

ENGR 318 - Engineering Mech: Fluids

ENGR 236 - Fund of Elec Circuits

PSY 361 - Industrial Psychology

MIT 341 - Magnetic Resonance Imaging

### Notes:

1. Some of the above courses have an additional lab requirement.
2. PHY 221, PHY 222, PHY 223 may not be used as focused electives.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

MATH 251 - Differential Calculus Credit Hours: 4

SPE 111 - Public Speaking Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

CST 116 - C++ Programming I Credit Hours: 4

or

ENGR 266 - Engineering Computation Credit Hours: 3

or

ENGR 267 - Engineering Programming Credit Hours: 3

MATH 252 - Integral Calculus Credit Hours: 4

PHY 221 - General Physics w/Calculus Credit Hours: 4

Social Science Elective Credit Hours: 3

Total: 14-15 Credit Hours

### Spring

MATH 253 - Sequences and Series Credit Hours: 4

PHY 222 - General Physics w/Calculus Credit Hours: 4

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Sophomore Year Fall

MATH 254 - Vector Calculus I Credit Hours: 4

MATH 321 - Appl Diff Equation I Credit Hours: 4

PHY 223 - General Physics w/Calculus Credit Hours: 4

Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

MATH 341 - Linear Algebra I Credit Hours: 4

MATH 354 - Vector Calculus II Credit Hours: 4

Elective Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

MATH 361 - Statistical Methods I Credit Hours: 4

Elective Credit Hours: 3

Elective Credit Hours: 3

Elective Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Junior Year Fall

MATH 310 - Mathematical Structures Credit Hours: 4

SPE 321 - Small Group/Team Comm Credit Hours: 3

Focused Elective Credit Hours: 3 <sup>a</sup>

Elective Credit Hours: 4 (upper division)

**Total: 14 Credit Hours**

### Winter

MATH 311 - Introduction to Real Analysis Credit Hours: 4

WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

Focused Elective Credit Hours: 3 <sup>a</sup>

Elective Credit Hours: 3 (upper division)

Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Spring

MATH 322 - Appl Diff Equation II Credit Hours: 4

MATH 451 - Numerical Methods I Credit Hours: 4

Focused Elective Credit Hours: 3 <sup>a</sup>

Math/Physics Elective Credit Hours: 3 <sup>b</sup>

Elective Credit Hours: 2

**Total: 16 Credit Hours**

### Senior Year Fall

MATH 421 - Applied Partial Diff Equations Credit Hours: 4

Focused Elective Credit Hours: 4 <sup>a</sup>

Math/Physics Elective Credit Hours: 4 <sup>b</sup>

Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

Mathematics Core Credit Hours: 4 (upper-division) <sup>c</sup>

Focused Elective Credit Hours: 3 <sup>a</sup>

Social Science Elective Credit Hours: 3

Elective Credit Hours: 3

Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Spring

Mathematics Core Credit Hours: 4 (upper-division) <sup>c</sup>

WRI 327 - Advanced Tech Writing Credit Hours: 3

or

WRI 350 - Documentation Develop Credit Hours: 3

Elective Credit Hours: 3

Elective Credit Hours: 3

**Total: 13 Credit Hours**

## Total for a B.S. in Mathematics: 183-184 Credit Hours

<sup>a</sup> Students will choose at least 16 credits from outside of mathematics with the approval of a mathematics advisor. At least 9 credits should be from a 3 course sequence. See above for examples.

<sup>b</sup> Students will choose 2 upper-division courses from mathematics or physics with the approval of a mathematics advisor.

° See "Upper-Division Core Requirements" listed above in the degree requirements section. The years and terms that these courses are offered will vary. For questions about availability, please consult with an advisor or contact the Mathematics Department.

## Applied Statistics Minor

The Minor in Applied Statistics is open to students in all majors and is specifically recommended for those students who wish to pursue graduate school or work in research. Students pursuing the minor will have enhanced statistical skills and a deeper understanding of statistics than what is received in one or two introductory courses. A minimum of 18 credits is required to complete this minor, 8 credits from required courses and 10 credits from elective courses.

### Curriculum List

Students are advised to consult an advisor from the Mathematics Department of select upper-division mathematics courses that would be most applicable to their major and/or career goals.

1. A minimum of 18 credits (all earned with grade of "C" or above) is required to earn the minor.
2. Required courses: MATH 361 - Statistical Methods I and MATH 362 - Statistical Methods II. In addition, at least 10 more credits of upper-division courses are needed from the lists below. Note that at least 4 credits of those must come from MATH/STAT courses listed below.
3. At least 12 credits must be taken at OIT.

### Courses

Upper-Division MATH/STAT Electives (at least 4 credits)

MATH 465 - Mathematical Statistics Credit Hours: 4

STAT 413 - Categorical Data Analysis Credit Hours: 4

STAT 431 - Sampling Methods Credit Hours: 4

STAT 412 - Regression & Times Series Credit Hours: 4

STAT 415 - Dsgn & Analysis of Experiments Credit Hours: 4

STAT 414 - Stat Methods in Epidemiology Credit Hours: 4

### Additional Courses

(at most 6 credits)

ENV 434 - Advanced Data Analysis Credit Hours: 4

BUS 456 - Business Research Methods Credit Hours: 3

or

BUS 457 - Business Research Methods II Credit Hours: 3

COM 326 - Communication Research Credit Hours: 3

GME 444 - Adjustment by Least Squares Credit Hours: 4

MFG 333 - Stat Methods Qual/Improv Credit Hours: 3

MGT 461 - Lean/Six Sigma Management I Credit Hours: 3

or

MGT 462 - Lean/Six Sigma Management II Credit Hours: 3

or

MGT 463 - Lean/Six Sigma Management III Credit Hours: 3

PSY 313 - Psych Research Methods I Credit Hours: 4

or

PSY 314 - Psych Research Methods II Credit Hours: 4

### Note:

Not all courses are offered every term or every year.

# Data Science, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

STAT 201 - Intro to Data Science Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Winter

CST 116 - C++ Programming I Credit Hours: 4

GIS 134 - Geographic Info Systems Credit Hours: 3

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Spring

CST 126 - C++ Programming II Credit Hours: 4

MATH 251 - Differential Calculus Credit Hours: 4

SPE 111 - Public Speaking Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Sophomore Year Fall

CST 136 - OOP with C++ Credit Hours: 4

MATH 252 - Integral Calculus Credit Hours: 4

WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

Lab Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

MATH 254 - Vector Calculus I Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4

Lab Science Elective Credit Hours: 4

**Total: 12 Credit Hours**

### Spring

CST 211 - Data Structures Credit Hours: 4

SPE 321 - Small Group/Team Comm Credit Hours: 3

STAT 211 - Data Science Methods Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Junior Year Fall

CST 324 - Database Systems and Design Credit Hours: 4

MATH 341 - Linear Algebra I Credit Hours: 4

MATH 362 - Statistical Methods II Credit Hours: 4

STAT 395 - Junior Project I Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

GIS 316 - Geospatial Vector Analysis I Credit Hours: 4

MATH 451 - Numerical Methods I Credit Hours: 4

STAT 396 - Junior Project II Credit Hours: 4

STAT 441 - Statistical Machine Learning I Credit Hours: 4

**Total: 16 Credit Hours**

### Spring

MATH 342 - Linear Algebra II Credit Hours: 4

MIS 311 - Intro to Systems Analysis Credit Hours: 3

STAT 397 - Junior Project III Credit Hours: 1

STAT 412 - Regression & Times Series Credit Hours: 4

STAT 442 - Statistical Machine Learning II Credit Hours: 4

**Total: 16 Credit Hours**

### Senior Year Fall

GIS 306 - Geospatial Raster Analysis Credit Hours: 4

MATH 465 - Mathematical Statistics Credit Hours: 4

MIS 312 - Systems Analysis I Credit Hours: 4

STAT 495 - Senior Project I Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

GIS 332 - Customizing the GIS Environ I Credit Hours: 4

MATH 327 - Discrete Mathematics Credit Hours: 4

MIS 334 - Business Analytics Credit Hours: 4

PHIL 331 - Ethics in the Professions Credit Hours: 3

or

PHIL 342 - Business Ethics Credit Hours: 3

STAT 496 - Senior Project II Credit Hours: 2

**Total: 17 Credit Hours**

### Spring

CST 475 - Big-Data Analysis Credit Hours: 3

STAT 405 - Advanced Methods in Data Science Credit Hours: 4

STAT 467 - Spatial Statistics Credit Hours: 4

STAT 497 - Senior Project III Credit Hours: 2

WRI 327 - Advanced Tech Writing Credit Hours: 3

or

WRI 345 - Science Writing Credit Hours: 3

or

WRI 350 - Documentation Develop Credit Hours: 3

**Total: 16 Credit Hours**

**Total for a B.S. in Data Science 181 Credit Hours**



# Communication Department

Veronica Koehn, *Department Chair*

*Professors:* K. Brown, M. Schnackenberg

*Associate Professors:* A. Fultz, F. Howes, K. Lundgren, V. Koehn, M. Search, C. Syrnyk

*Assistant Professors:* M. Frye, A. Lancaster

*Instructor:* A. McCracken

## Degrees Offered

- Bachelor of Science in Communication Studies
- Bachelor of Science in Professional Writing

## Minors Offered

- Human Interaction
- Professional Writing and Technical Communication

## Certificate Offered

- Dispute Resolution

## Communication Studies

The Bachelor of Science in Communication Studies allows students flexibility in designing a program that fits their life and career goals. Students choose core courses and elective from areas such as technical, organizational, and interpersonal communication. In addition, students build a career foundation by completing a *focused sequence of electives*.

## Program Learning Outcomes

Upon graduating, Communication Studies graduates should be able to:

1. Demonstrate critical and innovative thinking.
2. Display competence in oral, written, and visual communication.
3. Apply communication theories.
4. Understand opportunities in the field of communication.
5. Use current technology related to the communication field.
6. Respond effectively to cultural communication differences.
7. Communicate ethically.
8. Demonstrate positive group communication exchanges.

## Career Opportunities

The Communications Studies program prepares students for careers in areas such as organizational communication, new communication technologies, education, human resources, law, speech language pathology, public relations, sales, and dispute resolution; it also prepares students for graduate-level study.

## Professional Writing

The Professional Writing (PWR) professions serve content areas and technical fields. Housed in the Department of Communication, the PWR B.S. degree program includes core courses in theory and practice of writing and style, in addition to electives in digital text creation, interactive media, management, mathematics, communication, and health sciences. Students choose one of three emphases: Scientific and Technical Writing, Digital Media, or Writing in Organizations.

The PWR program begins with a foundation of writing and style, along with communication theories and application. Graduates will gain competence in the domains of visual and text creation, audience analysis, rhetorical theory, research methods, statistics, and group and team communication. The applied content includes large project creation and management, portfolio work, digital media production, and broad applications of communication skills. The program is designed to integrate written skills with technical knowledge, and courses in technical specialties are required. This program is interdisciplinary and expects students to create a curriculum that matches a specific career path.

## **Program Learning Outcomes**

Upon graduating, Professional Writing graduates should be able to:

1. Design and create documents appropriate for professional and consumer audiences using a variety of industry-standard tools
2. Use accepted rhetorical, linguistic and design theories to craft user- and reader-centered documents
3. Demonstrate professionally-appropriate practice in working with clients/stakeholders and teammates
4. Demonstrate professionally-appropriate ethical reasoning, including awareness intellectual property in the creation and management of documents
5. Analyze their position within the fields of publishing, technical communication, professional writing, and allied disciplines.
6. Manage the production of complex, large-scale projects and their related documentation

## **Career Opportunities**

Professional writers use their advanced written communication skills to synthesize information and span boundaries between technical experts, decision-makers, and the public. They work in a broad range of settings, including the public sector, high tech corporations, entertainment, education, design firms, and more.

## **General Education Courses**

To ensure that Oregon Tech's graduates are skilled communicators, the Communication Department provides writing, speech, and communication courses to satisfy general education requirements. Students in other majors should consult the general education and degree requirements in their major departments.

## **Student Preparation**

All students who plan to study at Oregon Tech should enroll in writing and speech classes during their high school years to better benefit from the university's communication courses. Students applying to the Communication Studies Program should have especially strong reading and writing skills. It is important to have a well-rounded college preparation background, including courses in math, sciences, and general education.

# Communication Studies, BS

## Degree Requirements

The Bachelor of Science in Communication Studies requires 184 credits. All major courses, general education communication courses, and focused sequence of electives courses must be completed with a grade of "C" or higher.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

COM 104 - Introduction to Communication Credit Hours: 3  
COM 115 - Intro to Mass Communication Credit Hours: 3  
COM 135 - Communication Software Credit Hours: 3 <sup>a</sup>  
COM 225 - Interspersed Communication Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

COM 105 - Intro to Communication Theory Credit Hours: 3  
PSY 201 - Psychology Credit Hours: 3  
COM 205 - Intercultural Comm Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Focused Sequence Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

ART 215 - Design Arts and Aesthetics Credit Hours: 3  
COM 106 - Introduction to Comm Research Credit Hours: 3  
COM 109 - Intro to Communication Tech Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Sophomore Year Fall

COM 216 - Essence of Grammar & Punctuation Credit Hours: 3  
COM 326 - Communication Research Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4

Open Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

COM 237 - Intro to Visual Communication Credit Hours: 3  
COM 248 - Digital Media Production Credit Hours: 3  
JOUR 211 - Pub/Student Newspaper Credit Hours: 3  
Focused Sequence Elective Credit Hours: 3  
MATH Any for which MATH 100 is the pre-req Credit Hours: 4

**Total: 16 Credit Hours**

#### Spring

COM 255 - Communication Ethics Credit Hours: 3  
COM 276 - Democracy and Media Credit Hours: 3  
Business Elective Credit Hours: 3  
Focused Sequence Elective Credit Hours: 3  
Lab Science/Math Elective Credit Hours: 4

**Total: 16 Credit Hours**

#### Junior Year Fall

COM 301 - Rhetorical Theory & Application Credit Hours: 3  
or  
COM 305 - Contemporary Rhetorical Theory Credit Hours: 3  
COM 325 - Gender and Communication Credit Hours: 3  
Focused Sequence Elective (WRI or PWR) Credit Hours: 3  
Focused Sequence Elective Credit Hours: 3  
Focused Sequence Elective Upper Division Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

COM 345 - Organization Comm I Credit Hours: 3  
SPE 314 - Argumentation Credit Hours: 3  
Open Elective Upper Division Credit Hours: 3  
Focused Sequence Elective Upper Division Credit Hours: 3  
Focused Sequence Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3  
COM 358 - Communication and the Law Credit Hours: 3  
Focused Sequence Elective Upper Division Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Writing Elective Upper Division Credit Hours: 3

**Total: 15 Credit Hours**

#### Senior Year Fall

COM 309 - Communication Tech in Use Credit Hours: 3  
COM 420 - Externship Credit Hours: 15 <sup>b</sup>  
Humanities Elective Upper Division Credit Hours: 3  
Open Elective Credit Hours: 3  
Social Science Elective Upper Division Credit Hours: 3

**Total: 17 Credit Hours**

#### Winter

COM 420 - Externship Credit Hours: 15 <sup>b</sup>  
Focused Sequence Elective Upper Division Credit Hours: 3  
Focused Sequence Elective Upper Division Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

COM 420 - Externship Credit Hours: 15 <sup>b</sup>  
COM 424 - Capstone Course Credit Hours: 3  
Focused Sequence Elective Upper Division Credit Hours: 3  
Lab Science/Math Elective Credit Hours: 4

**Total: 15 Credit Hours**

**Notes:**

<sup>a</sup> MIS 101, MIS 102, and MIS 103 may be substituted for COM 135

<sup>b</sup> There is no guarantee of externships for Communication Studies majors. The best externship experiences are often those identified and arranged by students.

**Total for a B.S. in Communication Studies: 187 Credit Hours**

## **Dispute Resolution Certificate**

The Dispute Resolution Certificate provides students with a thorough foundation of communication courses related to dispute resolution. The program culminates in specialized courses: negotiation, facilitation, and mediation, giving students expertise in the field. A practicum in mediation offers practical experience in community mediation and guarantees competence of students completing the certificate. This certificate provides students with both the theoretical background and the practical experience to effectively resolve conflicts in a variety of contexts.

### **Prerequisite or Corequisite Classes**

SPE 111 - Public Speaking Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

WRI 122 - Argumentative Writing Credit Hours: 4

### **Program Courses**

COM 205 - Intercultural Comm Credit Hours: 3

COM 225 - Interpers Communication Credit Hours: 3

COM 226 - Nonverbal Communication Credit Hours: 3

COM 345 - Organization Comm I Credit Hours: 3

COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3

COM 348 - Facilitation Credit Hours: 3

COM 425 - Mediation Credit Hours: 3

COM 426 - Mediation Practicum Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

## **Human Interaction Minor**

The Human Interaction Minor supplements Oregon Tech technical and applied science degrees and provides advanced training in interaction skills. The minor offers courses in the analysis and practice of human interaction in a variety of contexts. The minor focuses on helping students to gain competency in building relationships, dealing with difference and managing conflict. Students who have performed well in general education communication courses are encouraged to enroll in this minor. For further information on enrollment, contact the Communication Department curriculum coordinator.

## **Career Opportunities**

The Human Interaction minor enhances students' employability and career flexibility. Employers in many industries seek employees who demonstrate competent interaction on multi-disciplinary teams, communicate in many (including international) contexts, understand and resolve conflict in the workplace and create effective communication in diverse settings.

### **Requirements of Minor**

SPE 321 - Small Group/Team Comm Credit Hours: 3

COM 205 - Intercultural Comm Credit Hours: 3

COM 225 - Interpers Communication Credit Hours: 3

### **In addition, students will select THREE from the following list of courses:**

COM 336 - Nonverbal Communication Credit Hours: 3

COM 325 - Gender and Communication Credit Hours: 3

COM 345 - Organization Comm I Credit Hours: 3

COM 346 - Health Communication Credit Hours: 3

COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3

COM 446 - Communication & Leadership Credit Hours: 3

## **Professional Writing and Technical Communication Minor**

The Professional Writing and Technical Communication Minor supplements Oregon Tech technical degrees and provides advanced training and experience in communication skills. The minor offers specialized communication courses in such varied areas as proposal and grant writing, documentation development, and technical editing.

Students who have performed above-average work in their lower-division communication courses are encouraged to enroll in the program. For further information on enrollment, contact any Communication Department faculty member.

## Career Opportunities

The Professional Writing and Technical Communication Minor will enhance students' flexibility as their careers develop. Employers in private industry, governmental agencies, and research facilities seek a unique combination of skills. First, employers know that the major coursework at Oregon Tech prepares students well. Second, the Professional Writing and Technical Communication Minor courses build skills in project development, manual writing and editing, computer-aided writing and publishing, oral presentations, and interviewing skills that complement technical education. Even if students choose not to work as technical writers or editors, the Professional Writing and Technical Communication Minor may increase job opportunities and professional advancement.

### Requirements of the Minor

Students take one required core course, an upper-division WRI course from an approved list, and four electives from the list below. Students must earn a "C" or better in all courses to complete the minor.

### Required Courses

Students take WRI 227 and one core option from the list below.

WRI 227 - Technical Report Writing Credit Hours: 4

and

WRI 327 - Advanced Tech Writing Credit Hours: 3

or

WRI 328 - Style Credit Hours: 3

or

WRI 345 - Science Writing Credit Hours: 3

or

WRI 350 - Documentation Develop Credit Hours: 3

or

WRI 410 - Proposal & Grant Writing Credit Hours: 3

### Elective Courses

Students take four elective from the following list. At least two should be upper division.

COM 301 - Rhetorical Theory & Applicatn Credit Hours: 3

COM 305 - Contemporary Rhetorical Theory Credit Hours: 3

COM 365 - Electronic Comm & Society Credit Hours: 3

COM 415 - Dev Eff Multmdia Presntn Credit Hours: 3

JOUR 211 - Pub/Student Newspaper Credit Hours: 3

PWR 101 - Introduction to Professional Writing Credit Hours: 3

PWR 102 - Introduction to Web Authoring Credit Hours: 3

PWR 206 - Social Media Credit Hours: 3

PWR 215 - Writing in the Public Interest Credit Hours: 3

PWR 220 - Writing for Interactive Media Credit Hours: 3

PWR 306 - Writing for the Health Professions Credit Hours: 3

PWR 310 - Professional Writing for International Audiences Credit Hours: 3

PWR 315 - Advanced Web Authoring Credit Hours: 3

PWR 330 - User Research Credit Hours: 3

PWR 355 - Project Management for Writers Credit Hours: 3

WRI 328 - Style Credit Hours: 3

WRI 345 - Science Writing Credit Hours: 3

WRI 410 - Proposal & Grant Writing Credit Hours: 3

WRI 415 - Technical Editing Credit Hours: 3

WRI 420 - Document Design Credit Hours: 3

# Professional Writing, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

COM 115 - Intro to Mass Communication Credit Hours: 3  
COM 135 - Communication Software Credit Hours: 3 <sup>a</sup>  
MATH 111 - College Algebra Credit Hours: 4  
or  
MATH 243 - Introductory Statistics Credit Hours: 4  
PWR 101 - Introduction to Professional Writing Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4

**Total: 17 Credit Hours**

### Winter

JOUR 211 - Pub/Student Newspaper Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Technical Elective Credit Hours: 3

**Total: 12 Credit Hours**

### Spring

ART 215 - Design Arts and Aesthetics Credit Hours: 3  
or  
ART 226 - Digital Photography Credit Hours: 3  
COM 109 - Intro to Communication Tech Credit Hours: 3  
PWR 102 - Introduction to Web Authoring Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Technical Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Sophomore Year Fall

COM 216 - Essen of Grammar & Punctuation Credit Hours: 3  
COM 256 - Public Relations Credit Hours: 3  
or  
PWR 215 - Writing in the Public Interest Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Program Elective Credit Hours: 3  
Emphasis Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

COM 237 - Intro to Visual Communication Credit Hours: 3  
COM 248 - Digital Media Production Credit Hours: 3  
PWR 330 - User Research Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Emphasis Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

COM 225 - Interpers Communication Credit Hours: 3  
COM 255 - Communication Ethics Credit Hours: 3  
WRI 328 - Style Credit Hours: 3  
Technical Elective Credit Hours: 3  
Lab Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

### Junior Year\* Fall

COM 301 - Rhetorical Theory & Applicatn Credit Hours: 3  
or  
COM 305 - Contemporary Rhetorical Theory Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 420 - Document Design Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Lab Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

PWR 355 - Project Management for Writers Credit Hours: 3  
SPE 314 - Argumentation Credit Hours: 3  
WRI 415 - Technical Editing Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Technical Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

COM 358 - Communication and the Law Credit Hours: 3  
WRI 410 - Proposal & Grant Writing Credit Hours: 3  
WRI 325 - Advanced Composition Credit Hours: 3  
Emphasis Elective Credit Hours: 3  
Technical Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Senior Year Fall

COM 345 - Organization Comm I Credit Hours: 3  
PWR 490 - Portfolio Development Credit Hours: (Variable Credit 2-3)  
PWR 499 - Internship in Professional Writing Credit Hours: (Variable Credit to 9 credits)  
Emphasis Elective Credit Hours: 3  
Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

PWR 499 - Internship in Professional Writing Credit Hours: (Variable Credit to 9 credits)  
PWR Elective Credit Hours: 3  
Technical Elective Credit Hours: 3  
Upper Division COM/WRI Elective Credit Hours: 3  
Emphasis Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

COM 424 - Capstone Course Credit Hours: 3  
PWR 499 - Internship in Professional Writing Credit Hours: (Variable Credit to 9 credits)  
Upper Division Emphasis Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Upper Division Technical Elective Credit Hours: 3

**Total: 15 Credit Hours**

## Total for a B.S. in Professional Writing: 184 Credit Hours

### Note:

<sup>a</sup> MIS 101, MIS 102, and MIS 103 may be substituted for COM 135

### Emphasis Courses (18 Credits Minimum)

Students will select from one of the following Emphasis areas in order to satisfy the emphasis elective and technical elective requirements.

#### Digital Media Emphasis

(beyond the required courses in the program)

COM 115 - Intro to Mass Communication Credit Hours: 3

COM 207 - Seminar Credit Hours: 6 International Media Seminar:  
Paris

COM 215 - Creativity in Comm Credit Hours: 3

COM 248 - Digital Media Production Credit Hours: 3

COM 309 - Communication Tech in Use Credit Hours: 3

COM 365 - Electronic Comm & Society Credit Hours: 3

COM 415 - Dev Eff Multmdia Presntn Credit Hours: 3

HUM 335 - Video Game Studies Credit Hours: 3

HUM 345 - Digital Culture and Society Credit Hours: 3

PHIL 205 - Introduction to Logic Credit Hours: 3

PWR 206 - Social Media Credit Hours: 3

PWR 220 - Writing for Interactive Media Credit Hours: 3

PWR 315 - Advanced Web Authoring Credit Hours: 3

WRI 225 - Writing Nonfiction Credit Hours: 3

WRI 305 - Writ for the Marketplace Credit Hours: 3

PWR 306 - Writing for the Health Professions Credit Hours: 3

PWR 315 - Advanced Web Authoring Credit Hours: 3

PWR 320 - Structured Authoring Credit Hours: 3

WRI 225 - Writing Nonfiction Credit Hours: 3

WRI 327 - Advanced Tech Writing Credit Hours: 3

WRI 345 - Science Writing Credit Hours: 3

WRI 350 - Documentation Develop Credit Hours: 3

#### Writing in Organizations Emphasis

(beyond the required courses in the program)

BUS 313 - Health Care Systems & Policy Credit Hours: 3

COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3

COM 437 - Comm Training & Devpmt Credit Hours: 3

COM 445 - Organiz'l Communication II Credit Hours: 3

COM 446 - Communication & Leadership Credit Hours: 3

PHIL 331 - Ethics in the Professions Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

PWR 206 - Social Media Credit Hours: 3

PWR 215 - Writing in the Public Interest Credit Hours: 3

PWR 306 - Writing for the Health Professions Credit Hours: 3

PWR 310 - Professional Writing for International Audiences Credit  
Hours: 3

PWR 315 - Advanced Web Authoring Credit Hours: 3

PWR 320 - Structured Authoring Credit Hours: 3

WRI 327 - Advanced Tech Writing Credit Hours: 3

#### Scientific and Technical Emphasis

(beyond the required courses in the program)

BIO 200 - Medical Terminology Credit Hours: 2

BIO 209 - Current Research Tpc Med Sci I Credit Hours: 1

COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3

PHIL 205 - Introduction to Logic Credit Hours: 3

PHIL 305 - Medical Ethics Credit Hours: 3

PHIL 331 - Ethics in the Professions Credit Hours: 3



# Dental Hygiene Department

Paula Russell, *Department Chair/Director, Klamath Falls*

*Professor:* S. Hopper

*Associate Professor:* P. Russell, P. Hendrix

*Assistant Professors:* K. Beaty, J. Luebbbers, D. Swigart, T. Willey

*Instructors:* J. Bopp C. Botsch, E. Wells

## Degrees Offered

- Bachelor of Science in Dental Hygiene (entry level program)
- Bachelor of Science in Dental Hygiene, Online Degree Completion (for licensed professionals)

The Bachelor of Science in Dental Hygiene is offered on the Oregon Tech campus in Klamath Falls, on the Chemeketa Community College campus in Salem, Oregon, and online for licensed professionals completing their Bachelor's degree.

## Accreditation

The Dental Hygiene Program is accredited by the Commission on Dental Accreditation (CODA), a national Commission that is responsible for the professional accreditation of dental schools, dental hygiene programs, and other programs related to dentistry. Oregon Tech's Dental Hygiene Program's accreditation status is "approval without reporting requirements" which means it meets all of the "Accreditation Standards for Dental Hygiene Education Programs".

## Program Purpose and Mission Statement

The Oregon Tech Dental Hygiene Program provides an educational environment that fosters respect and encourages critical thinking. Its mission is to educate students to become primary healthcare providers who are well prepared to serve the public in multiple roles and who are empowered to become life-long learners.

Upon graduation, students are prepared for entry into the dental hygiene profession and are eligible for state and national exams leading to licensure as a registered dental hygienist, including all expanded functions allowed within the scope of practice for a dental hygienist.

## Program Learning Outcomes:

The dental hygiene graduate will be competent in:

1. **Communication:** The dental hygiene graduate will be competent in communication and collaborating with other members of the health care team to support comprehensive patient care
2. **Critical Thinking and Problem Solving:** The dental hygiene graduate will be competent in critical thinking and problem solving related to comprehensive care and management of patients
3. **Professionalism, Ethical Practice:** The dental hygiene graduate will be competent in applying ethical, legal, and regulatory concepts in the provision and/or support of oral health care services
4. **Lifelong Learning:** The dental hygiene graduate will demonstrate competent knowledge and self-assessment skills necessary for life-long learning
5. **Provision of Oral Health Care:** The dental hygiene graduate will be competent in providing the dental hygiene process of care for a wide range of patient profiles and all types of periodontal diseases
6. **Community Health:** The dental hygiene graduate will be competent in assessing, planning, implementing, and evaluating community based oral health programs including health promotion and disease prevention activities
7. **Disease Prevention:** The dental hygiene graduate will evaluate factors that can be used to promote patient adherence to disease prevention and/or health maintenance strategies.

## Career Opportunities

Dental hygienists are most commonly employed in private or corporate dental practices and provide oral health preventive and therapeutic services. Graduates are prepared for licensure as a dental hygienist and graduate with the qualifications to obtain permits and endorsements for expanded practice in such settings as nursing homes, schools, and hospitals. In addition to clinical practice, dental hygienists have careers in the fields of education, research, administration, and public health.

## Student Preparation

A strong science background is essential for individuals interested in any health sciences profession. Students considering a career in dental hygiene should take a college-bound course of study in high school that includes algebra, chemistry, and biology or human anatomy and physiology.

## Admissions Procedures

Any student who meets the general admissions requirements may enroll in Pre-Dental Hygiene courses (freshman year). Students are selected to enter the professional program through a separate application process.

A limited number of seats are available in the professional program courses (sophomore, junior, and senior years).

The application deadline is in March of the calendar year of enrollment. To be eligible for admission into the Dental Hygiene Program the following minimum eligibility requirements must be met:

1. Applicants must have on file with the Oregon Tech Office of Admissions an official *Application for Admission* to Oregon Tech, accompanied by a \$50 non-refundable fee and official transcripts of each college or university attended. Admission to Oregon Tech is independent of admission to the Dental Hygiene Program. All applicants to Oregon Tech are admitted as pre-dental hygiene majors until accepted into the dental hygiene program.
2. Applicants must have successfully completed or be in progress of completing all freshmen pre-dental hygiene courses. Introduction to Dental Hygiene (DH 100 on campus or DHE 100 online) must be taken through Oregon Tech. All other prerequisite (freshman) courses must be completed by the end of spring term, with the exception of BIO 233, which may be extended into the summer but must be successfully completed prior to program entry in the subsequent fall term.
3. Applicants must have a minimum cumulative 2.75 GPA in previous college work.
4. Applicants must submit a *Dental Hygiene Application for Admission*, related forms, and application fee of \$75 to the Dental Hygiene department. Detailed information and instructions can be found on the Oregon Tech Dental Hygiene Program web page, [www.oit.edu/dentalhygiene/how-to-apply](http://www.oit.edu/dentalhygiene/how-to-apply).

## Program Requirements

Dental hygiene students admitted to the Dental Hygiene Program (sophomore, junior, senior years) must purchase instruments and other supplies to be used during clinical practice and pay additional fees associated with dental hygiene courses. A background check, drug test, and proof of immunizations specific to healthcare workers are required prior to final admission into the professional program.

## Graduation Requirements

All courses listed in the curriculum for the catalog year a student begins a program must be fulfilled. Total credits required for graduation are: Bachelor of Science degree, 191. A minimum cumulative grade point average (GPA) of 2.0 is required for graduation. Students must maintain a grade of "C" or better in all Dental Hygiene courses to continue in the program.

# Dental Hygiene, BS

## Curriculum

The following are required courses and recommended terms for students attending on the Klamath Falls campus. Please visit [www.oit.edu/dentalhygiene](http://www.oit.edu/dentalhygiene) for transfer information from other Oregon colleges and for recommended course sequencing for those attending on the Chemeketa Community College campus. Courses marked as "approved elective" may be chosen from the list in the Degree Emphasis list.

## Pre-Dental Hygiene

### Freshman Year Fall

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
DH 100 - Introduction to Dental Hygiene Credit Hours: 2  
CHE Elective with Lab Credit Hours: 4+  
Psychology Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

BIO 105 - Microbiology Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
MATH 111 - College Algebra Credit Hours: 4  
or  
MATH 243 - Introductory Statistics Credit Hours: 4  
SOC 204 - Intro to Sociology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4

**Total: 19 Credit Hours**

### Spring

BIO 205 - Nutrition Credit Hours: 3  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
Humanities Elective Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 18 Credit Hours**

## Professional Courses

### Sophomore Year Fall

DH 221 - Clinical Prac & Seminar I Credit Hours: 4  
DH 225 - Head/Neck Anat, Histol, Embry Credit Hours: 3  
DH 240 - Prevention I Credit Hours: 3  
DH 266 - Dental Anatomy Credit Hours: 2  
Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

DH 222 - Clinical Prac & Seminar II Credit Hours: 4  
DH 241 - Prevention II Credit Hours: 3  
DH 244 - General and Oral Pathology Credit Hours: 3  
DH 252 - Oral Radiology I Credit Hours: 3  
DH 275 - Dental Ethics Credit Hours: 2

**Total: 15 Credit Hours**

### Spring

DH 223 - Clinical Prac & Seminar III Credit Hours: 3  
DH 242 - Prevention III Credit Hours: 3  
DH 253 - Oral Radiology II Credit Hours: 2  
DH 254 - Introduction to Periodontology Credit Hours: 2

DH 267 - Emergency Procedures Credit Hours: 3

DH 380 - Comm Dentl Hlth I Credit Hours: 2

**Total: 15 Credit Hours**

### Junior Year Fall

CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
DH 321 - Clinical Prac & Sem IV Credit Hours: 4  
DH 340 - Emerging Oral Health Topics Credit Hours: 3  
DH 354 - Periodontology Credit Hours: 3  
DH 381 - Comm Dentl Hlth II Credit Hours: 2  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 18 Credit Hours**

### Winter

DH 322 - Clinical Prac & Sem V Credit Hours: 3  
DH 341 - Vulnerable Populations Credit Hours: 3  
DH 351 - Pain Management I Credit Hours: 3  
DH 382 - Comm Dentl Hlth III Credit Hours: 2  
Humanities Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

DH 323 - Clinical Prac & Sem VI Credit Hours: 5  
DH 344 - Adv General & Oral Pathology Credit Hours: 3  
DH 352 - Pain Management II Credit Hours: 2  
DH 363 - Dental Materials Credit Hours: 4  
DH 370 - International Extrnshp I Credit Hours: 1 (optional)  
DH 383 - Comm Dentl Hlth IV Credit Hours: 1

**Total: 15/16 Credit Hours**

### Senior Year Summer

AHED 450 - Instructional Methods Credit Hours: 3  
DH 421 - Clinical Prac & Sem VII Credit Hours: 4  
DH 461 - Restorative Dentistry I Credit Hours: 2  
Elective Credit Hours: 3 <sup>a</sup>  
Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Fall

DH 372 - International Extrnshp III Credit Hours: 1 (optional)  
DH 422 - Clinical Prac & Sem VIII Credit Hours: 5  
DH 462 - Restorative Dentistry II Credit Hours: 2  
DH 475 - EBDM in Healthcare I Credit Hours: 3  
Communication Elective Credit Hours: 3  
Elective Credit Hours: 3 <sup>a</sup>

**Total: 16/17 Credit Hours**

### Winter

DH 423 - Clinical Prac & Sem IX Credit Hours: 5  
DH 454 - Dental Prac Mgmt Credit Hours: 3

DH 463 - Restorative Dentistry III Credit Hours: 2  
DH 476 - EBDM in Healthcare II Credit Hours: 3

Social Science Elective Credit Hours: 3  
**Total: 16 Credit Hours**

## **Total for a B.S. in Dental Hygiene 191-193 Credit Hours**

### **Note:**

All transfer students must abide by the Dental Hygiene Transfer Guide posted on the Oregon Tech Dental Hygiene web page

<sup>a</sup> Elective selected from an advisor approved list

### **Electives Approved by the Dental Hygiene Department**

#### **Clinical Practice**

BIO 336 - Essentials of Pathophysiology Credit Hours: 3  
BIO 346 - Pathophysiology I Credit Hours: 3  
BIO 347 - Pathophysiology II Credit Hours: 3  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
BUS 331 - Personal Finance Credit Hours: 3  
COM 205 - Intercultural Comm Credit Hours: 3  
PSY 301 - Basic Counseling Techniques Credit Hours: 4  
PSY 336 - Health Psychology I Credit Hours: 3  
PSY 337 - Health Psychology II Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3  
RCP 326 - Preparedness, Ethics, and Leadership Credit Hours: 2

#### **Education**

AHED 451 - Instructional Experience Credit Hours: 3  
AHED 460 - Fund of Distance Education Credit Hours: 3  
PSY 301 - Basic Counseling Techniques Credit Hours: 4  
PSY 347 - Organizational Behavior Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3

#### **Management**

ACC 201 - Prin of Accounting I Credit Hours: 4  
ACC 203 - Prin of Managerial Acct Credit Hours: 4  
BUS 223 - Marketing I Credit Hours: 3  
BUS 226 - Business Law Credit Hours: 3

BUS 308 - Prin of International Business Credit Hours: 3  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
BUS 317 - Health Care Management Credit Hours: 3  
BUS 337 - Prin of Health Care Marketing Credit Hours: 3  
BUS 345 - Fraud Examination Credit Hours: 3  
BUS 349 - Human Resource Management I Credit Hours: 3  
DH 465 - Independent Dental Hygiene Practice Credit Hours: 3  
PHIL 342 - Business Ethics Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3

#### **Public Health**

<sup>a</sup> Not currently offered online

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
COM 205 - Intercultural Comm Credit Hours: 3  
DH 370 - International Exrnshp I Credit Hours: 1  
DH 371 - International Exrnshp II Credit Hours: 1  
DH 372 - International Exrnshp III Credit Hours: 1  
DH 465 - Independent Dental Hygiene Practice Credit Hours: 3  
DH 471 - Community Program Planning II Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
SOC 325 - Global Population Health Credit Hours: 3 <sup>a</sup>  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3 <sup>a</sup>  
WRI 410 - Proposal & Grant Writing Credit Hours: 3  
WRI 510 - Grant Proposal Writing Credit Hours: 3

## Dental Hygiene, Degree Completion, BS

This program offers dental hygienists who have earned an associate's degree the opportunity to complete a Bachelor of Science in Dental Hygiene. The degree is offered through Oregon Tech Online.

Dental hygienists who have graduated with an associate's degree from an accredited dental hygiene program may be eligible to apply to the bachelor's degree completion program. Oregon Tech will make every effort to give maximum consideration to the transfer work presented at time of application. Typically, most professional and related science requirements are accepted. Additional coursework may be necessary to meet Oregon Tech general education requirements and a minimum of 45 credit hours must be completed through Oregon Tech to satisfy residency requirements.

## Graduation Requirements:

The following requirements must be met to earn a bachelor's degree in dental hygiene from Oregon Institute of Technology:

- Transfer your dental hygiene professional courses.
- Complete, or transfer, general education courses required for a bachelor's degree.
- Complete the bachelor's degree completion courses.
- Complete 60 credits of upper-division (300-400 level) coursework. (You will be awarded some upper-division credit for your transferred professional courses.)
- Complete at least 45 credits from Oregon Tech.
- Maintain a grade "C" or better in all courses.

### Courses Granted for Licensure

DHE 100 - Introduction to Dental Hygiene I Credit Hours: 2  
DH 221 - Clinical Prac & Seminar I Credit Hours: 4  
DH 222 - Clinical Prac & Seminar II Credit Hours: 4  
DH 223 - Clinical Prac & Seminar III Credit Hours: 3  
DH 225 - Head/Neck Anat, Histol, Embry Credit Hours: 3  
DH 240 - Prevention I Credit Hours: 3  
DH 241 - Prevention II Credit Hours: 3  
DH 242 - Prevention III Credit Hours: 3  
DH 244 - General and Oral Pathology Credit Hours: 3  
DH 252 - Oral Radiology I Credit Hours: 3  
DH 253 - Oral Radiology II Credit Hours: 2  
DH 254 - Introduction to Periodontology Credit Hours: 2  
DH 267 - Emergency Procedures Credit Hours: 3  
DH 275 - Dental Ethics Credit Hours: 2  
DH 321 - Clinical Prac & Sem IV Credit Hours: 4  
DH 322 - Clinical Prac & Sem V Credit Hours: 3  
DH 323 - Clinical Prac & Sem VI Credit Hours: 5  
DH 340 - Emerging Oral Health Topics Credit Hours: 3  
DH 341 - Vulnerable Populations Credit Hours: 3  
DH 344 - Adv General & Oral Pathology Credit Hours: 3  
DH 354 - Periodontology Credit Hours: 3  
DH 363 - Dental Materials Credit Hours: 4  
DH 266 - Dental Anatomy Credit Hours: 2  
DH 380 - Comm Dentl Hlth I Credit Hours: 2  
DH 381 - Comm Dentl Hlth II Credit Hours: 2  
DH 421 - Clinical Prac & Sem VII Credit Hours: 4  
DH 422 - Clinical Prac & Sem VIII Credit Hours: 5  
DH 423 - Clinical Prac & Sem IX Credit Hours: 5

### Completion Courses

<sup>a</sup> Credits may be granted for additional specialty licensure exams

AHED 450 - Instructional Methods Credit Hours: 3  
BUS 317 - Health Care Management Credit Hours: 3  
DH 401 - Overview Advanced Dental Hyg Credit Hours: 3  
DH 454 - Dental Prac Mgmt Credit Hours: 3

DH 470 - Community Program Planning I Credit Hours: 3  
DH 475 - EBDM in Healthcare I Credit Hours: 3  
DH 476 - EBDM in Healthcare II Credit Hours: 3  
MATH 111 - College Algebra Credit Hours: 4 (or higher)  
or  
MATH 243 - Introductory Statistics Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Communication Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Elective Credit Hours: 3 (approved by advisor)  
Elective Credit Hours: 3 (approved by advisor)  
Elective Credit Hours: 3 (approved by advisor)

### Additional Required General Education Courses (Transfer or Oregon Tech)

BIO 105 - Microbiology Credit Hours: 4  
BIO 200 - Medical Terminology Credit Hours: 2  
BIO 205 - Nutrition Credit Hours: 3  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
SOC 204 - Intro to Sociology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 123 - Research Writing Credit Hours: 3  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

# Emergency Medical Services Department

Jamie Kennel, *Department Chair*

*Professors:* J. Kennel

*Assistant Professors:* H. Jarrard

*Instructors:* K. Darling, C. Hamper, S. Schmidt, A. Wagner

## Degrees Offered

- Associate of Applied Science (AAS) in Paramedic (joint degree through Oregon Tech and OHSU).
- Bachelor of Science (BS) of Emergency Medical Services Management (joint degree through Oregon Tech and OHSU).

## Program Learning Outcomes

### EMT Program Learning Outcomes

- Recognize the nature and seriousness of the patient's condition and/or extent of injuries to assess requirements for emergency medical and trauma care
- Administer appropriate emergency medical care based on traumatic assessment findings of the patient's condition
- Administer appropriate emergency medical care based on assessment findings of the patient's condition
- Lift, move, position and otherwise handle the patient to minimize discomfort and prevent further injury
- Perform safely and effectively the expectations of the job description
- Perform the expectations of a 911 EMT safely and effectively.

### Paramedic Program Learning Outcomes

- Comprehend, apply, and evaluate information relative to the role of an entry-level Paramedic.
- Demonstrate technical proficiency in all of the skills necessary to fulfill the role of an entry-level Paramedic.
- Demonstrate personal behaviors consistent with professional and employer expectations of an entry level Paramedic.

### BS in EMS Management Learning Outcomes

- Foster professional growth in communication, teamwork, ethics, inquiry and analysis, quantitative literacy, and diversity.
- Prepare students to advance their professional medical training in all the major areas of pre-hospital clinical practice.
- Develop an awareness and practice of current EMS management challenges.

## Career Opportunities

The EMS department provides a full spectrum of pre-hospital training programs and degrees, jointly offered by OHSU and Oregon Tech, starting from your very first EMS or general education course all the way through to completing your bachelor's degree, all created with collaboration from local and national industry leaders including:

- Emergency Medical Technician (EMT) Training and Certification
- Paramedic Training (AAS degree & Nationally Accredited)
- Critical Care Paramedic Training
- Community Care Paramedic / Mobile Integrated Health care Training
- EMS Management (Bachelor's degree)

Depending on your career aspirations, graduates find career employment in a variety of settings including ambulance transport agencies, fire and rescue agencies, air-medical transport agencies, medical support for industrial sites, tactical-medical teams, hospitals, and international aid missions, to name just a few.

The EMT and Paramedic program prepares students for entry positions in the pre-hospital medicine profession. Upon successful completion of the program, graduates are eligible to sit for the National Registry examination, which can lead to both national and state certifications.

## Accreditation

While all programs at the university are accredited by the Northwest Commission on Colleges and Universities (NWCCU), where it is available and

adds value to our students, our EMS programs offer additional programmatic accreditation. The Paramedic program is nationally accredited by The Commission on Accreditation of Allied Health Education Programs ([www.caahep.org](http://www.caahep.org)) upon the recommendation of the Committee on Accreditation of Educational Programs for the Emergency Medical Services Professions (CoAEMSP).

## **Admission Requirements**

All courses offered by the EMS department require only general Oregon Tech admission with one exception: the second year of the Paramedic degree. Due to the large number of applications and relatively limited number of student positions, the second year of the paramedic degree is a competitive application process requiring a separate admissions step, further described on the Oregon Tech website ([www.oit.edu/paramedic](http://www.oit.edu/paramedic)).

Whether you're an incoming freshman or preparing to transfer into one of our programs, students have been most successful when they focus and excel in the following three areas:

- Strong academic performance overall with an emphasis on science coursework performance
- Experience in providing pre-hospital care (e.g. volunteer, intern, BLS transports, etc.) ideally with hands-on direct patient care
- Strong customer service experience with the public

All prospective students are encouraged to meet with the EMS department Program Coordinator to review transcripts and develop a customized plan to get started.

# Emergency Medical Services Management, Community Care Track, BS

## Curriculum

The following are required courses and recommended terms for students wishing to meet the AAS and BS degree requirements. All courses listed on the curriculum map in the catalogue year a student begins a program must be fulfilled for graduation eligibility.

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

EMS 151 - Emerg Med Tech (EMT) I Credit Hours: 6

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 18 Credit Hours**

### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

EMS 152 - Emerg Med Tech (EMT) II Credit Hours: 6

SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BIO 200 - Medical Terminology Credit Hours: 2

BIO 233 - Human Anatomy/Physiology III Credit Hours: 4

EMS 115 - Introduction to EMS Credit Hours: 3

PSY 201 - Psychology Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Paramedic Professional Courses

(Additional Application Required)

#### Sophomore Year Fall

CHE 210 - Clinical Pharmacology Credit Hours: 3

EMS 218 - Trauma Emergencies Credit Hours: 3

EMS 231 - Medical Emergencies Credit Hours: 4

EMS 235 - Basic Electrocardiography Credit Hours: 3

EMS 241 - Paramed Crisis Resrce Mgmt I Credit Hours: 3

EMS 271 - Paramedic Skills Lab I Credit Hours: 3

**Total: 19 Credit Hours**

#### Winter

EMS 211 - Prehospital Emerg Pharmacology Credit Hours: 3

EMS 232 - Medical Emergencies II Credit Hours: 3

EMS 236 - Advanced Electrocardiography Credit Hours: 3

EMS 242 - Paramed Crisis Resrce Mgmt II Credit Hours: 1

EMS 272 - Paramedic Skills Lab II Credit Hours: 2

EMS 283 - Clinical Practicum I Credit Hours: 6

or

EMS 284 - Clinical Practicum II Credit Hours: 6

**Total: 18 Credit Hours**

#### Spring

EMS 233 - Medical Emergencies III Credit Hours: 2

EMS 237 - Paramedic 12-Leads Credit Hours: 1

EMS 273 - Paramedic Skills Lab III Credit Hours: 1

EMS 243 - Paramed Crisis Resrce Mgmt III Credit Hours: 1

EMS 283 - Clinical Practicum I Credit Hours: 6

or

EMS 284 - Clinical Practicum II Credit Hours: 6

EMS 291 - Paramed Field Extern Practic I Credit Hours: 4

**Total: 15 Credit Hours**

### Summer

EMS 292 - Paramed Field Extern Prac II Credit Hours: 12

**Total: 12 Credit Hours**

### Junior Year Fall

BUS 317 - Health Care Management Credit Hours: 3

BUS 337 - Prin of Health Care Marketing Credit Hours: 3

EMS 321 - Community Paramedic I Credit Hours: 4

EMS 341 - Community Para Clinical I Credit Hours: 2

**Total: 12 Credit Hours**

### Winter

BUS 313 - Health Care Systems & Policy Credit Hours: 3

ECO 202 - Principles of Macroeconomics Credit Hours: 3

EMS 322 - Community Paramedic II Credit Hours: 4

EMS 342 - Community Para Clinical II Credit Hours: 2

**Total: 12 Credit Hours**

### Spring

ECO 201 - Principles of Microeconomics Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

PSY 347 - Organizational Behavior Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

Humanities - 300 or 400 Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Senior Year Fall

BUS 349 - Human Resource Management I Credit Hours: 3

MATH 361 - Statistical Methods I Credit Hours: 4

PHIL 331 - Ethics in the Professions Credit Hours: 3

WRI 327 - Advanced Tech Writing Credit Hours: 3

**Total: 13 Credit Hours**

### Winter

BUS 316 - Total Quality Health Care Credit Hours: 3

EMS 496 - EMS Capstone Project I Credit Hours: 3

EMS 456 - Research Methods in EMS Credit Hours: 2

MATH 362 - Statistical Methods II Credit Hours: 4

Math, Science, or Social Science Elective (upper division) Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

BUS 467 - Service Management Credit Hours: 3

EMS 497 - EMS Capstone Project II Credit Hours: 3

EMS 444 - EMS Systems, Lead & Mgt Credit Hours: 3

Math, Science, or Social Science Elective (upper division) Credit Hours: 3

**Total: 12 Credit Hours**



**Total for a B.S. in Emergency Medical Services Management Community Care Track: 191 Credit Hours**

# Emergency Medical Services Management, Critical Care Track, BS

## Curriculum

The following are required courses and recommended terms for students wishing to meet the AAS and BS degree requirements. All courses listed on the curriculum map in the catalogue year a student begins a program must be fulfilled for graduation eligibility.

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

EMS 151 - Emerg Med Tech (EMT) I Credit Hours: 6

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 18 Credit Hours**

### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

EMS 152 - Emerg Med Tech (EMT) II Credit Hours: 6

SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BIO 200 - Medical Terminology Credit Hours: 2

BIO 233 - Human Anatomy/Physiology III Credit Hours: 4

EMS 115 - Introduction to EMS Credit Hours: 3

PSY 201 - Psychology Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

## Paramedic Professional Courses

**(Additional Application Required)**

### Sophomore Year Fall

CHE 210 - Clinical Pharmacology Credit Hours: 3

EMS 218 - Trauma Emergencies Credit Hours: 3

EMS 231 - Medical Emergencies Credit Hours: 4

EMS 235 - Basic Electrocardiography Credit Hours: 3

EMS 241 - Paramed Crisis Resrce Mgmt I Credit Hours: 3

EMS 271 - Paramedic Skills Lab I Credit Hours: 3

**Total: 19 Credit Hours**

### Winter

EMS 211 - Prehospital Emerg Pharmacology Credit Hours: 3

EMS 232 - Medical Emergencies II Credit Hours: 3

EMS 236 - Advanced Electrocardiography Credit Hours: 3

EMS 242 - Paramed Crisis Resrce Mgmt II Credit Hours: 1

EMS 272 - Paramedic Skills Lab II Credit Hours: 2

EMS 283 - Clinical Practicum I Credit Hours: 6

or

EMS 284 - Clinical Practicum II Credit Hours: 6

**Total: 18 Credit Hours**

### Spring

EMS 233 - Medical Emergencies III Credit Hours: 2

EMS 273 - Paramedic Skills Lab III Credit Hours: 1

EMS 243 - Paramed Crisis Resrce Mgmt III Credit Hours: 1

EMS 283 - Clinical Practicum I Credit Hours: 6

or

EMS 284 - Clinical Practicum II Credit Hours: 6

EMS 291 - Paramed Field Extern Practic I Credit Hours: 4

**Total: 14 Credit Hours**

### Summer

EMS 292 - Paramed Field Extern Prac II Credit Hours: 12

**Total: 12 Credit Hours**

### Junior Year Fall

BUS 317 - Health Care Management Credit Hours: 3

BUS 337 - Prin of Health Care Marketing Credit Hours: 3

ECO 201 - Principles of Microeconomics Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 13 Credit Hours**

### Winter

BUS 313 - Health Care Systems & Policy Credit Hours: 3

ECO 202 - Principles of Macroeconomics Credit Hours: 3

EMS 331 - Critical Care Transport Credit Hours: 4

EMS 381 - Crit Care Clin Pract I Credit Hours: 1

**Total: 11 Credit Hours**

### Spring

EMS 332 - Critical Care Transport II Credit Hours: 3

EMS 382 - Crit Care Clin Pract II Credit Hours: 3

HUM - 300 or 400 Elective Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 15 Credit Hours**

### Senior Year Fall

BUS 349 - Human Resource Management I Credit Hours: 3

MATH 361 - Statistical Methods I Credit Hours: 4

PHIL 331 - Ethics in the Professions Credit Hours: 3

WRI 327 - Advanced Tech Writing Credit Hours: 3

**Total: 13 Credit Hours**

### Winter

BUS 316 - Total Quality Health Care Credit Hours: 3

EMS 496 - EMS Capstone Project I Credit Hours: 3

EMS 456 - Research Methods in EMS Credit Hours: 2

MATH 362 - Statistical Methods II Credit Hours: 4

Math, Science, or Social Science Elective (upper division) Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

BUS 467 - Service Management Credit Hours: 3

EMS 497 - EMS Capstone Project II Credit Hours: 3

EMS 444 - EMS Systems, Lead & Mgt Credit Hours: 3

Math, Science, or Social Science Elective (upper division) Credit Hours: 3

**Total: 12 Credit Hours**

**Total for a B.S. in Emergency Medical Services Management Critical Care Track: 189 Credit Hours**

# Emergency Medical Technology Paramedic, AAS

## Curriculum

The following are required courses and recommended terms for students wishing to meet the AAS and BS degree requirements. All courses listed on the curriculum map in the catalogue year a student begins a program must be fulfilled for graduation eligibility.

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

EMS 151 - Emerg Med Tech (EMT) I Credit Hours: 6

MATH 100 - Intermediate Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 18 Credit Hours**

### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

EMS 152 - Emerg Med Tech (EMT) II Credit Hours: 6

SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BIO 200 - Medical Terminology Credit Hours: 2

BIO 233 - Human Anatomy/Physiology III Credit Hours: 4

EMS 115 - Introduction to EMS Credit Hours: 3

PSY 201 - Psychology Credit Hours: 3

**Total: 12 Credit Hours**

### Paramedic Professional Courses

**(Additional Application Required)**

#### Sophomore Year Fall

CHE 210 - Clinical Pharmacology Credit Hours: 3

EMS 218 - Trauma Emergencies Credit Hours: 3

EMS 231 - Medical Emergencies Credit Hours: 4

EMS 235 - Basic Electrocardiography Credit Hours: 3

EMS 241 - Paramed Crisis Resrce Mgmt I Credit Hours: 3

EMS 271 - Paramedic Skills Lab I Credit Hours: 3

**Total: 19 Credit Hours**

### Winter

EMS 211 - Prehospital Emerg Pharmacology Credit Hours: 3

EMS 232 - Medical Emergencies II Credit Hours: 3

EMS 236 - Advanced Electrocardiography Credit Hours: 3

EMS 242 - Paramed Crisis Resrce Mgmt II Credit Hours: 1

EMS 272 - Paramedic Skills Lab II Credit Hours: 2

EMS 283 - Clinical Practicum I Credit Hours: 6

**Total: 18 Credit Hours**

### Spring

EMS 233 - Medical Emergencies III Credit Hours: 2

EMS 237 - Paramedic 12-Leads Credit Hours: 1

EMS 243 - Paramed Crisis Resrce Mgmt III Credit Hours: 1

EMS 273 - Paramedic Skills Lab III Credit Hours: 1

EMS 284 - Clinical Practicum II Credit Hours: 6

EMS 291 - Pramed Field Extern Practic I Credit Hours: 4

**Total: 15 Credit Hours**

### Summer

EMS 292 - Paramed Field Extern Prac II Credit Hours: 12

**Total: 12 Credit Hours**

**Total Credit Hours for A.A.S. Degree in EMT – Paramedic:**

**Technical Total: 64 Credit Hours**

**Degree Total: 108 Credit Hours**

# Humanities and Social Sciences Department

Maria Lynn Kessler, *Department Chair*

Chelsey Torgerson, *Program Director, Marriage and Family Therapy*

Alishia Huntoon, *Program Director, Extern Coordinator and Curriculum Coordinator, Applied Psychology - Online*

Maria Lynn Kessler, *Program Director Applied Psychology - Portland-Metro, Program Director Applied Behavior Analysis*

Trevor Petersen, *Program Director, Applied Psychology - Klamath Falls*

Kyle Chapman, *Program Director, Population Health Management – Klamath Falls*

*Professors:* M. Clark, A. Huntoon, M. Kessler, M. Neupert

*Associate Professors:* D. Bailey, B. Bunting, R. Madden, S. Nathenson, T. Petersen, Y. Rowher

*Assistant Professors:* K. Chapman, C. Fitzgerald, K. Garrett, C. Torgerson

## Degrees Offered

- Master of Science
  - Applied Behavior Analysis
  - Marriage and Family Therapy
- Bachelor of Science in:
  - Applied Psychology
  - Population Health Management

## Minors Offered

- Arts, Literature, and Philosophy (ALPs)
- Medical Sociology
- Psychology

## Graduate Certificates Offered

- Applied Behavior Analysis (ABA)
- Integrated Behavioral Health & Medical Family Therapy

## Module Offered

- Oregon Transfer (OTM)

The Humanities and Social Sciences Department offers undergraduate degrees in Applied Psychology and Population Health Management, graduate degrees in Applied Behavior Analysis and Marriage and Family Therapy, minors in Arts, Literature, and Philosophy (ALPs) Medical Sociology, and Psychology and a diverse collection of courses that meet the general education requirements for all students. In addition, these classes meet the lower-division requirements for college transfer students in many pre-professional programs. Our programs work closely with community partners to provide applied learning experiences for our students.

## Department Goals and Objectives

1. To provide coursework in the humanities and social sciences in order to prepare students for employment in a rapidly changing global market.
2. To provide course offerings in multiculturalism and globalization.
3. To assist students in developing critical thinking and problem-solving abilities and to develop scientific knowledge and inquiry skills.
4. To assist students in developing ethical and cultural awareness.
5. To prepare students to be responsible citizens and lifelong learners.
6. To assist students in developing an aesthetic appreciation of the arts.

## Applied Behavior Analysis

### Degree Offered

- Master of Science in Applied Behavior Analysis

## Certificate Offered

- Applied Behavior Analysis Graduate Certificate

Oregon's first master's degree in applied behavior analysis, the MS-ABA curriculum focuses on providing a rigorous and thorough foundation in the science of behavior analysis. Students will be prepared to apply the principles of behavior analysis with diverse populations and in a wide variety of settings. Oregon Tech's MS-ABA prepares students to meet national certification and Oregon licensure requirements.

Courses are taught on the Klamath Falls and Portland-Metro campuses and are available to students everywhere via Zoom (a synchronous videoconferencing program). The use of Zoom technology provides an alternative to fully online, asynchronous programs for students in all areas of the state who prefer the real-time, face-to-face educational experience.

- Integrated Behavioral Healthcare & Medical Family Therapy

As the only graduate certificate of its kind offered in the State of Oregon, the Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy at Oregon Tech will help meet the growing demand for qualified mental health professionals who are well-trained to work in integrated care settings, thus making students marketable and sought after, in addition to helping fill the need for health care professionals in southern Oregon and other underserved areas of the nation.

The Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy is embedded within the M.S. Marriage and Family Therapy (MFT) Program's curriculum. The Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy is currently open to students admitted to the M.S. Marriage and Family Therapy Program and is a 12-credit, four-course sequence that trains Oregon Tech's MS MFT students to specifically work within an integrated behavioral health model.

Titles given to those with this specialized training are "Behavioral Health Clinician," "Behavioral Health Practitioner," "Integrated Behavioral Health Therapist," or "Medical Family Therapist." Those with this certificate will typically work in integrative healthcare or collaborative healthcare settings, wherein they collaborate closely with primary care and medical providers, as well as other helping disciplines, to help patients and their families. They typically work in hospitals, doctors' offices, other medical settings, private practice offices, and community mental health agencies. Students who complete the necessary coursework within the M.S. MFT Program at Oregon Tech, which means earning a grade of "A" or "B" in each course, will earn the Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy.

### Applied Behavior Analysis

Applied Behavior Analysis (ABA) is an evidence-based, data-driven, systematic approach to intervention. Practitioners of ABA apply principles of reinforcement and focus on applications that improve the quality of life for individuals. Behavior analysts provide services in a variety of settings including schools, clinics, rehabilitation settings, residential facilities, social service agencies, mental health facilities, businesses, and client homes. They work with diverse populations including individuals and families affected by autism, developmental and intellectual disabilities, brain injury, mental health, geriatrics, child abuse, and neglect.

## Program Mission

The mission of the MS-ABA program is to enable students to become effective and ethical behavior analysts. Students will be prepared to apply principles of behavior analysis to enhance the lives of individuals across a wide variety of settings. The program emphasizes a foundation in theory, concepts, and principles, development of basic behavior analytic skills, and an emphasis on professional and ethical responsibilities.

## Program Objectives

1. To produce competent graduates who can work effectively and ethically across settings and with diverse populations
2. To enable students to obtain the knowledge and skills necessary for immediate employment in ABA and/or further graduate study in ABA and related areas
3. To prepare students for national certification and Oregon licensure as behavior analysts

### Program Learning Outcomes

1. Students will understand the history and philosophy of behaviorism and basic theoretical approaches to understanding behavior.
2. Students will demonstrate competence in understanding how principles of behavior are discovered and described in the context of basic research.
3. Students will use technical terminology to explain and provide examples of the characteristics, concepts, principles, and processes of behavior analysis.
4. Students will demonstrate an understanding of, and ability to conduct behavioral assessments and functional behavioral analyses (FBA), and identify strengths and limitations of assessments and FBAs.
5. Students will demonstrate competence in the measurement of behavior, data collection, data analysis, and graphic representation.
6. Students will demonstrate competence in single-subject research designs and will identify and describe the advantages, disadvantages, and ethical considerations of research designs.

7. Students will critically evaluate research, analyze, and apply research findings to the practice of applied behavior analysis.
8. Students will explain the fundamental elements of behavioral interventions including behavior change strategies, procedures and systems, including identification of scientific evidence and methods for ensuring effective implementation and maintenance of behavioral programs.
9. Students will demonstrate an understanding of the legal constraints and ethical guidelines as pertinent to behavioral research and practice.
10. Students will demonstrate an understanding of the roles, functions, and responsibilities of professional behavior analysts, including relationships with professional organizations, and maintaining professional credentials.
11. Students will demonstrate the professional skills essential to developing professional and therapeutic relationships, set goals, maintain boundaries, evaluate client outcome, terminate treatment, and collaborate with other professionals.
12. Students will demonstrate competent oral and written communication.

## Licensure and Certification

MS-ABA prepares students to meet national certification and Oregon licensure requirements. The program includes the Association of Behavior Analysis-International (ABAI) verified course sequence VCS) and practicum experience that meets national certification requirements for supervised experience

**BCBA course sequence:** the Association for Behavior Analysis-International has verified these courses as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst® exam. (Applicants will have to meet additional requirements to qualify)

**ABA Practicum:** second year practicum placements provide students with the opportunity for supervised experience. Practicum placements may be paid or unpaid positions with approved ABA agencies and, in Klamath Falls, with Oregon Tech's BIG ABA clinic and local schools

## Admissions

In order to ensure that students have the necessary preparation for success in the MS-ABA program, applicants must meet the Oregon Tech requirements for admission as well as the MS-ABA program specific requirements.

Applicants to the MS-ABA program at Oregon Tech shall meet the following requirements:

- Bachelor's Degree: Bachelor's degree from an accredited four-year institution in Psychology or a related field.
- GPA: Overall undergraduate GPA of 3.0 on a 4.0 scale and 3.0 for the last 90 quarter credits (60 semester) credits of coursework.
- Undergraduate Coursework: A grade of B or better in General Psychology, Research Methods, and Statistics.
- Academic Standing: Be in good academic standing at last college or university attended.
- GRE Scores: Graduate Record Examination scores for Verbal Reasoning at 150, for Quantitative Reasoning at 141, and for Analytical Writing at 3.5. GRE scores over five years old are not accepted.
- Personal Statement and Resume: Applicants will be required to write a statement that addresses career goals and relevance to the program, evidence of aptitude for graduate work and evidence of potential for success in the field.
- Reference Letters: Applicants to the program will be required to provide three letters of reference (at least one academic and one professional) that address the applicant's preparation, abilities, and character.
- Background Check: Due to the sensitive nature of this program in regard to work with children and/or vulnerable populations, applicants must pass a criminal background check such as that conducted by the Oregon Department of Human Services (DHS).
- The department and university can grant conditional admission to candidates not meeting all of the minimum requirements.

## Level of Course Work

All course work applied toward the master's degree must be earned in courses designed for graduate students; these courses are generally numbered 500 and above. Oregon Tech undergraduate seniors may enroll in 500 level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the department chair. Nine credits are applicable to a graduate degree. Undergraduate seniors may enroll in graduate-level courses for undergraduate credit subject to each department's policy. Oregon Tech offers some courses which are dual listed at the 400- and 500-level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply only to a graduate degree. Students enrolled in a dual-listed 500-level course will be required to complete additional work for graduate credit. Students may audit graduate courses subject to the policy described in the General Catalog. Audited courses cannot be used to meet degree requirements.

# Marriage and Family Therapy

## Degree Offered

- Master of Science in Marriage and Family Therapy (MS MFT)

## Program Overview

The MFT Program at Oregon Tech is a full-time mental health graduate program with specialized training in systems, families, and relationships. Students are admitted to the program to begin coursework each fall. The MFT Program takes 2.75 years to successfully complete; part-time opportunities are available upon request. A year-long practicum experience begins in June between years two and three of the program. Courses are offered nights, weekends, and days in variety of modalities, including: face-to-face in person; face-to-face via video conferencing; blended; and fully online.

**Rural Mental Health Care:** Mental health care needs in rural areas, like southern Oregon, provide unique challenges that require unique approaches. MFT students develop the expertise and skills required to excel as rural mental health care providers.

**Integrated Behavioral Health and Medical Family Therapy:** Medical health and mental health often influence one another. These not only affect the patient, but the patient's partner and family system as well. The MFT Program has embedded Integrated Behavioral Healthcare and Medical Family Therapy courses into the curriculum to help graduates develop the knowledge and skills required to become indispensable leaders in medical family therapy, who often work in medical settings and work closely and collaboratively with medical personnel.

**Substance Use, Addiction, and Recovery:** Mental health and addiction frequently co-exist. The MFT Program has integrated addiction courses into the curriculum in an effort to graduate competent trauma-informed, systemic clinicians with a strong foundation in addiction and recovery.

## Program Mission Statement

Oregon Tech's Master of Science in Marriage and Family Therapy program prepares graduates to become skilled Marriage and Family Therapists with multicultural competence, expertise in rural mental health care, medical family therapy and substance use disorders and addictions treatment.

In strong collaboration with local child and family service organizations, health care and mental health care providers, the MS MFT program supports and strengthens mental health care and child and family services in the under-served rural areas that are in southern Oregon.

## Program Objectives

1. Teach foundational knowledge related to human development, basic counseling skills, MFT theories and interventions, assessment and diagnosing, cultural humility, rural mental health care, and research.
2. Train trauma-informed and culturally competent marriage and family therapists.
3. Teach the integration of mental health and addiction and recovery in the etiology and treatment of co-occurring disorders.
4. Train marriage and family therapists in Integrated Behavioral Healthcare and Medical Family Therapy practices.
5. Increase awareness of issues of diversity, inclusion and social justice for the delivery of culturally-responsive and culturally-sensitive family therapy.
6. Promote the importance of ethical principles while upholding ethical standards that are consistent with the AAMFT Code of Ethics and the ACA Code of Ethics.

## Program Learning Outcomes

1. Theoretical Knowledge

Competency: Apply principles and constructs of various human development and systems theories to marriage and family practice.

2. Clinical Knowledge

Competency: Apply family therapy skills and techniques to assess, structure and direct therapy, help clients to find solutions, identify strengths, and stay engaged in the therapeutic process.

3. Professional Identity and Ethics

Competency: Develop professional identity consistent with professional attitudes and behaviors outlined in the AAMFT Code of Ethics and applicable laws and regulations, with particular attention to cultural competence.

4. Cultural Competency

Competency: Demonstrate knowledge about systemically and culturally contextualized experiences of members of socio-cultural majority and minority groups, integrating that knowledge into ethical practice as marriage and family therapists.

5. Research

Competency: Analyze research and translate research findings for improvement of family therapy services using statistics and program evaluation methods.



## 6. Interpersonal Effectiveness

Competency: Achieve personal development and demonstrate positive relationship skills via effective communication, respect for others, and awareness of their impact on others.

## Licensure and Credentialing

The Oregon Tech MFT Program has a comprehensive curriculum, approved by the Oregon Board of Licensed Professional Counselors and Therapists. Graduates will meet curriculum requirements for licensing as Licensed Marriage and Family Therapists in the state of Oregon.

The MFT Program curriculum is designed to meet COAMFTE requirements.

The certification of alcohol and drug counselors in the state of Oregon is overseen by the Mental Health and Addiction Certification Board of Oregon (MHACBO). Graduates of the MFT Program at Oregon Tech will meet the educational requirements for credentialing as Certified Alcohol and Drug Counselors III (CADC III).

## Career Opportunities

MFTs are trained in both psychotherapy and in family systems, which allows them to focus on understanding client symptoms in the context of the relational interactions that influence behavior. Family-based therapy is a powerful model for change. Research has shown that family-based interventions such as those utilized by MFTs are as effective as—and in many cases more effective than—alternative therapies, often at a lower cost. MFTs apply a holistic perspective to health care; they are concerned with the overall, long-term well-being of individuals and their families. Whoever the client, MFTs view problems from a relationship perspective. Settings in which MFTs become employed include, but are not limited to:

- Community mental health centers/agencies
- Child and family service agencies
- Private practice
- Religious and spiritual organizations
- Hospitals and medical settings
- School-based therapy settings
- Veterans services facilities
- Residential treatment facilities
- Addiction and recovery services

## Admission

In order to ensure that students have the necessary preparation for success in the MS-MFT program, applicants must meet the Oregon Tech requirements for admission as well as the MS-MFT program specific requirements.

Applicants to the MS-MFT program at Oregon Tech shall meet the following requirements:

- Bachelor's Degree: Bachelor's degree from an accredited four-year institution in Psychology, Sociology, Anthropology, Human Development, Family Studies, or related field.
- GPA: Overall undergraduate GPA of 3.0 on a 4.0 scale and 3.0 for the last 90 quarter credits (60 semester) credits of coursework.
- Undergraduate Coursework: A grade of B or better in Introduction to Psychology or Sociology, Research Methods, and Human Sexuality.
- Academic Standing: Be in good academic standing at last college or university attended.
- GRE Scores – GRE scores over five years old are not accepted.
- Personal Statement and Resume: Applicants will be required to write a statement that addresses career goals and relevance to the program, evidence of aptitude for graduate work and evidence of potential for success in the field.
- Reference Letters: Applicants to the program will be required to provide three letters of reference (at least one academic and one professional) that address the applicant's preparation, abilities, and character.
- Updated resume
- Background Check: Due to the sensitive nature of this program in regard to work with children, families, and/or vulnerable populations, applicants must pass a criminal background check
- The department and university can grant conditional admission to candidates not meeting all of the minimum requirements.

## Level of Course Work

All course work applied toward the master's degree must be earned in courses designed for graduate students; these courses are generally numbered 500 and above. Oregon Tech undergraduate seniors may enroll in 500 level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the department chair. Nine credits are applicable to a graduate degree. Undergraduate seniors may enroll in graduate-level courses for undergraduate credit subject to each department's policy. Oregon Tech offers some courses which are dual listed at the 400- and 500-

level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply only to a graduate degree. Students enrolled in a dual-listed 500-level course will be required to complete additional work for graduate credit. Students may audit graduate courses subject to the policy described in the General Catalog. Audited courses cannot be used to meet degree requirements.

## Applied Psychology

### Degree Offered

- Bachelor of Science in Applied Psychology

The Bachelor of Science in Applied Psychology prepares students for careers that apply the principles of psychology in diverse settings. The program provides a strong core curriculum in order for students to understand the foundations, theories, and principles of each area of psychology. As an applied program, both core and elective courses have a skills-based focus, allowing students to identify personal strengths, apply knowledge to real-world situations, create and implement new ideas, and ultimately be prepared to enter the workforce or continue on to graduate programs. A diverse offering of elective courses allows for students to focus on one or many areas of psychology, creating a unique opportunity for students to have an in-depth and personalized psychology degree. Students should consult with their advisor about specific interests for guidance in regard to elective offerings. The Applied Psychology program also offers Capstone in Applied Psychology (CAP) courses. These CAP courses vary by term and give senior students the opportunity to synthesize knowledge learned throughout the degree program and apply core principles and theories of psychology to a selected topic. Through an Applied Experience, students have the opportunity to participate in externships, advanced research courses, or community work to prepare themselves for exciting and rewarding careers in psychology or for additional course work in graduate programs.

### Mission Statement

The mission of the Applied Psychology Program is to enable students to apply core principles and theories of psychology and in-depth knowledge and skills in specific areas of psychology to communicate effectively, think critically, behave ethically and with cultural awareness, and work interpersonally with people from a wide variety of backgrounds.

### Career Opportunities

Nationwide, college graduates with a bachelor's in psychology perform a wide variety of jobs or attend a wide variety of graduate programs. Graduates may work in counseling, education, social service, management, public relations, public health, and other fields. All of these jobs are potentially available to graduates of Oregon Tech's Applied Psychology Program. Many of Oregon Tech's Applied Psychology graduates have found jobs in Oregon and beyond. Human service employers include county and state agencies, as well as a wide range of private and non-profit agencies. Graduates of Oregon Tech's Applied Psychology Program benefit from the emphasis of hands-on training and applied experiences. Graduates have also completed a Master of Arts in Teaching (MAT) and pursue careers in education, such as teaching, school counseling, and special education. Graduates have also been employed in industry and are following management training programs. Finally, graduates have pursued various master's and doctoral programs in psychology and related fields.

### Program Educational Objectives

The educational objectives of the Applied Psychology program are:

- To produce graduates with effective interpersonal skills who can work in a variety of practical settings.
- To enable students to obtain the knowledge and skills necessary for immediate employment and/or graduate study in psychology and related areas.
- To provide opportunities for students who wish to apply psychology training to employment in business and human service related organizations or to prepare for graduate programs in related areas.
- To serve as a minor to complement other programs on campus.

### Program Learning Outcomes

1. Students will demonstrate an understanding of and be able to use major research methodologies in psychology, including design, data analysis, and interpretation
2. Students will demonstrate knowledge and understanding of relevant ethical issues including a general understanding of the APA Code of Ethics.
3. Students will demonstrate basic counseling.
4. Students will demonstrate effective writing conventions by using APA style effectively in empirically based reports, literature reviews and theoretical papers.
5. Students will demonstrate effective oral communication skills in various formats (e.g. group discussion, debate and lecture).

# Population Health Management

Kyle Chapman, *Program Director, Advising Coordinator*

Sophie Nathenson, *Director, Population Health Management Research Center*

*Participating Faculty:* K. Chapman, S. Nathenson

## Degree Offered

- Bachelor of Science in Population Health Management

The Population Health Management (PHM) professions are complementary to clinical health care. Population Health Management is the field of translating health data into actionable programs and policies that improve the health of a group of people. The PHM B.S. degree program includes core courses in medical sociology, population health, applied psychology, management, mathematics, communication, and health sciences. Students may choose one of three emphases: Health Counseling/Outreach, Care Management and Coordination, and Applied Health Data Analytics.

The PHM program begins with a foundation in sociological theory, methods and research.

PHM graduates will gain competence in social theory, research methods, statistics, program planning and evaluation, and training in working with diverse and under-served populations.

## Mission Statement

The mission of the PHM program is to provide students with the best possible training for careers that improve health and well-being. As the United States health care system changes to adapt to a new demographic and health landscape, increasing emphasis is placed on preventative medicine and health maintenance. PHM graduates will help fill this pressing need, providing much needed health resources to hospitals, schools, governmental and non-profit organizations, and local communities. Such work empowers individuals through health programs and policy, to create a healthier future for our nation.

## Career Opportunities

Students who graduate from the PHM program may work in a wide variety of settings, all with the intent of improving the health and well-being of individuals and communities. Careers include health coaching, health research, community health program and evaluation, education, and patient advocacy. The PHM degree is an ideal preparation for graduate study in sociology, epidemiology, public health and medicine.

## Program Learning Outcomes

1. Students will demonstrate knowledge of basic theoretical frameworks of sociology and demonstrate an ability to apply social theory to behavioral trends.
2. Students will demonstrate understanding of the impact of such factors as culture, ethnicity, nationality, age, gender, sexual orientation, mental and physical characteristics, family values, education, religious and spiritual values, and socio-economics status on the health and wellbeing of individuals; students will demonstrate cultural competency.
3. Students will demonstrate an understanding of the sociological research method, including an ability to organize, analyze, and present data.
4. Students will demonstrate an understanding of the roles, functions, and responsibilities of healthcare professionals and patients, including alternative approaches to healthcare.
5. Students will demonstrate an understanding of health behavior change and the ability to practice techniques to assist others with health-seeking behavior changes.

## Oregon Transfer Module (OTM)

The Oregon Transfer Module (OTM) provides a one-year curriculum for students who plan to transfer to a State of Oregon community college or university. The module allows students to complete one year of general education foundation course work that is academically sound and will meet the admission standards of the receiving school. Students should work closely with an academic advisor to ensure selection of appropriate course work. Upon transfer, students may be required to complete additional course work in general education or an academic major specific to the receiving institution. Students who transfer prior to the completion of the Oregon Transfer Module will have their courses individually evaluated by the receiving institution. Students must complete a minimum of 45 credits of lower division course work with a grade of "C-" or better in order to receive credit for the Oregon Transfer Module. A minimum of 12 credits must be earned at Oregon Tech. The following courses may be used to complete the Oregon Transfer Module:

## **FOUNDATIONAL SKILLS**

### **Writing and Oral Communication**

#### **Writing**

Two courses of college level composition

#### **Oral Communication**

One course of Public Speaking or Communication

#### **Mathematics**

One course of College level Math

## **INTRODUCTION TO DISCIPLINES**

### **Arts and Letters/Humanities**

3 courses of Arts and letters/Humanities

Oregon Tech only allows 3 credits of performance or studio-based courses in this category

### **Science/Math/Computer Science**

3 courses, including at least one biological or physical science with a laboratory

### **Social Science**

3 courses of Social Science

## Arts, Literature, and Philosophy (ALPs) Minor

The ALPs minor may be completed by students from any major and is especially recommended to students who want an opportunity to take a secondary focus in the Humanities during their time at Oregon Tech. This secondary focus will give them an opportunity to further explore their passions in the fields of Arts, Literature, and Philosophy while receiving official recognition of their newly-acquired expertise. The minor will give students the ability to take more Humanities classes that are relevant to their major program and their future career goals while instilling in them the knowledge and values associated with a traditional liberal arts education.

The minor requires 18 credit hours, including one of the required courses listed below (3 credits). The remaining courses must be chosen from the following prefixes: ART, HUM, LIT, PHIL. At least 12 of these 15 credit hours must be upper division courses. Transfer students must take at least 9 hours of their minor credits at Oregon Tech to qualify.

### Requirements of the Minor

#### Required Courses

**(3 credits, one from this set is required, but others can be counted toward electives, below):**

HUM 105 - EAC: Text, Images, Games Credit Hours: 3  
HUM 125 - Intro Tech, Soc, Value Credit Hours: 3  
HUM 147 - West Cult in the Classical Age Credit Hours: 3 (f/k/a Introduction to Humanities I)  
HUM 148 - West Cult in the Medieval Age Credit Hours: 3 (f/k/a Introduction to Humanities II)  
HUM 149 - West Cult in the Modern Age Credit Hours: 3 (f/k/a Introduction to Humanities III)  
LIT 253 - 19th Century American Lit Credit Hours: 3 (f/k/a American Literature I)  
LIT 254 - 20th Century American Lit Credit Hours: 3 (f/k/a American Literature II)  
LIT 255 - Contemporary American Lit Credit Hours: 3 (f/k/a American Literature III)  
PHIL 105 - Introduction to Ethics Credit Hours: 3  
PHIL 205 - Introduction to Logic Credit Hours: 3

#### Electives

(15 credits, at least 12 upper division):

ART 205 - Introduction to Watercolors Credit Hours: 3  
ART 210 - Beginning Sculpture Credit Hours: 3  
ART 220 - Basic Drawing Credit Hours: 3  
ART 226 - Digital Photography Credit Hours: 3  
ART 280 - Introductory Painting Credit Hours: 3  
ART 282 - Intro to Acrylic Painting Credit Hours: 3  
HUM 105 - EAC: Text, Images, Games Credit Hours: 3  
HUM 125 - Intro Tech, Soc, Value Credit Hours: 3  
HUM 147 - West Cult in the Classical Age Credit Hours: 3 (f/k/a Introduction to Humanities I)  
HUM 148 - West Cult in the Medieval Age Credit Hours: 3 (f/k/a Introduction to Humanities II)

HUM 149 - West Cult in the Modern Age Credit Hours: 3 (f/k/a Introduction to Humanities III)  
HUM 235 - Introduction to Film Credit Hours: 4  
HUM 345 - Digital Culture and Society Credit Hours: 3  
HUM 335 - Video Game Studies Credit Hours: 3  
LIT 104 - Intro to Literature Credit Hours: 3  
LIT 105 - Intro to Literature Credit Hours: 3  
LIT 106 - Intro to Literature Credit Hours: 3  
HUM 225 - Cont Thtr: Ashland Plays Credit Hours: 3  
LIT 235 - American Multicultural Lit Credit Hours: 3  
LIT 253 - 19th Century American Lit Credit Hours: 3 (f/k/a American Literature I)  
LIT 254 - 20th Century American Lit Credit Hours: 3 (f/k/a American Literature II)  
LIT 255 - Contemporary American Lit Credit Hours: 3 (f/k/a American Literature III)  
LIT 266 - Native American Lit & Film Credit Hours: 3  
LIT 305 - Ecol Issues in Nature Writing Credit Hours: 3  
LIT 315 - Science Fiction Lit & Flim Credit Hours: 3  
LIT 325 - The Metropolis Credit Hours: 3  
LIT 335 - Travel Lit: Fiction & Nonfict Credit Hours: 3  
LIT 345 - Postapocalyptic Lit & Film Credit Hours: 3  
LIT 367 - Art & Trash in Contemp Fiction Credit Hours: 3  
LIT 373 - British Culture & Literature Credit Hours: 3  
LIT 381 - Contemporary World Lit Credit Hours: 3  
LIT 456 - Topics in Film Credit Hours: 3  
PHIL 105 - Introduction to Ethics Credit Hours: 3  
PHIL 205 - Introduction to Logic Credit Hours: 3  
PHIL 215 - Ethical Theory Credit Hours: 3  
PHIL 305 - Medical Ethics Credit Hours: 3  
PHIL 315 - The Ethics of Emerging Tech Credit Hours: 3  
PHIL 325 - Environmental Ethics Credit Hours: 3  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
PHIL 335 - Philosophy of Science Credit Hours: 3  
PHIL 342 - Business Ethics Credit Hours: 3  
PHIL 405 - Advanced Logic Credit Hours: 3

## Medical Sociology Minor

The Department of Humanities and Social Sciences offers a Medical Sociology Minor as a supplement to the Oregon Tech technical and applied degrees related to health, health care, management and social science. The minor offers courses covering the central topics of medical sociology, including the social factors in health and illness, the patient experience of illness, the role of health care professionals, and the interaction between health and society.

The Medical Sociology Minor is designed with the current employer demands and changes in health care organization in mind. Many employers within the health care field seek employees who are culturally competent, prepared to work with diverse populations, and are familiar with social determinants of health.

A minimum of 20 or 21 credits is required to complete the minor. Enrollment in the minor is through the Humanities and Social Sciences Department; contact the department chair or your advisor for more information.

### Required Courses

SOC 204 - Intro to Sociology Credit Hours: 3 <sup>a</sup>  
SOC 225 - Medical Sociology Credit Hours: 3  
SOC 325 - Global Population Health Credit Hours: 3  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3

### Choose three courses from the following:

Two of the three courses must be 300 or 400 level.

BIO 200 - Medical Terminology Credit Hours: 2  
BUS 316 - Total Quality Health Care Credit Hours: 3  
COM 225 - Interpers Communication Credit Hours: 3  
COM 345 - Organization Comm I Credit Hours: 3  
COM 346 - Health Communication Credit Hours: 3  
HIST 275 - Intro to Hist of Medicine Credit Hours: 3  
PHIL 305 - Medical Ethics Credit Hours: 3  
PSY 202 - Psychology Credit Hours: 3  
PSY 330 - Social Psychology I Credit Hours: 3  
PSY 336 - Health Psychology I Credit Hours: 3  
PSY 371 - Human Sexuality I Credit Hours: 3  
PSY 372 - Human Sexuality II Credit Hours: 3  
SOC 305 - Rural Health Credit Hours: 3  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
SOC 307 - Seminar Credit Hours: 15 will be considered as electives pending program director approval.  
SOC 407 - Seminar Credit Hours: 12 will be considered as electives pending program director approval.  
or  
PSY 307 - Seminar Credit Hours: 6 will be considered as electives pending program director approval.  
PSY 407 - Seminar Credit Hours: 12 will be considered as electives pending program director approval.

*Students are required to take SOC 204 before taking SOC 225*

## **Psychology Minor**

The psychology minor is open to all majors and is especially recommended for students majoring in allied health and medical sciences, management, and communication studies. The minor offers a variety of courses in psychology that can enhance knowledge. A minimum of 24 credits is required to complete the minor. Students should meet with a psychology advisor when choosing electives to fulfill the minor requirements. Enrollment in the minor is through the Humanities and Social Sciences Department; contact the department chair or your advisor for more information.

### **Requirements of the Minor**

A minimum of 24 credits is required to earn the minor.

A minimum of 12 credits must be selected from upper-division coursework. Students must pay strict attention to prerequisite requirements.

### **Required Courses**

SOC 204 - Intro to Sociology Credit Hours: 3 <sup>a</sup>

SOC 225 - Medical Sociology Credit Hours: 3

SOC 325 - Global Population Health Credit Hours: 3

SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3

### **Courses Required lower division courses (9 credits):**

PSY 201 - Psychology

PSY 202 – Psychology

PSY 203 – Psychology

### **Additional Courses:**

12 credits of upper division psychology courses

3 credits of lower or upper division courses

For all courses counted toward the Minor in Psychology, a letter grade of "C" or better is required to be awarded the minor.

At least 12 credits of courses in this minor must be completed at Oregon Tech.

**Note:** Not all courses are offered every term or every year.

# Applied Behavior Analysis Graduate Certificate

The Certificate in Applied Behavior Analysis is a 33-credit, twelve-course sequence for individuals who wish to pursue additional coursework in Applied Behavior Analysis. The Association for Behavior Analysis International has verified this course sequence as meeting the course work requirements for eligibility to take the Board Certified Behavior Analyst® exam (applicants for the BCBA® exam will have to meet additional requirements to qualify).

## Program Learning Outcomes

Upon completion of the Certificate in Applied Behavior Analysis, students will be able to:

1. Explain and provide examples of basic characteristics, principles, processes, and concepts of Applied Behavior Analysis
2. Select, design, and use appropriate methods to measure behavior
3. Display and interpret behavioral data in various formats
4. Evaluate behavioral interventions using appropriate experimental designs
5. Identify and describe the advantages, disadvantages, and ethical considerations of behavior analytic experimental designs
6. Read and interpret behavior analytic literature
7. Describe the major methods for conducting behavioral assessments and functional analyses, including strengths and limitations
8. Explain the fundamental elements of behavioral interventions including behavior change strategies, procedures and systems, including identification of scientific evidence
9. Describe methods for ensuring effective implementation and management of behavioral programs
10. Describe and provide examples of the ethical and professional responsibilities of behavior analysts and apply the BACB® Ethics Code for Behavior Analysts

## Required Courses

- ABA 511 - Foundations of ABA I Credit Hours: 3
- ABA 512 - Foundations of ABA II Credit Hours: 3
- ABA 521 - Ethics & Professional Issues I Credit Hours: 2
- ABA 522 - Ethics & Profess Issues II Credit Hours: 3
- ABA 524 – Observations and Measures Credit Hours: 2
- ABA 525 - Research Methods in ABA Credit Hours: 3
- ABA 526 - Behavioral Assessment I Credit Hours: 3
- ABA 527 – Radical Behaviorism Credit Hours: 3
- ABA 531 - Behavior Change I: Decreasing Challenging Behavior Credit Hours: 3
- ABA 532 – Behavior Change II: Increasing & Maintaining Behavior Credit Hours: 3
- ABA 546 – Behavioral Assessment II Credit Hours: 2
- ABA 547 – Supervision & Personnel Management Credit Hours: 3



## **Integrated Behavioral Healthcare & Medical Family Therapy Graduate Certificate**

As the only graduate certificate of its kind offered in the State of Oregon, the Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy at Oregon Tech will help meet the growing demand for qualified mental health professionals who are well-trained to work in integrated care settings, thus making students marketable and sought after, in addition to helping fill the need for health care professionals in southern Oregon and other underserved areas of the nation.

The Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy is embedded within the M.S. Marriage and Family Therapy (MFT) Program's curriculum. The Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy is a 12-credit, four-course sequence that trains Oregon Tech's MS MFT students to specifically work within an integrated behavioral health model.

Titles given to those with this specialized training are "Behavioral Health Clinician," "Behavioral Health Practitioner," "Integrated Behavioral Health Therapist," or "Medical Family Therapist." Those with this certificate will typically work in integrative healthcare or collaborative healthcare settings, wherein they collaborate closely with primary care and medical providers, as well as other helping disciplines, to help patients and their families. They typically work in hospitals, doctors' offices, other medical settings, private practice offices, and community mental health agencies. Students who complete the necessary coursework within the M.S. MFT Program at Oregon Tech, which means earning a grade of "A" or "B" in each course, will earn the Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy.

### **Program Learning Outcomes**

Upon completion of the Certificate in Applied Behavior Analysis, students will be able to:

1. Describe the multiple professional roles and functions of counselors across specialty areas, and their relationships with human service and integrated behavioral healthcare systems, including interagency and inter-organizational collaboration and consultation
  1. Describe the roles and functions unique to Rural Mental Healthcare
  2. Describe the roles and functions unique to Medical Family Therapy
2. Understand, describe, and apply biopsychosocial-spiritual approaches to healthcare.
3. Understand and describe how to work collaboratively as members of holistic medical teams, including how to refer, document, and communicate with healthcare professionals.
4. Understand and describe the bidirectional relationship between health and wellness on mental health functioning.
5. Demonstrate knowledge of the demands and needs of patients and families affected by acute and chronic illness.
  1. Describe how working with families around their cultural and illness beliefs can help them.
  2. Describe how therapeutic interventions can be informed by the family's developmental stage and the illness's psychosocial typology.
  3. Articulate how cultural considerations must be practiced with patients and their families.
6. Understand and describe how the care of patients and families affected by acute and chronic illness impacts mental health and medical providers.
7. Describe how students' own experiences with health and illness may affect their clinical work.
8. Understand and describe how to facilitate communication between patients, families, and healthcare providers and invite coordination of services.
9. Identify the obstacles faced by individual and families residing in rural communities who require treatment for substance use and co-occurring disorders.
10. Explain the roles of Medical Family Therapists and Behavioral Health Clinicians in integrated SUDs treatment.
11. Articulate the professional ethics and standards of practice that apply to the systemic treatment of patients in medical settings, and in addiction and recovery in underserved rural communities.

## **Applied Behavior Analysis Graduate Certificate**

The Certificate in Applied Behavior Analysis is a 27-credit, nine-course sequence for individuals who wish to pursue additional coursework in Applied Behavior Analysis. The Behavior Analyst Certification Board, Inc.® has approved this course sequence as meeting the course work requirements for eligibility to take the Board Certified Behavior Analyst® exam (applicants for the BCBA® exam will have to meet additional requirements to qualify).

### **Required Courses (27 Credits)**

- ABA 511 - Foundations of ABA I Credit Hours: 3
- ABA 512 - Foundations of ABA II Credit Hours: 3
- ABA 521 - Ethics & Professional Issues I Credit Hours: 2
- ABA 525 - Research Methods in ABA Credit Hours: 3
- ABA 526 - Behavioral Assessment I Credit Hours: 3
- ABA 531 - Behavioral Change I: Decreasing Challenging Behavior Credit Hours: 3
- ABA 532 - Behavioral Change II: Increasing and Maintaining Behavior Credit Hours: 3
- ABA 535 - Special Topics in ABA Credit Hours: 3

# Applied Behavior Analysis, MS

## Curriculum

Required courses and recommended terms during which they should be taken:

### First Year Fall

ABA 501 - ABA Colloquium Credit Hours: 1  
ABA 511 - Foundations of ABA I Credit Hours: 3<sup>b</sup>  
ABA 515 - Basic Behavior Analysis Credit Hours: 3  
ABA 521 - Ethics & Professional Issues I Credit Hours: 2<sup>b</sup>

**Total: 9 Credit Hours**

### Winter

ABA 501 - ABA Colloquium Credit Hours: 1  
ABA 512 - Foundations of ABA II Credit Hours: 3<sup>b</sup>  
ABA 526 - Behavioral Assessment I Credit Hours: 3<sup>b</sup>  
ABA 527 - Radical Behaviorism Credit Hours: 3

**Total: 10 Credit Hours**

### Spring

ABA 501 - ABA Colloquium Credit Hours: 1  
ABA 516 - ABA and Human Development Credit Hours: 3  
ABA 525 - Research Methods in ABA Credit Hours: 3<sup>b</sup>  
ABA 531 - Behavioral Change I: Decreasing Challenging Behavior  
Credit Hours: 3<sup>b</sup>

**Total: 10 Credit Hours**

### Summer

ABA 535 - Special Topics in ABA Credit Hours: 3<sup>b</sup>  
ABA 598 - Supervised Practicum Credit Hours: 2<sup>a</sup>

**Total: 5 Credit Hours**

### Second Year Fall

ABA 532 - Behavioral Change II: Increasing and Maintaining

**Total for a M.S. in Applied Behavior Analysis: 58/59 Credit Hours**

Behavior Credit Hours: 3<sup>b</sup>

ABA 598 - Supervised Practicum Credit Hours: 2<sup>a</sup>

ABA 599 - Thesis Credit Hours: 1

**Total: 6 Credit Hours**

### Winter

ABA 536 - Behavior, Physiology, and Pharmacology Credit Hours: 3

ABA 598 - Supervised Practicum Credit Hours: 2<sup>a</sup>

ABA 599 - Thesis Credit Hours: 1

ABA Elective Credit Hours: 3

**Total: 9 Credit Hours**

### Spring

ABA 598 - Supervised Practicum Credit Hours: 2<sup>a</sup>

or

ABA Elective Credit Hours: 3

ABA 599 - Thesis Credit Hours: 1

ABA Elective Credit Hours: 3

ABA Elective Credit Hours: 3

**Total: 9/10 Credit Hours**

### Elective Courses

ABA 565 - Organizational Behavior Management Credit Hours: 3

ABA 566 - ABA and Education Credit Hours: 3

ABA 567 - ABA and Health Credit Hours: 3

ABA 575 - Community Behavior Analysis Credit Hours: 3

ABA 576 - Clinical Behavior Analysis Credit Hours: 3

ABA 577 - ABA and Special Populations Credit Hours: 3

<sup>a</sup> Practicum Fee of \$xx (professional liability coverage)

<sup>b</sup> BCBA course sequence

# Applied Psychology, BS

## Degree Requirements

Students must meet the general education requirements, as stated below, and satisfactorily complete the courses listed in this curriculum to obtain the Bachelor of Science in Applied Psychology. A total of 180 credits are required for the degree. Students must complete a core program consisting of 71 credits; those core courses are PSY 201, PSY 202, PSY 203, PSY 215, PSY 216, PSY 301, PSY 311, PSY 312, PSY 313, PSY 317, PSY 330, PSY 331, PSY 334, PSY 335, PSY 339, PSY 455, PSY 475, PSY 255 or MATH 243 or MATH 361, and 12 credits toward an Applied Experience. Any of the following can count toward the Applied Experience: PSY 314, PSY 420, PSY 421, PSY 422, PSY 423, PSY 445, and/or PSY 497. Additionally, students are required to take 54 elective credits, and should work with their advisors to select elective courses that align closely with their interests and career goals. Students electing to take externship are restricted to a maximum of 32 credits. All core courses must be completed with a minimum grade of "C" in order to earn the degree.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

PSY 201 - Psychology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
Laboratory Science Elective Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 14 Credit Hours**

### Winter

PSY 202 - Psychology Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Laboratory Science Elective Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 14 Credit Hours**

### Spring

PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Laboratory Science Elective Credit Hours: 4  
Social Science Elective Credit Hours: 3  
Elective Credit Hours: 3  
**Total: 17 Credit Hours**

### Sophomore Year Fall

MATH 111 - College Algebra Credit Hours: 4  
PSY 215 - Abnormal Psychology I Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Winter

MATH 243 - Introductory Statistics Credit Hours: 4  
or  
MATH 361 - Statistical Methods I Credit Hours: 4  
or  
PSY 225 - Applied Stats for Social Sci Credit Hours: 4  
PSY 216 - Abnormal Psychology II Credit Hours: 3  
PSY 311 - Human Growth & Dev I Credit Hours: 3

Communications Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Spring

PSY 301 - Basic Counseling Techniques Credit Hours: 4  
PSY 312 - Human Growth & Dev II Credit Hours: 3  
PSY 313 - Psych Research Methods I Credit Hours: 4  
PSY 317 - Field & Career Preparation Credit Hours: 3  
**Total: 14 Credit Hours**

### Junior Year Fall

PSY 334 - Behavior Modification I Credit Hours: 4  
PSY 339 - Biopsychology Credit Hours: 3  
Electives Credit Hours: 9 <sup>a</sup>  
**Total: 16 Credit Hours**

### Winter

PSY 330 - Social Psychology I Credit Hours: 3  
PSY 335 - Behavior Modification II Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Electives Credit Hours: 6 <sup>a</sup>  
and/or  
Applied Experience Credit Hours: 6 <sup>b</sup>  
**Total: 16 Credit Hours**

### Spring

PSY 331 - Social Psychology II Credit Hours: 3  
PSY 455 - Cognitive Psychology Credit Hours: 3  
Electives Credit Hours: 9 <sup>a</sup>  
and/or  
Applied Experience Credit Hours: 9 <sup>b</sup>  
**Total: 15 Credit Hours**

### Senior Year Fall

PSY 475 - Capstone in Applied Psychology Credit Hours: 3  
Electives Credit Hours: 11 <sup>a</sup>  
and/or  
Applied Experience Credit Hours: 11 <sup>b</sup>  
**Total: 14 Credit Hours**

**Winter**Electives Credit Hours: 14 <sup>a</sup>

or

Applied Experience Credit Hours: 14 <sup>b</sup>**Total: 14 Credit Hours****Spring**Electives Credit Hours: 14 <sup>a</sup>

or

Applied Experience Credit Hours: 14 <sup>b</sup>**Total: 14 Credit Hours****Note:**

60 upper-division credits required

**Total for a B.S. in Applied Psychology: 180 Credit Hours**<sup>a</sup> Electives – 54 credits<sup>b</sup> Applied Experience – Student must complete at least 12 credits of the following: PSY 314, PSY 420, PSY 421, PSY 422, PSY 423, PSY 445, and PSY 497

## Arts, Literature, and Philosophy (ALPs) Minor

The ALPs minor may be completed by students from any major and is especially recommended to students who want an opportunity to take a secondary focus in the Humanities during their time at Oregon Tech. This secondary focus will give them an opportunity to further explore their passions in the fields of Arts, Literature, and Philosophy while receiving official recognition of their newly-acquired expertise. The minor will give students the ability to take more Humanities classes that are relevant to their major program and their future career goals while instilling in them the knowledge and values associated with a traditional liberal arts education.

The minor requires 18 credit hours, including one of the required courses listed below (3 credits). The remaining courses must be chosen from the following prefixes: ART, HUM, LIT, PHIL. At least 12 of these 15 credit hours must be upper division courses. Transfer students must take at least 9 hours of their minor credits at Oregon Tech to qualify.

### Requirements of the Minor

#### Required Course

**(3 credits, one from this set is required, but others can be counted toward electives, below):**

HUM 105 - EAC: Text, Images, Games Credit Hours: 3  
HUM 125 - Intro Tech, Soc, Value Credit Hours: 3  
HUM 147 - West Cult in the Classical Age Credit Hours: 3 (f/k/a Introduction to Humanities I)  
HUM 148 - West Cult in the Medieval Age Credit Hours: 3 (f/k/a Introduction to Humanities II)  
HUM 149 - West Cult in the Modern Age Credit Hours: 3 (f/k/a Introduction to Humanities III)  
LIT 253 - 19th Century American Lit Credit Hours: 3 (f/k/a American Literature I)  
LIT 254 - 20th Century American Lit Credit Hours: 3 (f/k/a American Literature II)  
LIT 255 - Contemporary American Lit Credit Hours: 3 (f/k/a American Literature III)  
PHIL 105 - Introduction to Ethics Credit Hours: 3  
PHIL 205 - Introduction to Logic Credit Hours: 3

#### Electives

**(15 credits, at least 12 upper division):**

ART 205 - Introduction to Watercolors Credit Hours: 3  
ART 210 - Beginning Sculpture Credit Hours: 3  
ART 220 - Basic Drawing Credit Hours: 3  
ART 226 - Digital Photography Credit Hours: 3  
ART 280 - Introductory Painting Credit Hours: 3  
ART 282 - Intro to Acrylic Painting Credit Hours: 3  
HUM 105 - EAC: Text, Images, Games Credit Hours: 3  
HUM 125 - Intro Tech, Soc, Value Credit Hours: 3  
HUM 147 - West Cult in the Classical Age Credit Hours: 3 (f/k/a Introduction to Humanities I)  
HUM 148 - West Cult in the Medieval Age Credit Hours: 3 (f/k/a Introduction to Humanities II)

HUM 149 - West Cult in the Modern Age Credit Hours: 3 (f/k/a Introduction to Humanities III)  
HUM 235 - Introduction to Film Credit Hours: 4  
HUM 345 - Digital Culture and Society Credit Hours: 3  
HUM 335 - Video Game Studies Credit Hours: 3  
LIT 104 - Intro to Literature Credit Hours: 3  
LIT 105 - Intro to Literature Credit Hours: 3  
LIT 106 - Intro to Literature Credit Hours: 3  
HUM 225 - Cont Thtr: Ashland Plays Credit Hours: 3  
LIT 235 - American Multicultural Lit Credit Hours: 3  
LIT 253 - 19th Century American Lit Credit Hours: 3 (f/k/a American Literature I)  
LIT 254 - 20th Century American Lit Credit Hours: 3 (f/k/a American Literature II)  
LIT 255 - Contemporary American Lit Credit Hours: 3 (f/k/a American Literature III)  
LIT 266 - Native American Lit & Film Credit Hours: 3  
LIT 305 - Ecol Issues in Nature Writing Credit Hours: 3  
LIT 315 - Science Fiction Lit & Film Credit Hours: 3  
LIT 325 - The Metropolis Credit Hours: 3  
LIT 335 - Travel Lit: Fiction & Nonfict Credit Hours: 3  
LIT 345 - Postapocalyptic Lit & Film Credit Hours: 3  
LIT 367 - Art & Trash in Contemp Fiction Credit Hours: 3  
LIT 373 - British Culture & Literature Credit Hours: 3  
LIT 381 - Contemporary World Lit Credit Hours: 3  
LIT 456 - Topics in Film Credit Hours: 3  
PHIL 105 - Introduction to Ethics Credit Hours: 3  
PHIL 205 - Introduction to Logic Credit Hours: 3  
PHIL 215 - Ethical Theory Credit Hours: 3  
PHIL 305 - Medical Ethics Credit Hours: 3  
PHIL 315 - The Ethics of Emerging Tech Credit Hours: 3  
PHIL 325 - Environmental Ethics Credit Hours: 3  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
PHIL 335 - Philosophy of Science Credit Hours: 3  
PHIL 342 - Business Ethics Credit Hours: 3  
PHIL 405 - Advanced Logic Credit Hours: 3

## **Integrated Behavioral Healthcare & Medical Family Therapy Graduate Certificate**

The Graduate Certificate in Integrated Behavioral Healthcare & Medical Family Therapy is a 12-credit, fourcourse sequence that provides specialized training in systemic integrated behavioral healthcare.

### **Required Courses**

MFT 562 - Rural Considerations in MH and SUD Treatment and Prevention Credit Hours: 3

MFT 566 - MedFT: Illness, Families, and Professionals Credit Hours: 3

MFT 568 - MedFT in Action: Community-based Integration & Collaboration Credit Hours: 3

MFT 510 - Introduction to MFT Credit Hours: 3

# Marriage and Family Therapy, MS

## Degree Requirements

The MS MFT requires successful completion of 90 credits of MS MFT graduate coursework. Courses are delivered in lockstep order, with prerequisites for each term offered in the previous term.

### Required Coursework

MFT 510 - Introduction to MFT Credit Hours: 3

MFT 511 - Family Therapy Theory & Practice I Credit Hours: 3

MFT 512 - MFT Theory and Practice II Credit Hours: 3

MFT 515 - MFT Practicum

MFT 516 - MFT Practicum

MFT 517 - MFT Practicum

MFT 520 - Counseling: Theory & Skills Credit Hours: 3

MFT 521 - Child & Adolescent Therapy Credit Hours: 3

MFT 522 - Couples Therapy Credit Hours: 3

MFT 523 - Group Therapy Credit Hours: 3

MFT 525 - Trauma and Recovery Credit Hours: 3

MFT 531 - Child & Adolescent Psychopathology & Diagnosis Credit Hours: 3

MFT 530 - Adult Psychopathology & Diagnosis Credit Hours: 3

MFT 540 - Research Methods Credit Hours: 4

MFT 550 - Professional Studies: Ethics Credit Hours: 3

MFT 560 - Dev. Cultural Competencies Credit Hours: 3

MFT 561 - Sexuality and Therapy Credit Hours: 3

MFT 562 - Rural Considerations in MH and SUD Treatment and Prevention Credit Hours: 3

MFT 564 - Substance Use & Co-Occuring Disorders Credit Hours: 3

MFT 566 - MedFT: Illness, Families, and Professionals Credit Hours: 3

MFT 570 - Internship I

MFT 571 - Internship II

MFT 572 - Internship III

MFT 580 - Independent Study in Marriage and Family Therapy

MFT 585 - Special Project or Training in Marriage and Family Therapy

MFT 590 - Clinical Capstone I

MFT 591 - Clinical Capstone II

## Medical Sociology Minor

The Department of Humanities and Social Sciences offers a Medical Sociology Minor as a supplement to the Oregon Tech technical and applied degrees related to health, health care, management and social science. The minor offers courses covering the central topics of medical sociology, including the social factors in health and illness, the patient experience of illness, the role of health care professionals, and the interaction between health and society.

The Medical Sociology Minor is designed with the current employer demands and changes in health care organization in mind. Many employers within the health care field seek employees who are culturally competent, prepared to work with diverse populations, and are familiar with social determinants of health.

A minimum of 20 or 21 credits is required to complete the minor. Enrollment in the minor is through the Humanities and Social Sciences Department; contact the department chair or your advisor for more information.

### Required Courses

SOC 204 - Intro to Sociology Credit Hours: 3 <sup>a</sup>

SOC 225 - Medical Sociology Credit Hours: 3

SOC 325 - Global Population Health Credit Hours: 3

#### OR

SOC 305 - Rural Health Credit Hours: 3

SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3

### Choose three courses from the following:

#### Two of the three courses must be 300 or 400 level.

BUS 316 - Total Quality Health Care Credit Hours: 3

HIST 275 - Intro to Hist of Medicine Credit Hours: 3

PHIL 305 - Medical Ethics Credit Hours: 3

PHM 105 - Intro to Population Health Management Credit Hours: 3

PHM 321 - Community Program Planning Credit Hours: 3

PHM 435 - Research Center Credit Hours: 3

SOC 205 - Current Health Issues Credit Hours: 3

SOC 206 - Social Problems Credit Hours: 3

SOC 305 - Rural Health Credit Hours: 3

SOC 345 - Aging and Society Credit Hours: 3

STAT 414 - Stat Methods in Epidemiology Credit Hours: 4

SOC 307 - Seminar Credit Hours: 15 will be considered as electives pending program director approval.

SOC 407 - Seminar Credit Hours: 12 will be considered as electives pending program director approval.

or

PSY 307 - Seminar Credit Hours: 6 will be considered as electives pending program director approval.

PSY 407 - Seminar Credit Hours: 12 will be considered as electives pending program director approval.



# Population Health Management, Applied Health Data Analytics Emphasis, BS

## Degree Requirements

Students must meet the general education requirements, as stated elsewhere in this catalog, and satisfactorily complete the courses listed in this curriculum to obtain the Bachelor of Science in Population Health Management. A total of 184 credits are required for the degree. Students must complete a core program; in addition, students must complete an emphasis area (listed below). A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed. Credits taken for externship or senior project do not count toward the emphasis. Students electing to take externship are restricted to a maximum of 32 credits. All core and emphasis courses must be completed with a minimum grade of "C" in order to earn the degree.

## Population Health Management

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

HIST 275 - Intro to Hist of Medicine Credit Hours: 3  
PHM 105 - Intro to Population Health Management Credit Hours: 3  
SOC 204 - Intro to Sociology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 111 - College Algebra Credit Hours: 4  
SOC 201 - Classical Sociol Theory Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

SOC 206 - Social Problems Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Sophomore Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SOC 205 - Current Health Issues Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 361 - Statistical Methods I Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SOC 345 - Aging and Society Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BUS 317 - Health Care Management Credit Hours: 3  
MATH 362 - Statistical Methods II Credit Hours: 4  
SOC 305 - Rural Health Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Junior Year Fall

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
GIS 103 - The Digital Earth Credit Hours: 3  
or  
MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
SOC 301 - Soc Science Research Methods Credit Hours: 4  
SOC 325 - Global Population Health Credit Hours: 3  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

GIS 134 - Geographic Info Systems Credit Hours: 3  
or  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
SOC 302 - Soc Science Resrch Methods II Credit Hours: 4  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

**Total: 14/15 Credit Hours**

### Spring

PHIL 305 - Medical Ethics Credit Hours: 3  
PHM 321 - Community Program Planning Credit Hours: 3  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3  
Elective Credit Hours: 6 <sup>a</sup>

**Total: 15 Credit Hours**

### Senior Year Fall

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

### Winter

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

**Spring**

PHM 435 - Research Center Credit Hours: 3

Externship or Emphasis Electives: 12

**Total: 15 Credit Hours****Emphasis Requirements**

Students completing the Applied Health Data Analytics emphasis must complete the following courses:

BUS 316 - Total Quality Health Care Credit Hours: 3

MATH 362 - Statistical Methods II Credit Hours: 4

MATH 465 - Mathematical Statistics Credit Hours: 4

MIS 344 - Business Intelligence Credit Hours: 3

MIS 357 - Info &amp; Comm Sys in Hlth Care Credit Hours: 3

MIS 445 - Legal/Eth/Soc Iss in HC Tech Credit Hours: 3

PSY 339 - Biopsychology Credit Hours: 3

SOC 405 - Program Planning &amp; Eval Credit Hours: 3

WRI 123 - Research Writing Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

WRI 410 - Proposal &amp; Grant Writing Credit Hours: 3

**Total for a B.S. in Population Health Management, Applied Health Data Analytics Emphasis:  
181/182 Credit Hours**<sup>a</sup> See advisor or consult emphasis elective list above for appropriate courses<sup>b</sup> To complete an emphasis, students must take courses from the appropriate list that follows. Credits taken for externship or senior project do not count as emphasis electives. A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed<sup>c</sup> Externship site and/or senior projects are coordinated in SOC 421. No more than 32 credits of externship allowed for graduation without departmental approval

# Population Health Management, BS

## Degree Requirements

Students must meet the general education requirements, as stated elsewhere in this catalog, and satisfactorily complete the courses listed in this curriculum to obtain the Bachelor of Science in Population Health Management. A total of 184 credits are required for the degree. Students must complete a core program; in addition, students must complete an emphasis area (listed below). A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed. Credits taken for externship or senior project do not count toward the emphasis. Students electing to take externship are restricted to a maximum of 32 credits. All core and emphasis courses must be completed with a minimum grade of "C" in order to earn the degree.

## Population Health Management

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

HIST 275 - Intro to Hist of Medicine Credit Hours: 3  
PHM 105 - Intro to Population Health Management Credit Hours: 3  
SOC 204 - Intro to Sociology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 111 - College Algebra Credit Hours: 4  
SOC 201 - Classical Sociol Theory Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

SOC 206 - Social Problems Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Sophomore Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SOC 205 - Current Health Issues Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 361 - Statistical Methods I Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SOC 345 - Aging and Society Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BUS 317 - Health Care Management Credit Hours: 3  
MATH 362 - Statistical Methods II Credit Hours: 4  
SOC 305 - Rural Health Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Junior Year Fall

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
GIS 103 - The Digital Earth Credit Hours: 3  
or  
MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
SOC 301 - Soc Science Research Methods Credit Hours: 4  
SOC 325 - Global Population Health Credit Hours: 3  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

GIS 134 - Geographic Info Systems Credit Hours: 3  
or  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
SOC 302 - Soc Science Resrch Methods II Credit Hours: 4  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

**Total: 14/15 Credit Hours**

### Spring

PHIL 305 - Medical Ethics Credit Hours: 3  
PHM 321 - Community Program Planning Credit Hours: 3  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3  
Elective Credit Hours: 6 <sup>a</sup>

**Total: 15 Credit Hours**

### Senior Year Fall

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

### Winter

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

**Spring**

PHM 435 - Research Center Credit Hours: 3

Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

**Total for a B.S. in Population Health Management: 181/182 Credit Hours**

<sup>a</sup> See advisor

<sup>b</sup> To complete an emphasis, students must take courses from the appropriate list that follows. Credits taken for externship or senior project do not count as emphasis electives. A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed

<sup>c</sup> Externship site and/or senior projects are coordinated in SOC 421. No more than 32 credits of externship allowed for graduation without departmental approval

# Population Health Management, Care Coordination/Pre-Health Professions Emphasis, BS

## Degree Requirements

Students must meet the general education requirements, as stated elsewhere in this catalog, and satisfactorily complete the courses listed in this curriculum to obtain the Bachelor of Science in Population Health Management. A total of 184 credits are required for the degree. Students must complete a core program; in addition, students must complete an emphasis area (listed below). A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed. Credits taken for externship or senior project do not count toward the emphasis. Students electing to take externship are restricted to a maximum of 32 credits. All core and emphasis courses must be completed with a minimum grade of "C" in order to earn the degree.

## Population Health Management

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

HIST 275 - Intro to Hist of Medicine Credit Hours: 3  
PHM 105 - Intro to Population Health Management Credit Hours: 3  
SOC 204 - Intro to Sociology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 111 - College Algebra Credit Hours: 4  
SOC 201 - Classical Sociol Theory Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

SOC 206 - Social Problems Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Sophomore Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SOC 205 - Current Health Issues Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 361 - Statistical Methods I Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SOC 345 - Aging and Society Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BUS 317 - Health Care Management Credit Hours: 3  
MATH 362 - Statistical Methods II Credit Hours: 4  
SOC 305 - Rural Health Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Junior Year Fall

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
GIS 103 - The Digital Earth Credit Hours: 3  
or  
MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
SOC 301 - Soc Science Research Methods Credit Hours: 4  
SOC 325 - Global Population Health Credit Hours: 3  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

GIS 134 - Geographic Info Systems Credit Hours: 3  
or  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
SOC 302 - Soc Science Resrch Methods II Credit Hours: 4  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

**Total: 14/15 Credit Hours**

### Spring

PHIL 305 - Medical Ethics Credit Hours: 3  
PHM 321 - Community Program Planning Credit Hours: 3  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3  
Elective Credit Hours: 6 <sup>a</sup>

**Total: 15 Credit Hours**

### Senior Year Fall

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

### Winter

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

**Spring**

PHM 435 - Research Center Credit Hours: 3

Externship or Emphasis Electives: 12

**Total: 15 Credit Hours****Emphasis Requirements**

Students completing the Care Coordination/Pre-Health Professions emphasis must complete the following courses:

ANTH 103 - Intro to Cultural Anthropology Credit Hours: 3

BIO 200 - Medical Terminology Credit Hours: 2

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

BIO 233 - Human Anatomy/Physiology III Credit Hours: 4

BUS 313 - Health Care Systems &amp; Policy Credit Hours: 3

BUS 316 - Total Quality Health Care Credit Hours: 3

COM 205 - Intercultural Comm Credit Hours: 3

COM 345 - Organization Comm I Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

PSY 360 - Organizational Psych Credit Hours: 3

PSY 410 - Organiz Change/Develop Credit Hours: 3

SOC 305 - Rural Health Credit Hours: 3

SOC 315 - Juvenile Delinquency Credit Hours: 3

SOC 405 - Program Planning &amp; Eval Credit Hours: 3

**Total for a B.S. in Population Health Management, Care Coordination/Pre-Health Professions Emphasis:  
181/182 Credit Hours**<sup>a</sup> See advisor or consult emphasis elective list above for appropriate courses<sup>b</sup> To complete an emphasis, students must take courses from the appropriate list that follows. Credits taken for externship or senior project do not count as emphasis electives. A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed<sup>c</sup> Externship site and/or senior projects are coordinated in SOC 421. No more than 32 credits of externship allowed for graduation without departmental approval

# Population Health Management, Health Promotion Emphasis, BS

## Degree Requirements

Students must meet the general education requirements, as stated elsewhere in this catalog, and satisfactorily complete the courses listed in this curriculum to obtain the Bachelor of Science in Population Health Management. A total of 184 credits are required for the degree. Students must complete a core program; in addition, students must complete an emphasis area (listed below). A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed. Credits taken for externship or senior project do not count toward the emphasis. Students electing to take externship are restricted to a maximum of 32 credits. All core and emphasis courses must be completed with a minimum grade of "C" in order to earn the degree.

## Population Health Management

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

HIST 275 - Intro to Hist of Medicine Credit Hours: 3  
PHM 105 - Intro to Population Health Management Credit Hours: 3  
SOC 204 - Intro to Sociology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

MATH 111 - College Algebra Credit Hours: 4  
SOC 201 - Classical Sociol Theory Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

SOC 206 - Social Problems Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Sophomore Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
PSY 201 - Psychology Credit Hours: 3

or

PSY 202 - Psychology Credit Hours: 3

or

PSY 203 - Psychology Credit Hours: 3  
SOC 205 - Current Health Issues Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Winter

MATH 361 - Statistical Methods I Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3

or

PSY 202 - Psychology Credit Hours: 3

or

PSY 203 - Psychology Credit Hours: 3  
SOC 345 - Aging and Society Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Spring

BUS 317 - Health Care Management Credit Hours: 3  
MATH 362 - Statistical Methods II Credit Hours: 4  
SOC 305 - Rural Health Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

### Junior Year Fall

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
GIS 103 - The Digital Earth Credit Hours: 3

or

MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
SOC 301 - Soc Science Research Methods Credit Hours: 4  
SOC 325 - Global Population Health Credit Hours: 3  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

GIS 134 - Geographic Info Systems Credit Hours: 3

or

MIS 275 - Intro to Relational Databases Credit Hours: 4  
SOC 302 - Soc Science Resrch Methods II Credit Hours: 4  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

**Total: 14/15 Credit Hours**

### Spring

PHIL 305 - Medical Ethics Credit Hours: 3  
PHM 321 - Community Program Planning Credit Hours: 3  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3  
Elective Credit Hours: 6 <sup>a</sup>

**Total: 15 Credit Hours**

### Senior Year Fall

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

### Winter

PHM 435 - Research Center Credit Hours: 3  
Externship or Emphasis Electives: 12

**Total: 15 Credit Hours**

**Spring**

PHM 435 - Research Center Credit Hours: 3

Externship or Emphasis Electives: 12

**Total: 15 Credit Hours****Emphasis Requirements**

Students completing the Health Promotion emphasis must complete the following courses:

COM 205 - Intercultural Comm Credit Hours: 3

COM 336 - Nonverbal Communication Credit Hours: 3

PSY 215 - Abnormal Psychology I Credit Hours: 3

PSY 216 - Abnormal Psychology II Credit Hours: 3

PSY 220 - Community Psych Credit Hours: 3

PSY 301 - Basic Counseling Techniques Credit Hours: 4

PSY 330 - Social Psychology I Credit Hours: 3

PSY 331 - Social Psychology II Credit Hours: 3

PSY 334 - Behavior Modification I Credit Hours: 4

PSY 335 - Behavior Modification II Credit Hours: 4

PSY 341 - Psychoactive Drugs I Credit Hours: 3

PSY 342 - Psychoactive DrugsII: Abused Credit Hours: 3

SOC 305 - Rural Health Credit Hours: 3

SOC 315 - Juvenile Delinquency Credit Hours: 3

SOC 405 - Program Planning &amp; Eval Credit Hours: 3

**Total for a B.S. in Population Health Management, Health Promotion Emphasis: 181/182 Credit Hours**<sup>a</sup> See advisor or consult emphasis elective list above for appropriate courses<sup>b</sup> To complete an emphasis, students must take courses from the appropriate list that follows. Credits taken for externship or senior project do not count as emphasis electives. A total of 18 credits are needed for an emphasis; a minimum of 9 upper division credits are needed<sup>c</sup> Externship site and/or senior projects are coordinated in SOC 421. No more than 32 credits of externship allowed for graduation without departmental approval



## **Psychology Minor**

The psychology minor is open to all majors and is especially recommended for students majoring in allied health and medical sciences, management, and communication studies. The minor offers a variety of courses in psychology that can enhance knowledge. A minimum of 24 credits is required to complete the minor. Students should meet with a psychology advisor when choosing electives to fulfill the minor requirements. Enrollment in the minor is through the Humanities and Social Sciences Department; contact the department chair or your advisor for more information.

### **Requirements of the Minor**

1. A minimum of 24 credits is required to earn the minor.
2. A minimum of 12 credits must be selected from upper-division coursework. Students must pay strict attention to prerequisite requirements.
3. Courses Required lower division courses (9 credits):
  1. PSY 201 - Psychology
  2. PSY 202 - Psychology
  3. PSY 203 - Psychology

#### Additional Courses:

1. 12 credits of upper division psychology courses
2. 3 credits of lower or upper division courses
4. For all courses counted toward the Minor in Psychology, a letter grade of "C" or better is required to be awarded the minor.
5. At least 12 credits of courses in this minor must be completed at Oregon Tech.

#### **Note:**

Not all courses are offered every term or every year.

# Medical Imaging Technology Department

Rich Carson, *Department Chair*

*Professors:* R. Cole, R. Hoylman, D. McCollam, D. McDonnell, T. McVay, S. Schultz, G. Zimmerman

*Associate Professors:* V. Bennett, M. Breedlove, B. Canaday, R. Carson, C. Caster

*Assistant Professors:* T. Guthrie, L. Jolly, B. Kowash

*Instructors:* L. Steinbock, W. Rogers

*Participating Faculty:* J. Isaacson, Associate Professor (Online Education)

*Participating Faculty:* J. Steenport (Online PACs)

## Degrees Offered

- Master of Science in Allied Health
- Bachelor of Science in Diagnostic Medical Sonography
- Bachelor of Science in Echocardiography
- Bachelor of Science in Nuclear Medicine and Molecular Imaging Technology
- Bachelor of Science in Radiologic Science
- Bachelor of Science in Vascular Technology

## Certificates Offered

- Magnetic Resonance Imaging
- Picture Archiving and Communication Systems (PACS)

## Accreditation

Oregon Institute of Technology is accredited by Northwest Commission on Colleges and Universities, 8060 165th Ave. NE, Suite 100, Redmond, WA 98052-3981, an institutional accrediting body recognized by the Council for Higher Education Accreditation and/or the Secretary of the U.S. Department of Education.

The Diagnostic Medical Sonography, Echocardiography and Vascular Technology programs are programmatically accredited through the Commission on Accreditation of Allied Health Education Programs (CAAHEP), upon review of the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS).

### *Echocardiography - Goal and Mission Statement*

To prepare competent entry-level adult cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains

### *Diagnostic Medical Sonography - Goal and Mission Statement*

To prepare competent entry-level general sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains

### *Vascular Technology - Goal and Mission Statement*

To prepare competent entry-level vascular sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains

## Bachelor of Science Program Descriptions

The Department of Medical Imaging Technology offers bachelor's degrees in five professional programs, which encompass the spectrum of imaging sciences. The curriculum of each bachelor's degree program provides the technical, scientific, and communication skills essential for the application of learned concepts. Each program prepares students for immediate employment and for successfully passing the national and state registry examinations in each field.

### *Diagnostic Medical Sonography (also called sonography, ultrasound, or general ultrasound)*

Sonography uses high frequency sound wave imaging and Doppler instrumentation to aid in the diagnosis of pathology and disease processes. The sonographer gathers pertinent patient history, creates images, and submits preliminary findings to the reading physician. Common exams include: obstetric, gynecological, peritoneal, retroperitoneal, pelvic, thoracic, musculoskeletal, extremity, neurological, and superficial procedures. Invasive applications are also performed in most clinical settings.

### **Program Learning Outcomes**

- Effective oral, visual, and written communication skills.
- The ability to work effectively in teams.
- The ability to provide basic patient care and comfort while utilizing ethical, professionalism and HIPAA guidelines.
- Knowledge and understanding of human gross and sectional anatomy relative to normal and abnormal sonographic imaging.
- Knowledge and understanding of human physiology, pathology and pathophysiology.
- Knowledge and understanding of ultrasound physical principles and instrumentation.
- Knowledge of sonographic biological effects, proper application of sonographic instrumentation relative to imaging and image quality.
- Appropriate ergonomic scanning applications.
- An understanding of diverse cultural and humanistic traditions in the global society.

### **DMS Program Educational Objectives**

The following are the faculty expectations of graduates from the Diagnostic Medical Sonography program:

- Employ diagnostic sonographic imaging techniques, critical thinking skills, effective communication skills, and professional judgment.
- Effectively apply ergonomically correct scanning techniques.
- Successfully complete nationally recognized credential examinations.
- Develop a dedication to independent life-long learning and professional contributions.

### *Echocardiography*

Echocardiography is a safe method of obtaining ultrasound images for diagnosis of cardiac pathology in adult and pediatric patient populations. Echocardiographers perform imaging exams that include acquisition of detailed images of heart anatomy, evaluation of pathologies, and measurement/analysis of hemodynamic flow patterns within the heart and the heart's major vessels. The Echocardiographer prepares the study images and reports pertinent findings to the interpreting cardiologist as part of the diagnostic process.

### **Program Learning Outcomes**

Graduates from this program will be able to:

1. Demonstrate the ability to communicate effectively in oral, written and visual forms.
2. Demonstrate the ability to work effectively in teams.
3. Demonstrate an ability to provide basic patient care and comfort.
4. Demonstrate professional judgment, discretion, and ethics.
5. Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.
6. Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.
7. Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.
8. Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.
9. Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

### **Echocardiography Program Educational Objectives**

1. The program prepares students to utilize diagnostic techniques, sound judgment and good decision making to provide patient services.
2. The program communicates the importance of being credentialed (RDCS, RCS) in the profession of echocardiography.
3. The program prepares students who think critically, communicate effectively, and exemplify professional ethics.
4. The program conveys the importance of becoming life-long learners and responsible citizens.

### *Nuclear Medicine and Molecular Imaging Technology*

Nuclear Medicine and Molecular Imaging Technology is an imaging science that demonstrates pathology through physiologic processes using radioactive compounds. Sometimes these data are fused with anatomical data such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). This branch of imaging science has been in existence for over four decades. This training also prepares the future Nuclear Medicine Technologist with skills in CT, MRI, PET/ CT, and Spect/CT.

### **Program Learning Outcomes**

Students completing the Nuclear Medicine and Molecular Imaging Technology program should possess the following abilities, measured by observation throughout the students' educational experience at Oregon Tech:

1. The student will apply knowledge, judgement and critical thinking when problem solving
2. The student will demonstrate ethical reasoning through a variety of scenarios in lecture and lab, and adherence to professional responsibilities identified on their Professional Evaluation performed at the end of each term.
3. The student will demonstrate teamwork by contributing equally to team goals, and interacting with peers and faculty in a respectful and supportive manner.
4. The student will demonstrate effective communication with other students, staff, and faculty in a respectful manner and at an appropriate time.
5. The student demonstrate emotional intelligence competencies when working with others.

### *Radiologic Science*

This program has been in existence at Oregon Tech for more than 50 years. The training prepares the future radiologic technologist with a wide variety of skills, including radiography, fluoroscopy, mobile and surgical radiography, Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Mammography, Cardiovascular Interventional Technology (CIT), Quality Assurance, and imaging department management.

### **Program Learning Outcomes**

Students completing the Radiologic Science program should possess the following abilities and are measured by observation throughout the students' educational experience at Oregon Tech:

- An ability to practice organizational skills using prioritization.
- An ability to demonstrate quality work in the didactic and laboratory settings.
- An ability to comprehend radiologic theory and principles and apply them in the laboratory setting.
- An ability to work in a stressful environment and perform effectively in under pressure.
- An ability to use good judgement and critical thinking skills.
- An ability to demonstrate confidence in their knowledge and skills.
- An ability to demonstrate attention to details and follow instructions.
- An ability to practice initiative.
- An ability to approach tasks and duties with a positive attitude.
- An ability to accept and apply constructive criticism.
- An ability to be punctual and reliable.
- An ability to practice positive interpersonal skills with faculty, classmates, other professionals.
- An ability to effectively work in a team setting.

### **Program Educational Objectives**

The following are the faculty expectations of graduates from the Radiologic Science program:

- Be compassionate, caring healthcare professionals.
- Be eligible, well prepared, and able to pass the ARRT credentialing examination.
- Have immediate job placement potential within six months of graduation.
- Work in advanced imaging fields and complete advanced imaging registries.

### *Vascular Technology*

Vascular technology is a profession which utilizes ultrasound, Doppler, color Doppler and various physiologic testing procedures to aid in the diagnosis of disease of the vascular system. Vascular technologists conduct patient interviews, compile health histories and determine risk assessments pertaining to vascular disease. The technologists choose appropriate testing modalities and provide referring physicians with preliminary interpretation of results.

### **Program Learning Outcomes**

1. The ability to communicate effectively in oral, written and visual forms.
2. The ability to work effectively in teams.
3. An ability to provide basic patient care and comfort.
4. Professional judgment and discretion including ethics.
5. Knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal vascular anatomy.
6. Knowledge and understanding of vascular physiology, pathology, and pathophysiology.
7. Knowledge and understanding of vascular physical principles and instrumentation.
8. Knowledge and understanding of clinical vascular diagnostic procedures and testing
9. An understanding of diverse cultural and humanistic traditions in the global society.

## **Master of Science Program Description**

The Department of Medical Imaging Technology offers a Master of Science in Allied Health, which is fully an online degree for students who hold a Bachelor's degree and are working in a health care setting. The program will focus on preparing allied health professionals for advancement in management, education and administration in their respective health care disciplines.

## Facilities

Oregon Tech's state-of-the-art imaging equipment allows medical imaging students to become familiar with a wide variety of imaging procedures like those performed in most medical centers. Students may also spend significant time at Sky Lakes Medical Center where they will gain experience directly with patients, prior to externship. This experience plus the academic coursework prepares the student well for the medical imaging professions.

## Externships

All five of the bachelor's degree programs in medical imaging culminate in a senior year of clinical externship at a medical center. The 11-month externship is spent at the affiliate institution under the supervision of a clinical instructor. Students do not have classes on the Oregon Tech campus during this year. The location of externship will be determined by a lottery conducted by medical imaging faculty. All students will be guaranteed an externship subject to the following:

1. All academic requirements must be met before externship assignments will be made.
2. Students must satisfy Oregon requirements for clinical placement as listed in Oregon Administrative Rules (OAR 409-030-0100 to 409-030-0250).

Upon successful completion of the externship year, imaging students will be eligible to sit for the professional registry pertaining to their degree.

## Admission Requirements

### Pre-Medical Imaging Technology: Freshman Year

Enrollment is open to all students who meet the general entry requirements to the university. Students will be listed as Pre-Medical Imaging Technology (Pre-MIT) students. Admittance to the Oregon Tech Pre-MIT Program does not mean the student has been accepted into a specific MIT program.

### Program Selection Criteria

Selection criteria are available on the MIT website at [www.oit.edu/mit](http://www.oit.edu/mit). Students must complete all the courses, including general education, in the specified freshman year (pre-medical imaging) curriculum. Selection will be made at the end of the spring term of the pre-medical imaging technology year. The number of students selected each year will be determined by the number of qualified applicants, and by the availability of clinical sites. Therefore, the number of qualified applicants may exceed the number of spaces available. Prior acceptance does not guarantee future acceptance into any MIT Program. Students must reapply yearly.

Selection will be based upon the following criteria and point system:

1. **GPA:** Students must have a total of a 2.95 **weighted** GPA (though a 3.0 or higher is highly recommended), in the following courses (or equivalent transfer courses) to apply to one of the five MIT Programs.
  - BIO 200 - Medical Terminology
  - BIO 231 - Human Anatomy/Physiology I
  - BIO 232 - Human Anatomy/Physiology II
  - BIO 233 - Human Anatomy/Physiology III
  - CHE 101 - Intro to General Chemistry
  - CHE 104 - Intro to General Chemistry Lab
  - MATH 112 - Trigonometry
  - MIT 103 - Intro to Med Imaging

GPA points are calculated as GPA x 10. (For example, a 3.5 GPA x 10 = 35). To determine how to calculate weighted GPA, see website at [www.oit.edu/mit](http://www.oit.edu/mit).

2. All applicants must attend an Oregon Tech hosted selection event at the end of spring term. Several activities are conducted during this event to allow students to demonstrate communication skills, and professionalism. Faculty from the MIT Department and industry leaders are present at the selection event to evaluate those skills.

## Application Requirements

Applications are available on the MIT website at [www.oit.edu/mit](http://www.oit.edu/mit).

Applications are due spring term. Incomplete applications will not be accepted. An application fee of \$75 is required. There are no refunds of the application fee. Repeat applicants must follow the same procedures as first-time applicants.

The application form allows ranking of programs by choice (first and second) and only one application per student will be accepted.

### **Level of Course Work**

All course work applied toward the master's degree must be earned in courses designed for graduate students; these courses are generally numbered 500 and above. Oregon Tech undergraduate seniors may enroll in 500 level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the department chair. Nine credits are applicable to a graduate degree. Undergraduate seniors may enroll in graduate-level courses for undergraduate credit subject to each department's policy. Oregon Tech offers some courses which are dual listed at the 400- and 500-level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply only to a graduate degree. Students enrolled in a dual-listed 500-level course will be required to complete additional work for graduate credit. Students may audit graduate courses subject to the policy described in the General Catalog. Audited courses cannot be used to meet degree requirements.

### **Transfer Students**

Transfer students who meet the academic requirements of the pre-medical imaging technology year, will not find a course at another college which substitutes for MIT 103 - Intro to Med Imaging. This course may be taken as a distance learning course. It must be completed in the summer, fall, winter or spring term prior to the application to a professional program. The MIT application is available at [www.oit.edu/mit](http://www.oit.edu/mit). Transfer students must apply to both Oregon Tech and MIT using two separate application processes.

### **Graduation Requirements**

All credits listed in the curriculum for the catalog year a student begins a program must be fulfilled.

Students must maintain a 2.00 GPA to be eligible for graduation. In addition, a final grade of "C" or better must be earned in all professional courses (DMS, ECHO, NMT, RDSC, VAS), and science/mathematics courses to continue in the program. A final grade of "C" or better must be also earned in all required communications courses by the end of the junior year to continue on in the program. Once the student is admitted into a professional program as a sophomore, all curricular requirements must be met within four academic years. Rare exceptions to the time limitation will be considered on a case by case basis, at the discretion of the re-admittance committee described below. When a student unsuccessfully attempts a programmatic course fall term, sophomore year, they must reapply to the program or another imaging program. If the student has an unsuccessful attempt subsequent to fall term sophomore year the student must submit a letter of intent to the program director of the specific program they seek to re-enter. The MIT re-admittance committee will determine if another opportunity will be granted. If re-admittance is approved additional requirements will be prescribed by the MIT committee.

Other requirements such as auditing courses, attending labs, and/or remedial work will be specified by the committee. The student must remain in compliance with committee's recommendations and requirements to satisfy degree progress. When a student attempts unsuccessfully a second time in the same or a different programmatic course, they are terminated from that program. Additionally, if a student receives a "D," "F" or "W" in two or more programmatic courses in one term, they will be dismissed from that program. The student may apply for admittance to a second imaging program under the same application criteria as other applicants. After two unsuccessful attempts to complete two different programs, the student may not apply for a third program.

### **Career Opportunities**

There continues to be a high demand for bachelor's degree prepared medical imaging professionals. Graduates have excellent opportunities for employment in hospitals, clinics, private practice, state and federal agencies, and with appropriate experience, in supervision, education and industry.

### **Degree Completion Programs**

The Diagnostic Medical Sonography, Echocardiography, Radiologic Science and Vascular Technology programs offer degree completion programs for registered technologists (in good standing) who wish to pursue a bachelor's degree in their field. These programs are fully online. There is no requirement to come to campus.

# Master of Science in Allied Health

The MSAH program supports Oregon Tech's mission to offer rigorous applied degree programs by providing scholarly, research and evidence based, high quality coursework (aligned with the National Center for Healthcare Leadership guidelines) ensuring student success in the work place.

The discipline of allied health leadership in health care settings involves effective communication, building relationships, self-confidence, self-development, team leadership, change leadership, accountability, collaboration, organizational development, performance measurements, financial skills, innovative thinking and strategic orientation. The MSAH curriculum emphasizes strong foundational course work and hands-on application through real life health care cases to prepare students to be effective professionals in their communities. Typical students in the program are already employed and are working to advance their degrees and career opportunities in leadership, management, and administration of public health systems, health care systems, hospitals, and hospital networks.

## Allied Health, MS

### Curriculum

This program will be delivered completely online, a choice of three tracks.

*\*Students must complete the allied health core courses, as well as one track to receive the MS in Allied Health.*

### Core Courses

- ALH 505 - Intro to IT for Hlth Care Pros Credit Hours: 1
  - ALH 510 - The Science of Evidence-Based Medicine Credit Hours: 3
  - ALH 515 - Scientific Writing & Healthcare Credit Hours: 3
  - ALH 525 - Effective Healthcare Ldshp. Credit Hours: 3
  - ALH 535 - Assmt. Plan. Imp. and Eval. Credit Hours: 3
  - ALH 545 - Pertinent Ethical & Legal Cons Credit Hours: 3
  - ALH 555 - Leadership Theory for HC Ldrs. Credit Hours: 3
  - ALH 565 - Population Health Issues for Allied Health Professionals Credit Hours: 3
  - ALH 575 - Methods of Research for Allied Health Professionals Credit Hours: 3
  - ALH 585 - Financial Consid. & Pol. Strat Credit Hours: 3
  - ALH 595 - Curriculum Design for AHP Credit Hours: 3
  - ALH 509 - Masters Capstone Project Credit Hours: 6
- or
- ALH 599 - Master's Thesis Presentation Credit Hours: 6

### Track 1 Administrative / Healthcare Leadership Track in Allied Health

- ALH 506 - Program Administration Credit Hours: 3
- STAT 505 - Biostatistics I Credit Hours: 3
- STAT 515 - Epidemiology I Credit Hours: 3
- WRI 510 - Grant Proposal Writing Credit Hours: 3

### Track 2 Dental Hygiene Track in Allied Health

- ALH 506 - Program Administration Credit Hours: 3
- ALH 508 - Medical Ed. Theories & Methods Credit Hours: 3
- STAT 505 - Biostatistics I Credit Hours: 3
- WRI 510 - Grant Proposal Writing Credit Hours: 3

### Track 3 Respiratory Care Track in Allied Health

- ALH 508 - Medical Ed. Theories & Methods Credit Hours: 3
- RCP 561 - Individual Development Plan Credit Hours: 3
- RCP 565 - Clinical Preceptorship Credit Hours: 3
- RCP 575 - Accreditation Practicum Credit Hours: 3

**Total for a M.S. in Allied Health: 49 Credit Hours**

# Diagnostic Medical Sonography, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Pre-Medical Imaging Technology

#### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MIT 103 - Intro to Med Imaging Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Professional Courses

#### Sophomore Year Fall

BIO 335 - Cross-Sectional Anatomy Credit Hours: 3  
DMS 223 - App of Abdominal Sonogr I Credit Hours: 3  
DMS 252 - Sophomore Lab I Credit Hours: 1  
MIT 225 - Patient Care in Sonography Credit Hours: 3  
PHY 217 - Physics of Med Imaging Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

DMS 224 - App of Abdominal Sonogr II Credit Hours: 3  
DMS 253 - Sophomore Lab II Credit Hours: 1  
MIT 231 - Sonographic Princ & Instru I Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Communications Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Spring

DMS 225 - App of Abdominal Sonogr III Credit Hours: 3  
DMS 234 - Pelvic Sonography Credit Hours: 3  
DMS 254 - Sophomore Lab III Credit Hours: 1

MIT 232 - Sonographic Princ & Instru II Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Junior Year Fall

DMS 346 - Musculoskeletal Sonography Credit Hours: 3  
DMS 352 - Junior Lab I Credit Hours: 1  
DMS 365 - Sonographic Pathology Credit Hours: 3  
DMS 337 - Breast Sonography Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 14 Credit Hours**

#### Winter

BUS 316 - Total Quality Health Care Credit Hours: 3

or

BUS 317 - Health Care Management Credit Hours: 3

or

BUS 313 - Health Care Systems & Policy Credit Hours: 3

DMS 316 - Survey of Vascular Tech Credit Hours: 3

DMS 353 - Junior Lab II Credit Hours: 1

DMS 370 - Obstetrical Sonography Credit Hours: 3

DMS 375 - Fetal Echocardiography Credit Hours: 3

**Total: 13 Credit Hours**

#### Spring

DMS 343 - Neonatal/Pediatric Sonography Credit Hours: 3

DMS 354 - Junior Lab III Credit Hours: 1

DMS 373 - Obstetrical Pathology Credit Hours: 3

DMS 388 - Externship Preparation Credit Hours: 2

SPE 321 - Small Group/Team Comm Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Senior Year Summer

DMS 430 - DMS Externship Credit Hours: 15

**Total: 15 Credit Hours**

#### Fall

DMS 430 - DMS Externship Credit Hours: 15

**Total: 15 Credit Hours**

#### Winter

DMS 430 - DMS Externship Credit Hours: 15

**Total: 15 Credit Hours**

#### Spring

DMS 430 - DMS Externship Credit Hours: 15

**Total: 15 Credit Hours**

**Total for a B.S. in Diagnostic Medical Sonography: 192 Credit Hours**



## Diagnostic Medical Sonography, Degree Completion, BS

### Courses Granted for Registry

DMS 223 - App of Abdominal Sonogr I Credit Hours: 3  
DMS 224 - App of Abdominal Sonogr II Credit Hours: 3  
DMS 225 - App of Abdominal Sonogr III Credit Hours: 3  
DMS 234 - Pelvic Sonography Credit Hours: 3  
DMS 252 - Sophomore Lab I Credit Hours: 1  
DMS 253 - Sophomore Lab II Credit Hours: 1  
DMS 254 - Sophomore Lab III Credit Hours: 1  
DMS 370 - Obstetrical Sonography Credit Hours: 3  
DMS 388 - Externship Preparation Credit Hours: 2 (waived)  
DMS 430 - Diagnostic Medical Sonography Externship Credit Hours: 45  
MIT 103 - Intro to Med Imaging Credit Hours: 3  
MIT 231 - Sonographic Princ & Instru I Credit Hours: 4  
MIT 232 - Sonographic Princ & Instru II Credit Hours: 4  
PHY 217 - Physics of Med Imaging Credit Hours: 3

**Total: 80 Credit Hours**

### Completion Credits

BIO 335 - Cross-Sectional Anatomy Credit Hours: 3  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
or  
BUS 316 - Total Quality Health Care Credit Hours: 3  
or  
BUS 317 - Health Care Management Credit Hours: 3  
DMS 316 - Survey of Vascular Tech Credit Hours: 3<sup>a</sup>  
DMS 337 - Breast Sonography Credit Hours: 3  
DMS 343 - Neonatal/Pediatric Sonography Credit Hours: 3  
DMS 346 - Musculoskeletal Sonography Credit Hours: 3  
DMS 352 - Junior Lab I Credit Hours: 1  
DMS 353 - Junior Lab II Credit Hours: 1  
DMS 354 - Junior Lab III Credit Hours: 1

DMS 365 - Sonographic Pathology Credit Hours: 3  
DMS 373 - Obstetrical Pathology Credit Hours: 3  
DMS 375 - Fetal Echocardiography Credit Hours: 3  
DMS 430A - DMS Externship Credit Hours: 8  
DMS 430B - DMS Externship Credit Hours: 7  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Communication Elective Credit Hours: 3

**Total: 51 Credit Hours**

### Transfer Courses

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Electives Credit Hours: 9  
Social Science Electives Credit Hours: 9  
Elective Credit Hours: 2

**Total: 61 Credit Hours**

<sup>a</sup> Credits may be granted for additional specialty registry exams. Please contact Program Director for more information.

# Echocardiography, BS

## Curriculum

Required Courses and recommended terms during which they should be taken:

### Pre-Medical Imaging Technology

#### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MIT 103 - Intro to Med Imaging Credit Hours: 3  
**Total: 15 Credit Hours**

#### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3  
**Total: 15 Credit Hours**

#### Spring

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Professional Courses

#### Sophomore Year Fall

BIO 220 - Cardiovascular Physiology Credit Hours: 4  
ECHO 231 - Echocardiography I Credit Hours: 4  
PHY 217 - Physics of Med Imaging Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
**Total: 15 Credit Hours**

#### Winter

BIO 346 - Pathophysiology I Credit Hours: 3  
ECHO 232 - Echocardiography II Credit Hours: 4  
MIT 231 - Sonographic Princ & Instru I Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 14 Credit Hours**

#### Spring

BIO 347 - Pathophysiology II Credit Hours: 3  
ECHO 320 - Cardiographic Methods Credit Hours: 3  
ECHO 332 - Invasive Cardiology Credit Hours: 3  
**Total for a B.S. in Echocardiography: 195 Credit Hours**

MIT 225 - Patient Care in Sonography Credit Hours: 3  
MIT 232 - Sonographic Princ & Instru II Credit Hours: 4  
**Total: 16 Credit Hours**

#### Junior Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
or  
BUS 317 - Health Care Management Credit Hours: 3  
or  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
ECHO 333 - Echocardiography III Credit Hours: 4  
ECHO 321 - Stress & Transesophageal Echo Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Humanities Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Winter

CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
ECHO 325 - Pediatric Echo Credit Hours: 3  
ECHO 376 - Survey of Vascular Testing Credit Hours: 3  
Social Science Elective Credit Hours: 3  
**Total: 12 Credit Hours**

#### Spring

ECHO 334 - Echocardiography IV Credit Hours: 4  
ECHO 385 - Echo Lab Management Credit Hours: 3  
ECHO 388 - Externship Preparation Credit Hours: 3  
Communication Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Senior Year Summer

ECHO 420 - Echo Externship Credit Hours: 15  
**Total: 15 Credit Hours**

#### Fall

ECHO 420 - Echo Externship Credit Hours: 15  
**Total: 15 Credit Hours**

#### Winter

ECHO 420 - Echo Externship Credit Hours: 15  
**Total: 15 Credit Hours**

#### Spring

ECHO 420 - Echo Externship Credit Hours: 15  
**Total: 15 Credit Hours**

## **Echocardiography, Degree Completion, BS**

### **Courses Granted for Registry**

BIO 220 - Cardiovascular Physiology Credit Hours: 4  
BIO 346 - Pathophysiology I Credit Hours: 3  
BIO 347 - Pathophysiology II Credit Hours: 3  
ECHO 231 - Echocardiography I Credit Hours: 4  
ECHO 232 - Echocardiography II Credit Hours: 4  
ECHO 320 - Cardiographic Methods Credit Hours: 3  
ECHO 321 - Stress & Transesophageal Echo Credit Hours: 3  
ECHO 333 - Echocardiography III Credit Hours: 4  
ECHO 388 - Externship Preparation Credit Hours: 3 (waived)  
ECHO 420 - Echocardiography Externship Credit Hours: 45  
MIT 103 - Intro to Med Imaging Credit Hours: 3  
MIT 231 - Sonographic Princ & Instru I Credit Hours: 4  
MIT 232 - Sonographic Princ & Instru II Credit Hours: 4  
PHY 217 - Physics of Med Imaging Credit Hours: 3

**Total: 90 Credit Hours**

### **Completion Courses**

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
or  
BUS 316 - Total Quality Health Care Credit Hours: 3  
or  
BUS 317 - Health Care Management Credit Hours: 3  
CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
ECHO 325 - Pediatric Echo Credit Hours: 3 <sup>a</sup>  
ECHO 332 - Invasive Cardiology Credit Hours: 3  
ECHO 334 - Echocardiography IV Credit Hours: 4  
ECHO 376 - Survey of Vascular Testing Credit Hours: 3 <sup>a</sup>  
ECHO 385 - Echo Lab Management Credit Hours: 3  
ECHO 420A - Echo Externship Credit Hours: 8

ECHO 420B - Echo Externship Credit Hours: 7  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Communication Elective Credit Hours: 3

**Total: 43 Credit Hours**

<sup>a</sup> Optional credits may be awarded for additional registries

### **Transfer Courses**

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Electives Credit Hours: 9  
Social Science Electives Credit Hours: 9  
Elective Credit Hours: 3

**Total: 62 Credit Hours**

## **Magnetic Resonance Imaging (MRI) Certificate**

The educational requirement for taking the MR registry is minimal for ARRT registered Radiologic Technologists, but the learning curve is steep. For technologists with little knowledge of MR physics and procedures a certificate is offered on campus and fully online that culminates in completing the didactic and clinical requirements. Online students must have access for clinical practice at their place of employment, and permission from management.

### **Requirements of the Certificate**

Students must earn a "C" or better in all courses to be awarded the certificate.

BIO 335 - Cross-Sectional Anatomy Credit Hours: 3

BIO 375 - Cross Sectional Anatomy II Credit Hours: 3 (Variable 1-3 credit hours)

MIT 341 - Magnetic Resonance Imaging Credit Hours: 4

MIT 342 - Mag. Resonance Imaging II Credit Hours: 3

MIT 365 - Mag. Resonance Imaging Review Credit Hours: 2

MIT 411 - Magnetic Resonance Externship Credit Hours: 5

# Nuclear Medicine and Molecular Imaging Technology, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Pre-Medical Imaging Technology

#### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MIT 103 - Intro to Med Imaging Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Professional Courses

#### Sophomore Year Fall

CHE 350 - Clinical Pharmacology/NMT Credit Hours: 3  
NMT 212 - Nuc Med Phy/Radiation Biophy Credit Hours: 3  
NMT 217 - Patient Care Credit Hours: 4  
PHY 217 - Physics of Med Imaging Credit Hours: 3

**Total: 13 Credit Hours**

#### Winter

NMT 205 - Nuclear Med Admin Credit Hours: 2  
NMT 215 - Radiochem/Radiopharmacy Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 13 Credit Hours**

#### Spring

NMT 225 - Nuclear Phy/Instrumtn Credit Hours: 4  
NMT 256 - Cardiovascular Imaging Credit Hours: 3

Communication Elective Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

#### Junior Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
or

BUS 317 - Health Care Management Credit Hours: 3  
or

BUS 313 - Health Care Systems & Policy Credit Hours: 3

MIT 341 - Magnetic Resonance Imaging Credit Hours: 4

NMT 311 - Imaging Procedures I Credit Hours: 4

NMT 367 - PET Imaging Credit Hours: 3

**Total: 14 Credit Hours**

#### Winter

BIO 335 - Cross-Sectional Anatomy Credit Hours: 3

BIO 346 - Pathophysiology I Credit Hours: 3

NMT 312 - Imaging Procedures II Credit Hours: 4

NMT 355 - Computed Tomography Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Spring

NMT 313 - Therapeutic Procedures Credit Hours: 3

NMT 325 - SPECT Imaging/Comp Appl Credit Hours: 4

NMT 388 - Externship Preparation Credit Hours: 3

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Senior Year Summer

NMT 410 - Nuclear Med Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

#### Fall

NMT 410 - Nuclear Med Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

#### Winter

NMT 410 - Nuclear Med Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

#### Spring

NMT 410 - Nuclear Med Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

**Total for a B.S. in Nuclear Medicine and Molecular Imaging Technology: 192 Credit Hours**

## **Picture Archiving and Communication Systems (PACS) Certificate**

Medical Imaging Technology students with an interest and aptitude in computer science have a unique opportunity at Oregon Tech. Networked digital imaging has created the need for technologists with specialized training. Career opportunities for managers of image networks are on the rise, but few working technologists have the training to prepare them for entering this field.

With the availability of Computer Systems and Management Information Systems majors at Oregon Tech, a certificate in Picture Archiving and Communication Systems (PACS) is available for motivated students to pursue this opportunity.

### **Requirements of the Certificate**

Students must earn a "C" or better in all courses to be awarded the certificate.

MIT 209 - PACS I: Intro to PACS Credit Hours: 3

MIT 219 - PACS II: Comm and Admin Credit Hours: 3

MIT 229 - PACS III: Tech Req & Imag Qual Credit Hours: 3

MIT 239 - PACS IV: Implem & Sys Mgmt Credit Hours: 3

MIT 249 - PACS V: DICOM Credit Hours: 3

MIT 259 - PACS VI: PACS Security Credit Hours: 3

# Radiologic Science, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Pre-Medical Imaging Technology

#### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MIT 103 - Intro to Med Imaging Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3

or

PSY 202 - Psychology Credit Hours: 3

or

PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Professional Courses

#### Sophomore Year Fall

PHY 217 - Physics of Med Imaging Credit Hours: 3  
RDSC 201 - Imaging Techniques I Credit Hours: 4  
RDSC 235 - Equipment Operation & Maint Credit Hours: 3  
Communication Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

RDSC 202 - Imaging Techniques II Credit Hours: 4  
RDSC 205 - Patient Care Credit Hours: 4  
RDSC 210 - Radiograph Position I Credit Hours: 4  
RDSC 366 - Radiographic Pathology Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BIO 335 - Cross-Sectional Anatomy Credit Hours: 3  
RDSC 211 - Radiograph Position II Credit Hours: 4  
RDSC 233 - Contrast Media Proc Credit Hours: 4  
RDSC 272 - Radiation Protection Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Junior Year Fall

BIO 336 - Essentials of Pathophysiology Credit Hours: 3  
RDSC 301 - Radiograph Position III Credit Hours: 4  
RDSC 320 - Surg/Trauma/Mobl Rdgrph Credit Hours: 4  
RDSC 355 - Computed Tomography Credit Hours: 4

**Total: 15 Credit Hours**

#### Winter

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
or  
BUS 316 - Total Quality Health Care Credit Hours: 3  
or

BUS 317 - Health Care Management Credit Hours: 3  
MIT 341 - Magnetic Resonance Imaging Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 14 Credit Hours**

#### Spring

MIT 342 - Mag. Resonance Imaging II Credit Hours: 3  
or  
MIT 356 - Computed Tomography II Credit Hours: 3  
or  
RDSC 354 - Mammography Credit Hours: 4  
RDSC 326 - Crdvsclr/Interv Tech Credit Hours: 4  
RDSC 388 - Externship Preparation Credit Hours: 2  
Social Science Elective Credit Hours: 3

**Total: 12/13 Credit Hours**

#### Senior Year Summer

RDSC 410 - Rad Science Externship Credit Hours: 15

**Total: 15 Credit Hours**

#### Fall

RDSC 410 - Rad Science Externship Credit Hours: 15

**Total: 15 Credit Hours**

#### Winter

RDSC 410 - Rad Science Externship Credit Hours: 15

**Total: 15 Credit Hours**

#### Spring

RDSC 410 - Rad Science Externship Credit Hours: 15

**Total: 15 Credit Hours**

**Total for a B.S. in Radiologic Science: 195/196 Credit Hours**

## **Radiologic Science, Degree Completion, BS**

### **Courses Granted for Registry**

MIT 103 - Intro to Med Imaging Credit Hours: 3  
PHY 217 - Physics of Med Imaging Credit Hours: 3  
RDSC 201 - Imaging Techniques I Credit Hours: 4  
RDSC 202 - Imaging Techniques II Credit Hours: 4  
RDSC 205 - Patient Care Credit Hours: 4  
RDSC 210 - Radiograph Position I Credit Hours: 4  
RDSC 211 - Radiograph Position II Credit Hours: 4  
RDSC 233 - Contrast Media Proc Credit Hours: 4  
RDSC 235 - Equipment Operation & Maint Credit Hours: 3  
RDSC 272 - Radiation Protection Credit Hours: 3  
RDSC 301 - Radiograph Position III Credit Hours: 4  
RDSC 320 - Surg/Trauma/Mobl Rdgrph Credit Hours: 4  
RDSC 388 - Externship Preparation Credit Hours: 2 (waived)  
RDSC 410 - Radiologic Science Externship Credit Hours: 45

**Total: 89 Credit Hours**

### **Completion Courses**

BIO 335 - Cross-Sectional Anatomy Credit Hours: 3  
BIO 336 - Essentials of Pathophysiology Credit Hours: 3  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
or  
BUS 316 - Total Quality Health Care Credit Hours: 3  
or  
BUS 317 - Health Care Management Credit Hours: 3  
MIT 341 - Magnetic Resonance Imaging Credit Hours: 4  
RDSC 326 - Crdvsclr/Interv Tech Credit Hours: 4 <sup>a</sup>  
RDSC 354 - Mammography Credit Hours: 4 <sup>a</sup>  
or  
RDSC 355 - Computed Tomography Credit Hours: 4  
RDSC 366 - Radiographic Pathology Credit Hours: 3

RDSC 411 - Special Rad Sci Extern Credit Hours: 15  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Communication Elective Credit Hours: 3

**Total: 45 Credit Hours**

<sup>a</sup> Optional credit may be awarded for additional registries

### **Transfer Courses**

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Electives Credit Hours: 9  
Social Science Electives Credit Hours: 9  
Elective Credit Hours: 2

**Total: 61 Credit Hours**



# Vascular Technology, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Pre-Medical Imaging Technology

#### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MIT 103 - Intro to Med Imaging Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Professional Courses

#### Sophomore Year Fall

BIO 220 - Cardiovascular Physiology Credit Hours: 4  
MIT 225 - Patient Care in Sonography Credit Hours: 3  
PHY 217 - Physics of Med Imaging Credit Hours: 3  
VAS 214 - Vascular Anatomy Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Winter

BIO 346 - Pathophysiology I Credit Hours: 3  
MIT 231 - Sonographic Princ & Instru I Credit Hours: 4  
VAS 246 - Perphrl Arterial Disease Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Spring

BIO 347 - Pathophysiology II Credit Hours: 3  
MIT 232 - Sonographic Princ & Instru II Credit Hours: 4  
VAS 245 - Periphrl Venous Disease Credit Hours: 4

**Total for a B.S. in Vascular Technology: 197 Credit Hours**

VAS 335 - Radiographic Vasclr Anat Credit Hours: 3

**Total: 14 Credit Hours**

#### Junior Year Fall

BUS 316 - Total Quality Health Care Credit Hours: 3  
or  
BUS 317 - Health Care Management Credit Hours: 3  
or  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
VAS 365 - Abdominal Vasc Disease Credit Hours: 4  
VAS 375 - Survey Abdom Sonography Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Communications Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
VAS 366 - Spec Circulatory Problms Credit Hours: 4  
VAS 337 - Survey of Echocardiography Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 14 Credit Hours**

#### Spring

SPE 321 - Small Group/Team Comm Credit Hours: 3  
VAS 367 - Cerebrovascular Disease Credit Hours: 4  
VAS 385 - Vascular Lab Mgmt Credit Hours: 3  
VAS 388 - Externship Preparation Credit Hours: 3  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Senior Year Summer

VAS 420 - Vascular Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

#### Fall

VAS 420 - Vascular Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

#### Winter

VAS 420 - Vascular Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

#### Spring

VAS 420 - Vascular Tech Extern Credit Hours: 15

**Total: 15 Credit Hours**

## Vascular Technology, Degree Completion, BS

### Courses Granted for Registry

BIO 346 - Pathophysiology I Credit Hours: 3  
BIO 347 - Pathophysiology II Credit Hours: 3  
MIT 103 - Intro to Med Imaging Credit Hours: 3  
MIT 231 - Sonographic Princ & Instru I Credit Hours: 4  
MIT 232 - Sonographic Princ & Instru II Credit Hours: 4  
PHY 217 - Physics of Med Imaging Credit Hours: 3 <sup>a</sup>  
VAS 214 - Vascular Anatomy Credit Hours: 4  
VAS 245 - Periphrl Venous Disease Credit Hours: 4  
VAS 246 - Perphrl Arterial Disease Credit Hours: 4  
VAS 367 - Cerebrovascular Disease Credit Hours: 4  
VAS 388 - Externship Preparation Credit Hours: 3 (waived)  
VAS 420 - Vascular Technology Externship Credit Hours: 45

**Total: 84 Credit Hours**

### Completion Credits

BIO 220 - Cardiovascular Physiology Credit Hours: 4  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
or  
BUS 316 - Total Quality Health Care Credit Hours: 3  
or  
BUS 317 - Health Care Management Credit Hours: 3  
CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
VAS 335 - Radiogrphc Vasclr Anat Credit Hours: 3  
VAS 337 - Survey of Echocardiography Credit Hours: 3  
VAS 365 - Abdominal Vasc Disease Credit Hours: 4  
VAS 366 - Spec Circulatory Problms Credit Hours: 4  
VAS 375 - Survey Abdom Sonography Credit Hours: 3 <sup>a</sup>

VAS 385 - Vascular Lab Mgmt Credit Hours: 3  
VAS 420A - Special Vas Tech Extern Credit Hours: 8  
VAS 420B - Special Vas Tech Extern Credit Hours: 7  
Communication Elective Credit Hours: 3

**Total: 51 Credit Hours**

### Transfer Courses

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Electives Credit Hours: 9  
Social Science Electives Credit Hours: 9  
Elective Credit Hours: 3

**Total: 62 Credit Hours**

<sup>a</sup> Optional credit may be awarded for additional registries

# Medical Laboratory Science

Dawn Taylor, *Department Chair and Program Director*

*Associate Professor:* D. Taylor, C. Doty

*Assistant Professors:* R. Brown

*Instructors:* R. Barrett, K. Weber

*Adjunct Faculty:* The program utilizes medical laboratory professionals in medical, research, and public health laboratories.

## Degree Offered

- Bachelor of Science in Medical Laboratory Science (joint degree with Oregon Tech and Oregon Health and Science University - OHSU) Oregon Tech, in partnership with OHSU, offers a course of study leading to a Bachelor of Science in Medical Laboratory Science degree. Students take coursework that combines a rigorous competency-based science curriculum with community-sponsored clinical training. Graduates are prepared to enter the medical laboratory science profession and to pursue career opportunities in various laboratory settings including medical, research, and public health. Students who successfully complete the degree program are eligible to take the *Medical Laboratory Scientist (MLS)* national board certification examination offered by the *American Society for Clinical Pathology (ASCP)*.

## Accreditation

The Medical Laboratory Science professional program is accredited by the *National Accrediting Agency for Medical Laboratory Science (NAACLS)*, 5600 North River Road, Suite 720, Rosemont, Illinois 60018-5119, (773) 714-8880.

## Mission Statement

The mission of the Oregon Tech • OHSU Medical Laboratory Science Program is to educate, train, and graduate professionally competent and ethical individuals, committed to life-long learning, and who are prepared to meet current and future workplace challenges in medical laboratory science.

## Program of Study

During the *pre-professional phase* of study, students complete a minimum of 95-quarter hours that includes (a) 47-quarter hours of general education coursework, including two college-level math courses, one of which must be statistics; (b) 24-quarter hours of biology (200 level or above) that must include one microbiology course and one immunology course; and (c) 24-quarter hours of chemistry (200 level of above). Students must receive a grade of C or better in all required course work.

Through an application process, students are selected to enter the professional program.

The MLS professional program is admission-restricted and 15 months (5 consecutive terms) long, beginning in September of the academic year in which a student is admitted and ending in December of the following year. Admitted students spend four quarters completing medical laboratory science-specific coursework on the Oregon Tech Portland-Metro campus. Upon successful completion of the on-campus work, students are assigned to one or more program-affiliated laboratories to complete an extended fifth term (16 weeks) of clinical training. During clinical training, students spend 40 hours per week applying knowledge and skills to perform a wide variety of testing in a contemporary, accredited medical laboratory and to further develop discipline-specific competency under supervision of clinical instructors. Currently, the Department of MLS maintains affiliations with accredited laboratories in Oregon, Washington, Idaho, Nevada, Arizona, Colorado, Hawaii, Alaska, and Wyoming.

Students admitted to the MLS professional program are guaranteed placement for their clinical training subject to the following policies and procedures:

1. Due to the variable availability of training sites year to year, student placement at a specific site and term may not be possible. Therefore, placement of students for clinical training is determined by the program in consultation with clinical affiliate training sites.
2. Before beginning clinical training, students must comply with all training site and Oregon standardized administrative requirements including but not limited to immunizations, screening (e.g., background check, drug screen, etc.), trainings (e.g., safety, CPR, etc.), and proof of health insurance coverage valid for the entire clinical training period.
3. All academic and non-academic requirements must be met to the satisfaction of program faculty before a student is permitted to start clinical training.
4. Students are solely responsible for transportation and housing needs associated with their clinical training placement.

## Professional Program Application and Admission Requirements

The professional program admits one cohort of students a year. All prospective students should submit completed applications from September 1st to January 15th. Students can download application instructions and the application forms from URL <http://www.oit.edu/portland-metro/academics/degrees/medical-laboratory-science/how-to-apply>.

Importantly, transfer and post-baccalaureate students must also submit a separate application for admission to Oregon Tech. Prospective students may apply online at URL <http://www.oit.edu/portland-metro/admissions>. When asked, applicants should select "**Pre MLS**" as their major. NOTE: **Admission to Oregon Tech does not mean that an applicant has been admitted to the MLS professional program.**

Admission to the professional program is criterion-based, competitive, and decided by the program admissions committee. Admission selection is based upon scholarship, personal qualifications, recommendations from three references, and interview results. Selected candidates are interviewed in February or early March and applicants selected for admission are notified in writing by the Program Director during March. To be eligible for admission, candidates for the MLS professional program must meet the following minimum eligibility requirements:

- **Those applicants who have earned a Baccalaureate degree must have completed a minimum of 95 transferable quarter credit hours to include:**
  - **Mathematics:** one college-level math course. Minimum requirements are met by MATH 111 - College Algebra. **Additional required math course:** statistics;
  - **Biology:** 24-quarter credit hours that must include one course in immunology and a course in microbiology. The microbiology coursework must include a laboratory component either integral to the course or taken separately; courses must be at the 200-level or above and not survey type. **Highly recommended courses:** general biology, genetics, anatomy and physiology, cellular or molecular biology;
  - **Chemistry:** 24-quarter credit hours of chemistry; courses must be at the 200 level or above and not survey type. **Highly recommended courses:** general chemistry, organic chemistry, biochemistry, and quantitative analysis
- Those applicants who have not earned a Baccalaureate degree must have completed a minimum of 95 transferable quarter hours to include the prerequisites listed in 1 above and:
  1. 18-quarter credit hours of Communication course work including specified course work in writing and speech (see Baccalaureate General Education Requirements described elsewhere in this catalog);
  2. 9-quarter credit hours of Humanities course work in topical areas such as Art, Art History or Appreciation, Music, Music History or Appreciation, English (excluding writing and speech), Linguistics, and Philosophy (no more than three credits of activity of performance-based courses may be used in this category); and
  3. 12-quarter credit hours of Social Science course work in topical areas such as Anthropology, Economics, Geography, History, Political Science, Psychology, and Sociology.

Prerequisite course work does not need to be completed to apply, but official transcript(s) documenting completion of all outstanding prerequisite coursework with grades of 'C' or better must be on file with the MLS Department office before any offer of admission is finalized. The Oregon Tech Registrar's office will review each applicant's transcripts to confirm that the requirements are met. Applicants who have met **admission requirements** seven or more years prior to application to the MLS Program must complete additional academic work to qualify. This may be accomplished by:

- Completing a course in chemistry and a course in biology with a grade of C or better; courses must be at the 200-level or above and not survey type; or
- Receiving credit by examination in biochemistry and in microbiology; or
- Achieving a CLEP score at or above 50 on both the biology and chemistry examinations.

Applicants seeking transfer credit from international institutions must provide a credential evaluation from an Oregon Tech-approved credential evaluation service and must meet requirements as described in two above. Contact the Oregon Tech Office of Admissions on-line at <http://www.oit.edu/admissions/international-students> or by telephone 503.821.1250 or 1.800.422.2017 for additional information.

- All applicants must have a minimum GPA of 2.5 to apply.

## **Health Insurance and Immunizations**

Students admitted to the MLS program are required to have and show proof of comprehensive health insurance coverage. This is because during a student's tenure in the MLS program they will work with patient samples and be in close contact with patients who may be ill. This means MLS program students are at a high risk for exposure to certain infections. Health insurance is not available through the university. Students must acquire this insurance on their own.

**Note:** MLS program students are NOT permitted to begin the program or attend a clinical externship without demonstrating proof of health insurance.

All MLS program students are required to meet immunization requirements as dictated by OARs 409-030-0100 to 409-030-0250. Students will be provided with current information once accepted into the professional program.

## Essential Requirements

In accordance with its accreditation standards, the MLS program has established essential requirements. To be admitted and maintain enrollment, participate in, and successfully complete the MLS professional program, a student must meet these non-academic standards of performance:

- A. Students must demonstrate the ability to acquire and to communicate information. Specifically, a program student must be able to:
  1. Read for comprehension and follow verbal and written instructions to demonstrate mastery of information presented in coursework, including relevant content in basic science and clinical courses, at a level deemed appropriate by the faculty.
  2. Effectively communicate in written and spoken English in order to transmit information to faculty, staff, peers, and members of the health care team.
  3. Make a correct judgment in seeking supervisory help and consultation in a timely manner.
  4. Competently utilize technology to research, investigate, acquire and present information obtained by observation and experimentation.
  5. Use strategies that minimize miscommunication.
  6. At all times and in all circumstances, follow established procedures to safeguard protected patient information communicated by non-electronic and electronic means.
- B. Students must demonstrate sufficient motor and sensory function to execute movements required to carry out work assignments in all phases of diagnostic testing, including pre-analytical, analytical, and post-analytical. Specifically, a program student must be able to:
  1. Distinguish physical and/or chemical attributes, including color, shape, size, and fine detail of objects both macroscopically and microscopically.
  2. Demonstrate sufficient dexterity to safely manipulate specimens, laboratory utensils, tools, equipment and instrumentation including computer touch-screens, keyboards and handheld calculators, necessary to obtain and report complete and accurate diagnostic test results.
  3. Demonstrate adequate mobility to attend to duties in the various locations of the medical laboratory work environment.
  4. Use sensory skills to acquire and apply information presented by various means and media, including demonstrations.
  5. Perform sustained, often repetitive physical activity that may require sitting, standing and/or walking for prolonged periods of time.
  6. Accurately read, record, and when necessary, respond to numbers, letters and symbols displayed in print whether transmitted through non-electronic, electronic or other technological media.
  7. Demonstrate proficiency performing a wide range of tests in areas of the contemporary medical laboratory including but not limited to hematology, clinical chemistry, immunohematology, and microbiology, molecular and other emerging diagnostic venues.
- C. Students must project an image of professionalism through behavior, speech, and grooming. Each student is to possess requisite knowledge and skill and safely perform a wide variety of test procedures with precision and accuracy. Specifically, a program student must be able to:
  1. Follow established laboratory safety protocols when working with various sample types including blood, urine, and other body fluids and tissues, and with microbial organisms that may be infectious, and hazardous chemicals.
  2. Work accurately and safely under stress and time constraints to make subjective evaluations and decisions when mistakes may have a negative and/or high impact on patient care.
  3. Adapt to changing environments, maintain a professional demeanor and concentration in distracting situations.
  4. Demonstrate attributes that include integrity, responsibility, and tolerance.
  5. Speak, act and perform all work in an ethical manner.
  6. Show respect for self and others.
  7. Work independently as well as cooperatively with others, performing professional obligations in a timely, responsible manner.
  8. Prioritize tasks and accept responsibility for work performed independently and as a team member.
  9. Assess his or her performance, willingly accept criticism, and actively seek ways to improve.

## Program Learning Outcomes:

1. Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology, and other emerging diagnostic venues.
2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.
3. Professional and ethical conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.
4. Maintaining appropriate composure under stressful conditions.
5. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.
6. Application of safety and governmental regulations and standards as applied to medical laboratory practice.
7. Effective communication skills to ensure accurate and appropriate information transfer.

# Medical Laboratory Science, BS

## Graduation Requirements

BS MLS degree students must complete 181-183 quarter credits hours, maintain a minimum GPA of 2.00, and earn a grade of "C" or better in all professional program courses (MLS) as prescribed by the curriculum outline.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

### Curriculum

Required courses and recommended terms during which they should be taken:

**Note:** If a student is admitted into the MLS professional program and has followed this curriculum map, the MLS degree can be completed in 11 terms.

### Pre-Medical Laboratory Science

This is the curriculum map to be followed by EAMLSP students.

#### First Year Fall

Biology Elective Credit Hours (200 level or above): 4

or

Recommended: BIO 211 - Principles of Biology Credit Hours: 4

or

Recommended: BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

Chemistry Elective Credit Hours (200 level or above): 5

or

Recommended: CHE 221 - General Chemistry I Credit Hours: 5

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 17 Credit Hours**

#### Winter

Biology Elective Credit Hours (200 level or above): 4

or

Recommended: BIO 212 - Principles of Biology Credit Hours: 4

or

Recommended: BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

Chemistry Elective Credit Hours (200 level or above): 5

or

Recommended: CHE 222 - General Chemistry II Credit Hours: 5

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

Biology Elective Credit Hours (200 level or above): 4

or

Recommended: BIO 213 - Principles of Biology Credit Hours: 4

or

Recommended: BIO 233 - Human Anatomy/Physiology III Credit

Hours: 4

Chemistry Elective Credit Hours (200 level or above): 5

or

Recommended: CHE 223 - General Chemistry III Credit Hours: 5

MLS 100 - Introduction to MLS Credit Hours: 2 (only required for MLS early admission track students)

SPE 111 - Public Speaking Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 16/18 Credit Hours**

#### Second Year Fall

BIO 345 - Medical Microbiology Credit Hours: 5

Chemistry Elective Credit Hours (200 level or above): 4

Statistics Elective Credit Hours: 4

WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 17 Credit Hours**

#### Winter

Biology Elective Credit Hours (200 level or above): 3

Chemistry Elective Credit Hours (200 level or above): 4

Communication Elective Credit Hours: 3 <sup>a</sup>

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

BIO 436 - Immunology Credit Hours: 4

Chemistry Elective Credit Hours (200 level or above): 4

Communication Elective Credit Hours: 3 <sup>a</sup>

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

## Communication Electives

Students must choose courses from the following list:

COM 205 - Intercultural Comm Credit Hours: 3 <sup>a</sup>  
COM 225 - Interpers Communication Credit Hours: 3  
COM 320 - Advanced Intercultural Comm Credit Hours: 3 <sup>a</sup>  
COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3  
COM 401 - Civil Engineering Project I Credit Hours: 3  
SPE 314 - Argumentation Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 123 - Research Writing Credit Hours: 3  
WRI 214 - Business Correspondence Credit Hours: 3  
WRI 227 - Technical Report Writing Credit Hours: 4  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
WRI 328 - Style Credit Hours: 3  
WRI 350 - Documentation Develop Credit Hours: 3  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

<sup>a</sup>COM 205 and COM 320 **may not** be used to satisfy both Communication and Humanities credits

## Professional Courses

All senior level courses require admission to the Medical Laboratory Science Program or instructor consent.

### Professional Courses

#### Fall

MLS 420 - Clinic Immun & Infect Serology Credit Hours: 5  
MLS 432 - Foundations of MLS I Credit Hours: 4  
MLS 442 - Hematology I Credit Hours: 6  
MLS 464 - Medical Mycology and Parasitology Credit Hours: 3

**Total: 18 Credit Hours**

#### Winter

MLS 415 - Clinical Chemistry I Credit Hours: 6  
MLS 444 - Microbiology I Credit Hours: 6  
MLS 452 - Hematology II Credit Hours: 5  
MLS 462 - Foundations of MLS II Credit Hours: 3

**Total: 20 Credit Hours**

#### Spring

MLS 416 - Clinical Chemistry II Credit Hours: 6  
MLS 443 - Immunohematology I Credit Hours: 4

MLS 445 - Microbiology II Credit Hours: 4  
MLS 449 - Principles of Urinalysis Credit Hours: 3

**Total: 17 Credit Hours**

#### Summer

MLS 422 - Molecular Diagnostics Credit Hours: 4  
MLS 424 - Hemostasis Credit Hours: 3  
MLS 453 - Immunohematology II Credit Hours: 3  
MLS 417 - Clinical Chemistry III Credit Hours: 2

**Total: 12 Credit Hours**

#### Fall

MLS 463 - Foundations of MLS III Credit Hours: 1  
MLS 470 - Chemistry & Immunology Extern Credit Hours: 4  
MLS 471 - Hematology Externship Credit Hours: 4  
MLS 472 - Microbiology Externship Credit Hours: 4  
MLS 473 - Immunohematology Extern Credit Hours: 3

**Total: 16 Credit Hours**

**Total for a B.S. Medical Laboratory Science: 181-183 Credit Hours**

# Natural Sciences Department

Ken Usher, *Department Chair*

Lloyd Parratt, *Associate Department Chair*

*Professors:* H.-Y. Li, R. McClure, T. McVay, K. Usher, R. Wilde

*Associate Professors:* J. Kellermann, T. Lund, G. Pak, L. Parratt

*Assistant Professors:* J. Blacktop, A. Clark, K. Gandhi, J. Kinder, Y. Yang

*Instructors:* T. Elliott, K. Farris, D. Johnston

## Degrees Offered

- Bachelor of Science in Biology-Health Sciences
- Bachelor of Science in Environmental Sciences

## Minors Offered

- Applied Physics
- Biology
- Chemistry
- Coaching
- Sustainability

The Department of Natural Sciences prepares students for challenging, rewarding careers in health, biological, and environmental sciences. The department also provides courses in biology, chemistry, and physics in support of degrees in nursing, medical imaging, dental hygiene, respiratory care, management and engineering programs.

## Biology Programs

Many students have an interest in biology. At Oregon Tech we have designed two programs that prepare graduates for rewarding careers that require a strong foundation in biology. For outdoor or field-oriented options, please refer to the Environmental Sciences program in our department. It offers several emphases, which can readily be tailored to biological interests and student research projects. Graduates from our Environmental Sciences program often go on to careers with public and private agencies such as US Fish and Wildlife Service, US Forest Service and the Nature Conservancy. For medically-oriented options in biology, please see our Biology-Health Sciences program. It offers a strong preparation to apply to professional programs, exceeding the minimum requirements for highly competitive fields such as Medicine, Pharmacy, Dentistry, Veterinary Medicine, Physician Assistant, Physical Therapy, and others.

## Biology-Health Sciences Program

Travis Lund, *Program Director*

### Degree Offered

- Bachelor of Science in Biology-Health Sciences

### Program Learning Outcomes

Upon graduating from the BHS program at Oregon Tech, students will be able to:

1. Demonstrate scientific knowledge and understanding.
  - a. Demonstrate foundational knowledge in the natural sciences (e.g., terminology, organization, classifications, appropriate use of units, methodologies, and fundamental principles).
  - b. Apply scientific principles to biological and medical examples/contexts.
2. Be proficient in scientific reasoning and critical thinking.
  - a. Analyze data to determine its relationship to principles, and evaluate the data for errors.
  - b. Analyze and evaluate content in biology.
3. Be able to effectively find and use resources from the literature.
4. Demonstrate effective oral, written and visual communication.
5. Demonstrate mathematical knowledge and skills in the biological sciences.

## Objective and Career Opportunities

If you are interested in pre-medical, pre-dental, pre-veterinary, pre-pharmacy, pre-physical therapy, etc., then this is the major you want. The degree program provides an intensive course of study in the basic sciences, social sciences, humanities, communication, and mathematics to prepare students for entry into professional programs. The program will meet prerequisite requirements for graduate schools of medicine, dentistry, veterinary



medicine, osteopathic medicine, optometry, pharmacy, podiatry, physician assistant, physical therapy and occupational therapy. These are all competitive graduate programs, and our graduates who apply to them have a strong record of acceptance. Our curriculum includes all of the core courses with labs in biology, anatomy & physiology, chemistry (general, organic, and biochemistry), and physics needed for applying to them, as well as upper-division science coursework that is tailored to medical fields, including cell biology, clinical pharmacology, medical genetics, medical microbiology, neuroscience, nutrition, parasitology, pathophysiology, virology, and immunology. We also have opportunities for undergraduate research that can engage students' interest and make them stand out as candidates for graduate programs. Courses in health management, medical microbiology, biochemistry, and molecular & cell biology also provide strong preparation for graduate work in biotechnology, public health, and medical administration. Some students transfer into Oregon Tech's Medical Laboratory Science program, before or after earning their Biology-Health Sciences degree. This major can also prepare one for a career in education with an emphasis in biology.

## **Student Preparation**

The Biology-Health Sciences curriculum is a demanding instructional program requiring considerable effort in science and mathematics coursework. Prospective students are advised to complete at least three years of high school mathematics and a minimum of three years of high school science (biology, chemistry, and physics).

## **Pre-Professional Program in Dentistry**

Kamal Gandhi, *Advising Coordinator*

The pre-professional program in dentistry prepares the student for entrance into dental school and provides a B.S. degree in Biology-Health Sciences. The Biology-Health Sciences curriculum at Oregon Tech provides a pathway to complete all the prerequisites that dental schools like to see, as well as upper-division coursework that is tailored to becoming a superior applicant. Most dental students have completed four years of college, and have a B.S. degree. Dental school typically lasts four years, although an accelerated degree may take only three years to finish. The length of a dental specialty residency depends on the specialty and the school it is affiliated with, so a specialty residency can range from two to six years.

Students are encouraged to work closely with their advisor to map out their curricular plan to prepare them for dental school application by sophomore year.

Admission to dental school is very competitive and requires strong academic achievement and extensive volunteering experience in dental settings. Students considering a career in dentistry should explore the websites of the schools they have interest in as the prerequisites for each may vary, and these can be tailored within our Biology-Health Sciences program. While our curriculum is very challenging, admission into dental school is highly competitive and requires strong academic achievement. The coursework at Oregon Tech helps students prepare for the dental admission test (DAT) offered by the American Dental Association. The test consists of a battery of four tests on the following: survey of the natural sciences, perceptual ability, reading comprehension, and quantitative reasoning.

The ADEA Associated American Dental Schools Application Service (ADEA AADSAS) is the centralized application service for U.S. dental schools. Please visit their website to find more information regarding dental school application.

For complete program requirements and a list of appropriate courses, please see the Biology-Health Sciences Program.

## **Pre-Professional Program in Medicine**

Kamal Gandhi, *Advising Coordinator*

The pre-professional program in medicine prepares the student for entrance into medical school and provides a B.S. degree in Biology-Health Sciences. The Biology-Health Sciences curriculum at Oregon Tech provides a pathway to complete all the prerequisites that medical schools like to see as well as upper-division science coursework that is tailored to becoming a superior applicant. Admission into a medical school doctoral program requires a four-year bachelor's degree with a preference for a science major over a non-science major. Once accepted, medical school then requires approximately four years of education and three to six years of internship and residency.

Students are encouraged to work closely with an advisor in our program to map out their curricular and other plans by sophomore year to prepare them for medical school application. Students are urged to volunteer in medical settings, possibly during high school and especially during college. For students currently in high school, it is advised that the student enrolls in many sciences courses before college to help them prepare for future success. Increasingly, participation in undergraduate research, which is an optional part of the Biology-Health Sciences major, is recommended to develop and demonstrate strong scientific inquiry competency for medical school.

Students considering a career in medicine should explore the websites of the schools they have interest in as the prerequisites for each may vary, and these can be tailored within our Biology-Health Sciences program. While our curriculum is very challenging, admission into medical school is highly competitive and requires strong academic achievement. The coursework at Oregon Tech helps students prepare for the medical college admission test (MCAT) required by nearly all medical schools. The test, which is divided into four sections including: physical sciences, biological sciences, social sciences and critical reasoning sections, is used to predict a student's ability to succeed academically.

For complete program requirements and a list of appropriate courses please see the Biology-Health Sciences Program.

## **Pre-Professional Program in Pharmacy**

Kamal Gandhi, *Advising Coordinator*

The pre-professional program in pharmacy prepares the student for entrance into pharmacy school and provides a B.S. degree in Biology-Health Sciences. A doctor of pharmacy degree normally takes four years to complete. Most entering pharmacy students have completed four years of undergraduate education and possess a bachelor's degree in the sciences, including specific prerequisites for the pharmacy school. The Biology-Health Sciences curriculum at Oregon Tech provides a pathway to complete all the prerequisites that pharmacy schools like to see as well as upper-division science coursework that is tailored to becoming a superior applicant. Oregon Tech has a cooperative agreement with Pacific University in Oregon that can allow qualifying students to complete their B.S. in Biology-Health Sciences from us and their Pharm.D. from Pacific University in as few as six years total.

Students are encouraged to work closely with their advisor in our program to map out their curricular and other plans by sophomore year to prepare them for pharmacy school application. Students are urged to begin volunteering in pharmacy settings, possibly during high school and especially during college. For students currently in high school, it is recommended to shadow and talk with pharmacists and to take many science courses before college to help prepare for future success.

The application process to pharmacy school is done through the Pharmacy College Application Service (PharmCAS). Students are encouraged to look at their web site while also looking at the sites of schools they have an interest in. Some pharmacy schools require the Pharmacy College Admissions Test (PCAT), but Oregon State University and the pharmacy schools in California do not. Admission to school is competitive so a strong undergraduate GPA, community service, and communication and leadership skills will help.

For complete program requirements and a list of appropriate courses please see the Biology-Health Sciences Program.

## **Pre-Professional Program in Physical Therapy**

Kamal Gandhi, *Advising Coordinator*

The pre-professional program in physical therapy prepares the student for applying for doctor of physical therapy (DPT) program and provides a B.S. degree in Biology-Health Sciences. The curriculum at The Biology-Health Sciences curriculum at Oregon Tech provides a pathway to complete all the prerequisites that physical therapy schools like to see as well as upper-division science coursework that is tailored to becoming a superior applicant. Most DPT programs require applicants to earn a B.S. degree prior to admission. The length of professional DPT programs is typically three years. Oregon Tech is tentatively launching its DPT program in summer 2023. Students graduated from The Biology-Health Sciences will have advantage in admission to the program.

Each institution may require different courses and students are encouraged to work with their academic advisor to plan course schedule. Most DPT programs require applicants to meet minimum GPA and complete the Graduate Record Examination (GRE). Many programs require applicants to have volunteer or paid experiences working with patients under the supervision of a licensed physical therapist. This experience may be an important factor in the admissions process.

Most, but not all professional DPT programs, participate in the Physical Therapist Centralized Application Service (PTCAS). Applicants who wish to apply to a nonparticipating PTCAS program must apply directly to the institution using the DPT program's local application.

For complete program requirements and a list of appropriate courses, please see the Biology-Health Sciences Program.

## **Pre-Professional Program for Physician Assistant Studies**

Kamal Gandhi, *Advising Coordinator*

The pre-professional program for Physician Assistants (PA) prepares the student for entrance into that Master's program and provides a B.S. degree in Biology-Health Sciences. A Master's degree in PA Studies normally takes 2.5 years to complete. Most entering PA students have completed four years of undergraduate education and possess a bachelor's degree in the sciences, including specific prerequisites for the PA school. The Biology-Health Sciences curriculum at Oregon Tech provides a pathway to complete all the prerequisites that PA schools like to see as well as upper-division science coursework that is tailored to becoming a superior applicant. In addition to strong academics, applying to P.A. programs requires a substantial amount of patient care experience, often over 1000 hours. Our pre-professional students often work nearby in healthcare settings during their undergraduate education. Some students choose to get a degree in an allied health major such as medical imaging or respiratory care, along with an additional year or more of science pre-requisites for applying to PA school, and our advisors help advise those students as well.

Students are encouraged to work closely with their advisor in our program to map out their curricular and other plans by sophomore year to prepare them for PA school application. Students are urged to begin volunteering in patient care settings, possibly during high school and especially during

college. For students currently in high school, it is recommend to shadow and talk with PA's and other medical providers and to take many science courses before college to help prepare for future success.

For complete program requirements and a list of appropriate courses please see the Biology-Health Sciences Program.

## **Pre-Professional Program in Veterinary Medicine**

Kamal Gandhi, *Advising Coordinator*

The pre-professional program in veterinary medicine prepares students for entrance into veterinary school. A doctor of veterinary medicine program typically lasts four years and features in-depth training in animal sciences. Most veterinary colleges accept applicants have a B.S. degree at a four-year university. The Biology-Health Sciences curriculum at Oregon Tech provides a pathway to complete all the prerequisites that pharmacy schools like to see as well as upper-division science coursework that is tailored to becoming a superior applicant.

The prerequisites for each veterinary school vary slightly. Students are encouraged to work closely with their advisor in our program to map out their curricular and other plans by sophomore year to prepare them for veterinary school application. Admission to veterinary school is competitive and requires a good undergraduate GPA in addition to shadowing or working with a veterinarian, volunteering in an animal shelter, or working at a zoo or rehabilitation facility while completing their undergraduate courses. Experience in 4-H, FFA or a similar group is also great for the application. Graduate Record Examination (GRE) is required by most veterinary schools, and some also require the Biology GRE. The Medical College Admission Test (MCAT) is also accepted by some schools in place of the GRE.

Association of American Veterinary Medical Colleges (VMCAS) is the centralized application service for Colleges of Veterinary Medicine. Please visit their website to find more information regarding veterinary school application. Being a resident of a state that has a veterinary school is also a major advantage to being accepted since most schools take few out-of-state applicants. The WICHE program in the western United States allows out-of-state students to attend veterinary school at Colorado State University at Fort Collins, Oregon State University, Washington State University or the Midwestern University at Glendale, AZ veterinary schools for in-state tuition.

For complete program requirements and a list of appropriate courses please see the Biology – Health Sciences Program.

# Environmental Sciences Program

Jherime Kellermann, *Program Director*

## Degree Offered

- Bachelor of Science in Environmental Sciences

## Dual Major Options

- Bachelor of Science in Civil Engineering and Environmental Sciences

*Advising Coordinators:* Ashton Greer and Jherime Kellermann

- Bachelor of Science in Renewable Energy Engineering and Environmental Sciences

*Advising Coordinators:* Mason Terry and Jherime Kellermann

The Bachelor of Science degree in Environmental Sciences program focuses on interdisciplinary scientific study of ecology, natural resources, and sustainability with emphases on management, research, and communication. The curriculum is comprised of four integrated core areas in ecology and natural resources: data analysis and statistics; geographic information systems (GIS); and social sciences.

Emphasis is placed on active experiential learning, particularly in the field. The program offers numerous and diverse opportunities for students to engage in applied research and resource management projects with the support of faculty and professionals through local and regional partnerships.

## Program Learning Outcomes

Upon completion of the program, students will have demonstrated the following abilities:

1. A strong working knowledge in foundations of ecology, natural resources, and sustainability.
2. Insights into humanity's role in the world's biggest challenges including climate change, sustainable resource use, and environmental health and justice.
3. The application of scientific reasoning and analytical methods to study natural phenomena.
4. Geospatial literacy through map interpretation and navigation, and the application of geographic information systems to address geospatial problems.
5. Design, execute, and communicate scientific projects.

## Student Preparation

We believe there is a place in our program for everyone with an interest in natural resources, environmental issues, conservation and sustainability, or just being in the great outdoors! Environmental science and natural resources is a huge field that can accommodate a wide range of individual interests and skill whether it's working with wild animals, plants, people, or computers and technology. We encourage students to explore the diversity of job opportunities with federal, state, and tribal agencies, non-governmental organizations (NGOs), and private industries to help guide your studies.

## Career Opportunities

Our faculty and partners are here to help you build an impressive resume of academic and work experience that will place you in the job or graduate program of your choice. Graduates can expect to find employment in federal, state, and tribal government agencies, non-governmental organizations (NGOs), and education and research institutions. Students are also well prepared to enter graduate school. Students graduating from our program have taken positions with the U.S. Geological Survey, U.S. Bureau of Reclamation, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, U.S. Forest Service, Oregon Department of Forestry, Oregon State Police Wildlife Enforcement, Klamath County Health Department, Klamath Irrigation District, Klamath County Soil and Water Conservation District, the Nature Conservancy, and JELD-WEN Windows and Doors.

## Physical Education and Health Education

### Physical Education Philosophy and Courses

At Oregon Institute of Technology, the physical education philosophy is that every man and woman can achieve and maintain fitness through a sound program based on varied developmental, sport, and recreational activities. The physical education courses provide basic instruction in vigorous activities.

Course offerings include fitness training, weight lifting, aerobics activities, archery, ice skating, rugby, recreational basketball, tai chi, Zumba, yoga, kick boxing, core strength & balance, Pilates, rowing, belly dance, scuba, swim classes, relaxation & flexibility, varsity sports and major sports seminars, including weight loss and weight loss management. Other offerings include wilderness navigation, cross country skiing and snowshoeing.

### **Health Education Philosophy and Courses**

Selected courses in health education are provided to assist students to prevent physical and mental health disorders and to promote well-being.

### **Course Policy**

Physical education courses are currently offered as elective credits only. Some courses may require an additional course fee depending on facility and special equipment needs. There is no limit on the number of times a physical education course can be repeated.

## Applied Physics Minor

Students wishing to pursue the minor in Applied Physics should consult with physics faculty in the Natural Sciences Department for advising.

The Minor in Applied Physics is available to any student and is especially recommended for individuals interested in pursuing careers or graduate studies in physical or applied sciences and engineering. The Minor in Applied Physics requires completion of 32 credits of coursework as outlined below. A grade of "C" or better is required in all courses applied toward the minor.

### Required Coursework:

PHY 221 - General Physics w/Calculus Credit Hours: 4

PHY 222 - General Physics w/Calculus Credit Hours: 4

PHY 223 - General Physics w/Calculus Credit Hours: 4

MATH 254 - Vector Calculus I Credit Hours: 4

MATH 321 - Appl Diff Equation I Credit Hours: 4

At least 12 credits of upper-division physics Electives (PHY prefix)

### Approved Upper-Division Electives:

Up to six credits of the upper-division elective coursework may be satisfied by approved non-PHY electives that utilize the technical application of physics (see list below; other courses must be approved by the physics faculty and the chair of the Natural Sciences department on a case-by-case basis). Of the 12 upper-division elective credits, six cannot be counted toward the student's major program.

Any course 300-level or higher that has a PHY prefix.

Examples include:

PHY 311 - Intro to Modern Physics Credit Hours: 3

PHY 330 - Electricity & Magnetism Credit Hours: 3

PHY 448 - Geometric Optics Credit Hours: 4

PHY 449 - Radiometry & Optical Detect Credit Hours: 4

PHY 450 - Physical Optics Credit Hours: 4

PHY 451 - Lasers Credit Hours: 4

PHY 452 - Waveguides and Fiber Optics Credit Hours: 4

PHY 453 - Optical Metrology Credit Hours: 4

PHY 410 - Math Meth: Fourier Optics Credit Hours: 3

### Approved non-PHY Electives:

EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4

EE 343 - Solid State Electronic Devices Credit Hours: 3

REE 344 - Nuclear Energy Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 347 - Hydroelectric Power Credit Hours: 3

MECH 312 - Dynamics II Credit Hours: 3

MECH 318 - Fluid Mechanics Credit Hours: 4

MECH 323 - Heat Transfer I Credit Hours: 3

MECH 417 - Fluid Mechanics II Credit Hours: 3

MECH 480 - Mechanical Vibrations Credit Hours: 3

MECH 313 - Thermodynamics II Credit Hours: 3

**Note:** Not all courses are offered every year or on every campus. Additional prerequisites may be required; see catalog descriptions and recent course schedules for details.

## **Biology Minor**

For advising, see Lloyd Parratt

The biology minor is open to all majors except Biology-Health Sciences majors. It is especially recommended for students who want to further their knowledge in biology as it relates to their chosen field. The minor offers specialized courses in biology and will document student proficiency in specific areas of biology. A minimum of 24 credits is required to complete the minor. Any substitution for elective courses must be approved by an advisor in the Natural Sciences Department. Students are advised to pay strict attention to prerequisites when selecting courses for the biology minor.

### **Requirements of Minor**

#### **Required Core Courses:**

BIO 211 - Principles of Biology Credit Hours: 4

BIO 212 - Principles of Biology Credit Hours: 4

BIO 213 - Principles of Biology Credit Hours: 4

#### **And a minimum of 12 credits upper-division course work from the following list:**

<sup>a</sup> Courses offered in alternating years.

BIO 313 - Botany Credit Hours: 4 <sup>a</sup>

BIO 331 - Human Anatomy/Physiology I Credit Hours: 5

BIO 332 - Human Anatomy/Physiology II Credit Hours: 5

BIO 333 - Human Anatomy/Physiology III Credit Hours: 5

BIO 337 - Aquatic Ecology Credit Hours: 4 <sup>a</sup>

BIO 341 - Medical Genetics Credit Hours: 3

BIO 342 - Cell Biology Credit Hours: 4

BIO 345 - Medical Microbiology Credit Hours: 5

BIO 352 - Developmental Biology Credit Hours: 4

BIO 357 - Intro to Neuroscience Credit Hours: 3

BIO 426 - Evolutionary Biology Credit Hours: 3

BIO 436 - Immunology Credit Hours: 4

# Biology-Health Sciences, BS

## Degree Requirements

The minimum graduation requirement is 181 credit hours of prescribed coursework. Students must meet the general education requirements, as stated elsewhere in this catalog, and satisfactorily complete the courses listed in this curriculum to obtain a Bachelor of Science degree in Biology-Health Sciences. Biology-Health Sciences students must complete every science course with a minimum grade of "C" and must maintain a minimum grade point average of 2.5 in lower division science courses to advance to upper-division science courses in the major.

Because the prerequisite requirements and recommended courses for entry into health professions and graduate schools differ, some upper-division courses may be substituted for others, with approval of your academic advisor.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

BIO 211 - Principles of Biology Credit Hours: 4

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

BIO 109 - Intro to Medical Sciences Credit Hours: 2

BIO 212 - Principles of Biology Credit Hours: 4

MATH 112 - Trigonometry Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Spring

BIO 213 - Principles of Biology Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4 <sup>a</sup>

Health Biology Elective Credit Hours: 2 (lower-division) <sup>b</sup>

SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

### Sophomore Year Fall

BIO 345 - Medical Microbiology Credit Hours: 5

CHE 221 - General Chemistry I Credit Hours: 5

MATH 251 - Differential Calculus Credit Hours: 4

Humanities Elective: 3

**Total: 17 Credit Hours**

### Winter

BIO 209 - Current Research Tpc Med Sci I Credit Hours: 1

CHE 222 - General Chemistry II Credit Hours: 5

MATH 252 - Integral Calculus Credit Hours: 4

SPE 321 - Small Group/Team Comm Credit Hours: 3 <sup>f</sup>

Health Biology Elective Credit Hours: 3 (upper-division) <sup>c</sup>

**Total: 16 Credit Hours**

### Spring

CHE 223 - General Chemistry III Credit Hours: 5

WRI 122 - Argumentative Writing Credit Hours: 4

Or

WRI 227 - Technical Report Writing Credit Hours: 4

Health Biology Elective Credit Hours: 4 (upper-division) <sup>c</sup>

Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Junior Year Fall

BIO 331 - Human Anatomy/Physiology I Credit Hours: 5

CHE 331 - Organic Chemistry I Credit Hours: 4

PHY 221 - General Physics w/Calculus Credit Hours: 4 <sup>d</sup>

**Total: 13 Credit Hours**

### Winter

BIO 332 - Human Anatomy/Physiology II Credit Hours: 5

CHE 332 - Organic Chemistry II Credit Hours: 4

PHY 222 - General Physics w/Calculus Credit Hours: 4 <sup>d</sup>

Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Spring

BIO 333 - Human Anatomy/Physiology III Credit Hours: 5

CHE 333 - Organic Chemistry III Credit Hours: 4

PHY 223 - General Physics w/Calculus Credit Hours: 4 <sup>d</sup>

WRI 327 - Advanced Tech Writing Credit Hours: 3 <sup>g</sup>

**Total: 16 Credit Hours**

### Senior Year Fall

CHE 450 - Biochemistry I Credit Hours: 4

Health Biology Elective Credit Hours: 3 (upper-division) <sup>c</sup>

Social Science Elective Credit Hours: 3

Elective Credit Hours: 3 <sup>e</sup>

Elective Credit Hours: 3 <sup>e</sup>

**Total: 16 Credit Hours**

### Winter

BIO 346 - Pathophysiology I Credit Hours: 3

BIO 409 - Crnt Rsch Tpcs in Med Sci II Credit Hours: 2

CHE 451 - Biochemistry II Credit Hours: 4

Social Science Elective Credit Hours: 3

Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

Health Biology Elective Credit Hours: 3 (upper-division) <sup>c</sup>

Health Biology Elective Credit Hours: 4 (upper-division) <sup>c</sup>

Health Biology Elective Credit Hours: 4 (upper-division) <sup>c</sup>



Elective Credit Hours: 3 <sup>e</sup>

**Total: 14 Credit Hours**

**Health Biology Electives (lower-division):**

BIO 200 - Medical Terminology Credit Hours: 2

BIO 205 - Nutrition Credit Hours: 3

BIO 216 - Intro to Veterinary Medicine Credit Hours: 4

BIO 226 - Intro to Wildlife Rehab Credit Hours: 3

**Health Biology Electives (upper-division):**

BIO 326 - Parasitology Credit Hours: 4

BIO 341 - Medical Genetics Credit Hours: 3

BIO 342 - Cell Biology Credit Hours: 4

BIO 347 - Pathophysiology II Credit Hours: 3

BIO 352 - Developmental Biology Credit Hours: 4

BIO 357 - Intro to Neuroscience Credit Hours: 3

BIO 426 - Evolutionary Biology Credit Hours: 3

BIO 435 - Exercise Physiology Credit Hours: 3

BIO 436 - Immunology Credit Hours: 4

BIO 461 - Human Cadaver Dissection Credit Hours: 1

BIO 462 - Human Cadaver Dissection Credit Hours: 1

BIO 495 - Research Project in Biology Credit Hours: Varies (1-4)

CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3

CHE 452 - Biochemistry III Credit Hours: 4

CHE 495 - Research Project in Chemistry Credit Hours: Varies (1-4)

STAT 414 - Stat Methods in Epidemiology Credit Hours: 4

**Total for a B.S. in Biology-Health Sciences: 181 Credit Hours**

<sup>a</sup> MATH 361 may be replaced by MATH 243

<sup>b</sup> Minimum of 2 credits of lower-division health biology elective must be completed, chosen from the lower-division list above. Alternately, an additional elective from the upper-division list may be taken, in which case a total of at least 23 credits of upper-division health biology electives are required

<sup>c</sup> Minimum of 21 credits of upper-division health biology electives must be completed, chosen from the upper-division list above

<sup>d</sup> PHY 221, PHY 222, PHY 223, may be replaced by PHY 201, PHY 202, PHY 203 with advisor consent

<sup>e</sup> Advisor approval of all elective choices is required. Additional courses from the health biology lists above, and/or suitable courses from BUS, COM, ENV, MATH, PSY, or SOC are recommended

<sup>f</sup> SPE 321 may be replaced by COM 205 or COM 225

<sup>g</sup> WRI 327 may be replaced by WRI 345 or WRI 410

When choosing electives or substituting courses, students are responsible for completing a minimum of 60 credits of upper-division work before a degree will be awarded. Upper-division work is defined as 300 and 400 level classes at a bachelor's degree granting institution.

## Chemistry Minor

For advising, see Addie Clark

Oregon Tech offers a minor in chemistry to students in all majors interested in deepening their knowledge of chemistry, the "central science". A minor in chemistry allows students the opportunity to gain understanding of chemical phenomena, become proficient in techniques, and develop their abilities applying fundamental chemistry concepts to more complex problems in fields from medicine to renewable energy to materials science. A chemistry minor can help prepare students for graduate school, medical school, or professional laboratory or research work.

The minor includes a required core of one year of general chemistry and one term of organic chemistry. Students must then choose 16 credits of chemistry electives to complete the minor. Of these electives, 12 must be upper-division and at least 8 must be CHE courses. A minimum of 16 credits applied towards the minor must be earned at Oregon Tech.

Students wishing to pursue the minor in chemistry should consult with both their primary academic advisor and a chemistry minor advisor.

### Requirements of Minor

#### Required Core Courses (17 - 19 credits):

CHE 201 - General Chemistry I Credit Hours: 3

CHE 204 - General Chemistry I Lab Credit Hours: 1

or

CHE 221 - General Chemistry I Credit Hours: 5

CHE 202 - General Chemistry II Credit Hours: 3

CHE 205 - General Chemistry II Lab Credit Hours: 1

or

CHE 222 - General Chemistry II Credit Hours: 5

CHE 203 - General Chemistry III Credit Hours: 3

CHE 206 - General Chemistry III Lab Credit Hours: 1

or

CHE 223 - General Chemistry III Credit Hours: 5

CHE 331 - Organic Chemistry I Credit Hours: 4

or

PHY 305 - Nanoscience & Nanotech Credit Hours: 4

CHE 315 - Environmental Analytical Chemistry Credit Hours: 3

CHE 332 - Organic Chemistry II Credit Hours: 4

CHE 333 - Organic Chemistry III Credit Hours: 4

CHE 450 - Biochemistry I Credit Hours: 4

CHE 451 - Biochemistry II Credit Hours: 4

CHE 452 - Biochemistry III Credit Hours: 4

CHE 465 - Fate/Transport of Pollutants Credit Hours: 4

EE 343 - Solid State Electronic Devices Credit Hours: 3

ENGR 355 - Thermodynamics Credit Hours: 3

MECH 360 - Engineering Materials II Credit Hours: 3

MECH 260 - Engineering Materials I Credit Hours: 3

MLS 415 - Clinical Chemistry I Credit Hours: 6

MLS 416 - Clinical Chemistry II Credit Hours: 6

MLS 417 - Clinical Chemistry III Credit Hours: 2

PHY 311 - Intro to Modern Physics Credit Hours: 3

REE 331 - Fuel Cells Credit Hours: 3

REE 333 - Batteries Credit Hours: 3

REE 335 - Hydrogen Credit Hours: 3

REE 337 - Materials for RE Applications Credit Hours: 3

REE 346 - Biofuels and Biomass Credit Hours: 3

Any other CHE course at the 200-level or higher, except for pharmacology courses (CHE 210, CHE 350, CHE 360)

Other electives approved by the Natural Sciences department.

#### Elective Courses

(16 credits required; at least 12 must be upper division (300-level or higher) and at least 8 must be CHE courses) At least 6 elective credits must not be counted towards a major (or another minor or program) as required courses or technical electives:

CHE 260 - Electrochemistry for RE Applic Credit Hours: 4

CHE 305 - Nanoscience & Nanotech Credit Hours: 4

or

ENGR 305 - Nanoscience & Nanotech Credit Hours: 4

## Coaching Minor

The Coaching Minor offers Oregon Tech students the opportunity to gain knowledge and skills in coaching. The Coaching Minor features study in the basics of sports medicine, team communication and psychology, and coaching theory. It also includes an opportunity to apply that knowledge to coaching in practical ways. Students who obtain the minor will document their preparation to coach in any sport or situation. For advising or for more information contact the head of the Coaching Minor Committee, currently, Dr. Kevin Brown.

## Career Opportunities

The Coaching Minor represents a credential that documents the student's academic and practical preparation to coach. For students interested in coaching, this should give them an advantage over others without documented training and experience.

### Requirements of the Minor

It is strongly recommended that students interested in obtaining this minor see a Coaching Minor advisor prior to taking courses.

HED 275 - Intro to Sports Medicine Credit Hours: 3  
PSY 376 - Foundations of Sports Psych Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
PHED 255 - Intro to Coaching Theory Credit Hours: 3  
PHED 355 - Coaching in Application Credit Hours: 3  
PHED 455 - Coaching Practicum Credit Hours: 3

### And six credits of PHED practice courses:

#### Athletic Conditioning

Choose 3 credits from the following courses:

PHED 102 - Zumba Credit Hours: 1  
PHED 110 - Boot Camp/Kick Boxing Credit Hours: 1  
PHED 111 - Core Strength and Balance Credit Hours: 1  
PHED 112 - Intro to Cardio and Core Credit Hours: 1  
PHED 113 - Super Circuit/Cardio Training Credit Hours: 1  
PHED 120 - Pilates and Body Pump Credit Hours: 1  
PHED 121 - Total Fitness Conditioning I Credit Hours: 1  
PHED 122 - Total Fitness Conditioning II Credit Hours: 1  
PHED 123 - Dancercise/Step Aerobics Credit Hours: 1  
PHED 125 - Weight Management Fitness Credit Hours: 1  
PHED 126 - Body Pump & Core Ball Pilates Credit Hours: 1  
PHED 146 - Yoga Credit Hours: 1  
or  
PHED 188 - Varsity Sport/Strength Cond Credit Hours: 1

#### Sport Activity

Choose 3 credits from the following courses:

PHED 100 - Belly Dance: Beginning Credit Hours: 1  
PHED 101 - Belly Dance: Intermediate Credit Hours: 1  
PHED 125 - Weight Management Fitness Credit Hours: 1  
PHED 130 - Rowing Credit Hours: 1  
PHED 131 - Scuba: Beginning Credit Hours: 2  
PHED 132 - Scuba: Advanced Credit Hours: 2  
PHED 141 - Tai Chi for Circulation Credit Hours: 1  
PHED 142 - Tai Chi for Internal Organs Credit Hours: 1  
PHED 143 - Tai Chi & Qigong: Hlth, Bns, Mu Credit Hours: 1  
PHED 144 - Tai Chi & Qigong: Neck/Back St Credit Hours: 1  
PHED 145 - Relaxation and Flexibility Credit Hours: 1  
PHED 150 - Aikido Credit Hours: 1  
PHED 151 - Karate Credit Hours: 1  
PHED 160 - Cross Country Skiing: Begin Credit Hours: 1  
PHED 161 - Snowshoeing: Beginning Credit Hours: 1  
PHED 162 - Ice Skating Credit Hours: 1  
PHED 163 - Wilderness Navigation Credit Hours: 1  
PHED 170 - Golf Credit Hours: 1  
PHED 171 - Archery: Beginning Credit Hours: 1  
PHED 172 - Archery: Intermediate Credit Hours: 1  
PHED 174 - Recreational Basketball Credit Hours: 1  
PHED 175 - Rugby Credit Hours: 1  
PHED 180 - Varsity Cross Country Credit Hours: 1  
PHED 181 - Varsity Soccer Credit Hours: 1  
PHED 182 - Varsity Track/Field Credit Hours: 1  
PHED 183 - Varsity Men's Baseball Credit Hours: 1  
PHED 184 - Varsity Men's Basketball Credit Hours: 1  
PHED 185 - Varsity Women's Basketball Credit Hours: 1  
PHED 186 - Varsity Women's Softball Credit Hours: 1  
PHED 187 - Varsity Women's Volleyball Credit Hours: 1  
PHED 201 - Sports Seminar: Officiating Credit Hours: 2

**Note:** Requirements constitute 24 credits, of which 12 credits are upper division.

# Environmental Sciences, BS

## Degree Requirements

Students must meet the general education requirements, as stated elsewhere in this catalog, and complete the courses listed in the curriculum to obtain a Bachelor of Science in Environmental Sciences. A total of 183 credits are required for the degree. Students are encouraged to develop a technical emphasis area based on their own interests.

Students are required to pass each science course with a grade of "C" or better. This requirement is based on the quantitative skills needed in later courses as well as the degree of integration in subject material that is present throughout the program.

## The Environmental Sciences Curriculum

The Environmental Sciences curriculum integrates "hands-on" skills and knowledge. Field or laboratory work are important components of many ES courses. Several freshman and sophomore courses allow a student to develop skills in computer applications, Geographic Information Systems (GIS), Global Positioning Systems (GPS), simulation modeling, and field assessment methods.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

BIO 211 - Principles of Biology Credit Hours: 4  
ENV 108 - Mentorship and Team Building Credit Hours: 1  
ENV 111 - Intro to Env Sciences Credit Hours: 4  
GEOG 105 - Physical Geography Credit Hours: 4  
GIS 103 - The Digital Earth Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

BIO 212 - Principles of Biology Credit Hours: 4  
GIS 134 - Geographic Info Systems Credit Hours: 3  
MATH 111 - College Algebra Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

BIO 213 - Principles of Biology Credit Hours: 4  
GIS 205 - Mobile and Web GIS Credit Hours: 2  
MATH 112 - Trigonometry Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

#### Sophomore Year Fall

CHE 221 - General Chemistry I Credit Hours: 5  
ENV 108 - Mentorship and Team Building Credit Hours: 1  
ENV 217 - Intro to Natural Resources Management Credit Hours: 4  
MATH 251 - Differential Calculus Credit Hours: 4

**Total: 14 Credit Hours**

#### Winter

CHE 222 - General Chemistry II Credit Hours: 5  
ENV 224 - Scientific Reason & Method Credit Hours: 3  
ECO 201 - Principles of Microeconomics Credit Hours: 3  
or  
ECO 202 - Principles of Macroeconomics Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Spring

CHE 223 - General Chemistry III Credit Hours: 5  
ENV 226 - Environmental Data Analysis Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
Or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Technical Emphasis Elective Credit Hours: 4<sup>a</sup>

**Total: 16 Credit Hours**

#### Junior Year Fall

ENV 108 - Mentorship and Team Building Credit Hours: 1  
ENV 355 - Careers/Professionalism in Env Sci Credit Hours: 3  
PHY 201 - General Physics Credit Hours: 4

or  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
Social Science Elective Credit Hours: 3

Technical Elective Credit Hours: 4<sup>a</sup>

**Total: 15 Credit Hours**

#### Winter

CHE 315 - Environmental Analytical Chemistry Credit Hours: 3  
ENV 314 - Environmental Law & Policy Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4  
Technical Elective Credit Hours: 3<sup>a</sup>

**Total: 13 Credit Hours**

#### Spring

CHE 465 - Fate/Transport of Pollutants Credit Hours: 4  
ENV 434 - Advanced Data Analysis Credit Hours: 4  
Plant Elective Credit Hours: 4<sup>b</sup>  
Technical Elective Credit Hours: 4<sup>a</sup>

**Total: 16 Credit Hours**

#### Senior Year Fall

ENV 108 - Mentorship and Team Building Credit Hours: 1  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Technical Elective Credit Hours: 3<sup>a</sup>  
Technical Elective Credit Hours: 4<sup>a</sup>

Upper Division WRI Elective Credit Hours: 3 <sup>c</sup>  
**Total: 14 Credit Hours**

Technical Elective Credit Hours: 3 <sup>a</sup>  
**Total: 15 Credit Hours**

#### **Winter**

ENV 485 - Ecoregional Management Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Technical Elective Credit Hours: 3 <sup>a</sup>

#### **Spring**

ENV 484 - Sustainable Human Ecology Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Wildlife Elective Credit Hours: 4 <sup>d</sup>  
Technical Elective Credit Hours: 4 <sup>a</sup>  
Total: 15 Credit Hours

### **Total for a B.S. in Environmental Science: 180 Credit Hours**

<sup>a</sup> 32 total credits of technical emphasis electives are required to graduate

<sup>b</sup> Choice of BIO 313, BIO 367, or ENV 375 (additional courses taken from this list count as Technical Elective credit)

<sup>c</sup> Choice of WRI 327, WRI 328, WRI 345, WRI 350, or WRI 410

<sup>d</sup> Choice of BIO 366, BIO 377, or BIO 386 (additional courses taken from this list count as Technical Elective credit)

#### **Technical Electives**

BIO 107, BIO 207, BIO 307, BIO 407  
BIO 313 - Botany Credit Hours: 4  
BIO 337 - Aquatic Ecology Credit Hours: 4  
BIO 354 - Environmental Health Credit Hours: 3  
BIO 366 - Zoology Credit Hours: 4  
BIO 367 - Plant Ecology Credit Hours: 4  
BIO 377 - Wildlife Ecology Credit Hours: 4  
BIO 386 - Ornithology Credit Hours: 4  
BIO 426 - Evolutionary Biology Credit Hours: 3  
BIO 446 - Conservation Biology Credit Hours: 3  
CE 374 - Hydrology Credit Hours: 4  
CE 405 - Sustainability & Infrastruct Credit Hours: 3  
CE 489 - Treatment Wetlands Credit Hours: 3  
CHE 107, CHE 207, CHE 307, CHE 407  
CHE 331 - Organic Chemistry I Credit Hours: 4  
ENV 107, ENV 207, ENV 307, ENV 407  
ENV 214 - Watershed Sci & Tech Credit Hours: 3  
ENV 365 - Adv Field Methods in Env Sci Credit Hours: 3  
ENV 375 - Forest Ecology & Management Credit Hours: 4  
ENV 420 - Externship in Env Sci Credit Hours: Varies (1-9)  
ENV 465 - Ecological Resto. & Monitoring Credit Hours: 4  
ENV 469 - Treatment Wetlands Credit Hours: 3  
ENV 495 - Research in Env. Sciences Credit Hours: 4  
GEOG 107, GEOG 207, GEOG 307, GEOG 407  
GEOG 335 - Soils Credit Hours: 4  
GEOL 107, GEOL 207, GEOL 307, GEOL 407  
GIS 306 - Geospatial Raster Analysis Credit Hours: 4  
GIS 316 - Geospatial Vector Analysis I Credit Hours: 4  
GIS 332 - Customizing the GIS Environ I Credit Hours: 4  
GIS 426 - Geospatial Vector Analysis II Credit Hours: 4  
GIS 432 - Customizing the GIS Environ II Credit Hours: 4  
GIS 446 - GIS Database Development Credit Hours: 2  
GME 161 - Plane Surveying I Credit Hours: 4  
GME 425 - Remote Sensing Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
MATH 362 - Statistical Methods II Credit Hours: 4  
PHY 107, PHY 207, PHY 307, PHY 407  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4

## Sustainability Minor

For advising, see Jherime Kellermann, Environmental Science

The sustainability minor is available to all students in all majors and is recommended for any student who wants to develop sustainability literacy and gain credit for a breadth of study encompassing the three primary cores of sustainability education: natural sciences, humanities and social sciences, and engineering and technology. The minor in sustainability acknowledges the completion of 18 credits as outlined below. Introductory and capstone courses are included and at least one course must be taken in each of the three core areas. At least 12 of the 18 credits must be upper division. Advising for the minor is performed by a primary advisor with support from secondary advisors representing each of the three core areas.

### Requirements of Minor

#### Required Core Courses (7 credits):

ENV 484 - Sustainable Human Ecology Credit Hours: 4

SOC 235 - Intro to Sustainability Credit Hours: 3

#### Elective Courses

(At least 11 credits required with at least one course taken from each area: natural sciences, humanities and social sciences, and engineering and technology):

##### Natural Sciences

ENV 111 - Intro to Env Sciences Credit Hours: 4

BIO 337 - Aquatic Ecology Credit Hours: 4

CHE 260 - Electrochemistry for RE Applic Credit Hours: 4

CHE 315 - Environmental Analytical Chemistry Credit Hours: 3

CHE 465 - Fate/Transport of Pollutants Credit Hours: 4

ENV 265 - Field Methods Environ Science Credit Hours: 3

ENV 314 - Environmental Law & Policy Credit Hours: 3

ENV 336 - Environmental Hydrology Credit Hours: 4

ENV 365 - Adv Field Methods in Env Sci Credit Hours: 3

ENV 427 - Greenhouse Gas Accounting/Footprints Credit Hours: 3

ENV 469 - Treatment Wetlands Credit Hours: 3

GEOG 105 - Physical Geography Credit Hours: 4

Other courses as approved by the advisory team

##### Humanities and Social Sciences

ANTH 335 - The Built Environment Credit Hours: 3

ANTH 452 - Globalization Credit Hours: 3

COM 205 - Intercultural Comm Credit Hours: 3

COM 365 - Electronic Comm & Society Credit Hours: 3

ECO 357 - Energy Economics & Policy Credit Hours: 3

GEOG 106 - Cultural Geography I Credit Hours: 3

GEOG 107 - Cultural Geography II Credit Hours: 3

GEOG 108 - Cultural Geography III Credit Hours: 3

HIST 225 - Tech & Rise of the West Credit Hours: 3

HIST 226 - Tech & Modern World Credit Hours: 3

HIST 356 - A History of Energy Credit Hours: 3

HIST 357 - History of the Electric Grid Credit Hours: 3

HUM 125 - Intro Tech, Soc, Value Credit Hours: 3

PHIL 331 - Ethics in the Professions Credit Hours: 3

PHIL 342 - Business Ethics Credit Hours: 3

PSY 334 - Behavior Modification I Credit Hours: 4

Other courses as approved by advisory team

##### Engineering and Technology

CE 405 - Sustainability & Infrastruct Credit Hours: 3

CE 457 - Transportation & Land Dev. Credit Hours: 3

CE 481 - Environmental Engineering I Credit Hours: 3

CE 489 - Treatment Wetlands Credit Hours: 3

CE 586 - Water & Wastewater Treatment Credit Hours: 4

GIS 134 - Geographic Info Systems Credit Hours: 3

GIS 103 - The Digital Earth Credit Hours: 3

MET 416 - Energy Systems Credit Hours: 3

REE 201 - Intro to Renewable Energy Credit Hours: 3

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 331 - Fuel Cells Credit Hours: 3

REE 346 - Biofuels and Biomass Credit Hours: 3

REE 427 - Greenhouse Gas Acct/Footprints Credit Hours: 3

Other courses as approved by the advisory team

# Nursing

Susan Bakewell-Sachs, *School of Nursing Dean and Vice President for Nursing Affairs for OHSU*

Tamara Rose, *Campus Associate Dean*

*Instructors:* S. Brandsness, L. Callahan, L. Gimple, M. Gran-Moravec, D. Mize, C. Neubauer, C. VanDerWeide

This program is offered at Oregon Institute of Technology by the Oregon Health & Science University School of Nursing, in cooperation with Oregon Tech.

## Degree Offered

- Bachelor of Science with a major in Nursing

The OHSU School of Nursing is a health professions leader in academic productivity and innovative educational programming. It is recognized as a model in educating students for careers in nursing at both the graduate and undergraduate levels. In July 1993, the Nursing Program at Oregon Tech became a member of the Statewide Integrated Nursing Education System for Oregon. Campuses are located in: Ashland, at Southern Oregon University; Klamath Falls, at Oregon Institute of Technology; La Grande, at Eastern Oregon University; Monmouth, at Western Oregon University; and Portland, at Oregon Health & Science University. In addition to a basic baccalaureate degree in nursing, the statewide program offers opportunities for RNs seeking B.S. degrees.

Non-nursing coursework may be taken at Oregon Institute of Technology, a community college, or other accredited institutions of higher learning. Pre-nursing majors must apply and be accepted by the OHSU School of Nursing in order to progress into the nursing major. Admission is dependent on a point system which includes academic performance, application essays, and on-site interviews if invited.

The baccalaureate in Nursing Program provides the essential foundation for professional nursing licensure and practice. The Nursing Program, as of fall 2006, includes one year (if courses are begun in summer term, or having transfer credits) or two years of pre-nursing courses and then, after acceptance into the program, three years of professional nursing courses and general courses, as well. Selection into the professional program is competitive.

Nursing courses build upon and complement the liberal arts and science foundation required for professional practice. The graduate of the B.S. program is eligible to complete the registered nursing licensure examination and is prepared to assume responsibility for providing professional nursing care.

## Options for Registered Nurses to Obtain a B.S.

There is a process in place for assisting RNs to complete coursework to obtain a B.S. This is an online degree and is not offered on the Oregon Tech campus. Please contact the School of Nursing for information at (866) 223-1811.

## Approval and Accreditation

The Nursing Program is approved by the Oregon State Board of Nursing (OSBN) and accredited by the Commission on Collegiate Nursing Education (CCNE) through 2023.

## Admission

To be considered for admission to the School of Nursing, a student must submit an online application and official transcripts ([www.ohsu.edu/son](http://www.ohsu.edu/son)). The application process begins October 1 through February 15. The minimum criteria to apply are:

- have 30 credits of prerequisite courses completed by the end of fall term
- have completed the Human Anatomy and Physiology I
- be at the Intermediate Algebra math level
- have a minimum 3.0 GPA for your prerequisite courses

## Transfer Credits

Transfer credits are accepted subject to review by OHSU Registrar's office for comparability and number of credits which may be granted.

## Requirements for Major

Students with a baccalaureate degree in another discipline should see a nursing advisor for requirements with the nursing major.

# Nursing, BS

## Curriculum

Courses and terms during which they may be taken.

### Pre-Nursing

#### Freshman Year Summer

SPE 111 - Public Speaking Credit Hours: 4 <sup>c</sup>  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
MATH 100 - Intermediate Algebra Credit Hours: 4 <sup>a</sup>  
PSY 201 - Psychology Credit Hours: 3  
WRI 122 - Argumentative Writing Credit Hours: 4  
Elective Credit Hours: 1-3

**Total: 16-18 Credit Hours**

#### Winter

BIO 105 - Microbiology Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
PSY 311 - Human Growth & Dev I Credit Hours: 3  
WRI 123 - Research Writing Credit Hours: 3  
or  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 14-15 Credit Hours**

#### Spring

BIO 205 - Nutrition Credit Hours: 3  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
PSY 312 - Human Growth & Dev II Credit Hours: 3  
Elective Credit Hours: 3

**Total: 13 Credit Hours**

<sup>a</sup> The math competency may be demonstrated by a math placement test or by successful completion of MATH 95/MATH 100 Intermediate Algebra or higher

<sup>b</sup> Introductory Statistics is a nursing degree requirement

<sup>c</sup> SPE 111 is a prerequisite to the third writing (WRI 123 or WRI 227) course which is a degree requirement

### Professional Courses

#### Sophomore Year Fall

NRS 210A - Foundations of Nursing - Health Promotion Credit Hours: 4  
NRS 210B - Foundations Practicum Credit Hours: 5

**Total: 9 Credit Hours**

#### Winter

NRS 211 - Foundations of Nursing in Chronic Illness I Credit Hours: 6  
NRS 230 - Pharmacology I Credit Hours: 3  
NRS 232 - Pathophysiology I Credit Hours: 3

**Total: 12 Credit Hours**

#### Spring

NRS 212 Foundations of Nursing in Acute Care I Credit Hours: 6  
NRS 231 Pharmacology II Credit Hours: 3  
NRS 233 Pathophysiology II Credit Hours: 3

**Total: 12 Credit Hours**

#### Junior Year Fall

BIO 235 - Human Genetics Credit Hours: 3  
NRS 322 - Nursing in Acute Care II and End-of-Life Credit Hours: 9

**Total: 12 Credit Hours**

#### Winter

MATH 243 - Introductory Statistics Credit Hours: 4 <sup>a</sup>  
NRS 321 - Nursing in Chronic Illness II and End-of-Life Credit Hours: 9

**Total: 13 Credit Hours**

#### Spring

NRS 410 - Population-Based Chronic Illness and Health Promotion Credit Hours: 9  
NRS 411 - Epidemiology Credit Hours: 3

**Total: 12 Credit Hours**

#### Senior Year Fall

NRS 412 - Leadership, Outcome Management in Nursing Credit Hours: 10  
Elective Credit Hours: varies

**Total: 10+ Credit Hours**

#### Winter

NRS 424 - Integrative Practicum I Credit Hours: 9  
NRS 424J - "J" Course Credit Hours: 1  
Elective Credit Hours: varies

**Total: 10+ Credit Hours**

#### Spring

NRS 425 - Integrative Practicum II Credit Hours: 9  
NRS 425J - "J" Course Credit Hours: 1  
Elective Credit Hours: varies

**Total: 10+ Credit Hours**

<sup>a</sup> MATH 243 may be taken any term



# Respiratory Care and Sleep Health

Jeff Pardy, *Department Chair*

*Participating Faculty:* L. McLaughlin, J. Perri, K. Rabe, M. Schwartz, J. Shinn, A. Venes, B. Westling

*Adjunct Faculty:* S. O'Keefe

## Respiratory Care Program

### Degree Offered

- Bachelor of Science in Respiratory Care

The Bachelor of Science degree program prepares the respiratory care student for entry into the respiratory care profession and eligibility for the National Board for Respiratory Care (NBRC) certificate examination (CRT) and registry examinations (RRT). Upon successful completion of the program, the graduate is eligible to apply for state licensure.

### Accreditation

The Respiratory Care Program is fully accredited by the Commission on Accreditation for Respiratory Care ([www.coarc.com](http://www.coarc.com)), 1248 Harwood Rd., Bedford, TX 76021, (817) 283-2835.

### Career Opportunities

Registered respiratory therapists are physician extenders who, under medical direction, administer cardiopulmonary care, evaluate and assess pulmonary patients, and administer medications and diagnostic tests when appropriate. Their duties involve the use of many of the latest advances in medical arts, sciences, and technology. Graduates are employed in hospitals, physician's offices, rehabilitation facilities, home-care agencies and health care promotion centers as caregivers, managers and educators.

### Licensure

Students, when applying for licensure, will be asked if they have ever been convicted of a criminal offense, or if they have a history of drug or alcohol abuse. Students with a concern in this area should immediately contact the Oregon Respiratory Therapist Licensing Board (ORTLB) prior to applying to this program.

### Program Learning Outcomes

Students in the program will demonstrate:

- the ability to communicate effectively in oral, written and visual forms
- knowledge of the respiratory care code of ethics and ethical and professional conduct
- the ability to function effectively as a member of the health care team
- knowledge and application of mechanical ventilation and therapeutics
- knowledge and application of cardiopulmonary pharmacology and pathophysiology
- management of respiratory care plans for adult, neonatal and pediatric patients

### Pre-Respiratory Care Freshman Year

Enrollment is open to all students who meet the general entry requirements to Oregon Institute of Technology. Students will be listed as Pre-Respiratory Care students. Students will be selected into the professional curriculum based on cumulative grade-point average, non-smoking status, performance on an anatomy and physiology test and submission of a technical paper. Alternatively, students may be admitted based upon successful completion of a CoARC accredited associate degree program in respiratory care.

Students are strongly advised to complete all the general education courses in the freshman year curriculum before making application to the professional program.

Selections will be made at the end of the spring and summer terms of the Pre-Respiratory Care year. The number of students selected each year will be determined by the availability of clinical sites and other resources, which means that the number of qualified applicants may exceed the number of spaces available. When that is the case, students with the highest cumulative GPA are the first to be offered a position in the program.

### Degree Completion Program

The Respiratory Care Program offers a degree completion program for respiratory therapists who wish to pursue a bachelor's degree in their field. The program is offered online and requires collaborative learning. Admission is based on successful completion of a CoARC accredited associate

degree in respiratory care. When students have completed RCP 442 and have submitted documentation of the Registered Respiratory Therapist credential college credit is granted. Students must participate in an orientation. Each prospective student's academic credits will be individually evaluated to determine acceptability of the non-professional coursework and the sequencing of the professional courses. Every student must meet the Oregon Tech general education requirements for graduation. The Respiratory Care Degree Program includes the presentation of a senior project.

## **Graduation Requirements**

All credits listed in the curriculum for the catalog year a student begins a program must be fulfilled. A minimum of 187 credits must be completed and students must maintain a 2.00 GPA to be eligible for graduation. In addition, a final grade of "C" or better must be earned in all professional courses (RCP), communication courses, and science/mathematics courses to continue in the program. All curricular requirements must be met within five academic years once the student is admitted into the professional program as a sophomore. Students must successfully pass the SAE examination as a condition of the BS degree completion.

## **Clinical Sleep Health**

### **Degree Offered**

- Associate of Applied Science in Sleep Health, Clinical Sleep Health Option

### **Certificate Offered in Clinical Sleep Health**

Students must successfully complete the core courses required to sit for a national exam. Computer and Internet access is required. Successful completion of the certificate curriculum (together with a completed Associate degree) leads to eligibility to sit for the national Certified Clinical Sleep Health examination (CCSH).

The program objectives and focus are to provide content knowledge in the following domains: Sleep Over the Lifespan; Clinical Evaluation and Management; Patient and Family Communication and Education; and Program Maintenance and Administration.

### **Associate of Applied Science in Sleep Health – Clinical Sleep Health Options**

Students must successfully complete the courses in the certificate program for Clinical Sleep Health and 46 other general education credits. The degree completion courses can be taken from Oregon Tech or transferred from another college, however at least 30 credits must be taken from Oregon Tech. Successful completion of the two year curriculum leads to eligibility to sit for the national Certified Clinical Sleep Health (CCSH) exam. Computer and Internet access is required.

Students who have completed the CCSH exam may pursue a Health Care Management, Clinical Option, BS . Students complete health management classes offered through the Oregon Tech Management Department either in the classroom or via the online education program while working in their hometown. See the Management Department section of this catalog for more information regarding this degree.

### **Accreditation**

The Clinical Sleep Health Program is accredited under the university accreditation by the Northwest Commission on Colleges and Universities (NWCCU), 8060 165th Avenue, N.E., Suite 100, Redmond, WA 98052-3981. NWCCU is an institutional accrediting body recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education. As of this date, Commission on Accreditation of Allied Health Education Programs (CAAHEP) does not have an accrediting body for this degree.

### **Career Opportunities**

Certified Clinical Sleep Health specialists, under medical direction, conduct diagnostic testing, evaluation of sleep disorder patients, patient/community education, compliance certification, status evaluations, and coordination of patient care plans. Their duties involve the use of highly advanced technology and compassionate patient care. Graduates are employed by hospitals, out-patient testing facilities and bio-medical equipment manufacturers.

### **Licensure**

Students are eligible to sit for the national CCSH exam administered by the Board of Registered Polysomnographic Technologists following the completion of the courses in the certificate program.

### **Program Learning Outcomes**

1. Describe normal sleep architecture, quantity, and quality for the following populations: adult, geriatric, pediatric and infant
2. Identify factors contributing to variations in normal sleep

3. Identify and recognize the pathophysiology, epidemiology, and clinical presentation of abnormal sleep
4. Correlate and document sleep and medical history
5. Identify co-morbid conditions and impact on patients
6. Assess and explain evaluation and measurement tools
7. Evaluate and describe treatment/therapy options and develop individualized patient care plans
8. Develop sleep educational programs for patients and their families in the areas of sleep hygiene and specific treatments
9. Develop multidisciplinary and collaborative sleep programs for inpatients, outpatients, and occupational health and wellness programs
10. Develop system to track and manage therapeutic programs for performance improvement and quality
11. Develop a community outreach program to promote sleep disorders as a public health issue

## Student Preparation

The Certificate in Clinical Sleep Health is designed for those who have an approved medical license and at least an associate degree. Applicants must have one of the following credentials to be eligible for admission into the certificate program.

- Polysomnographic Technologist (RPSGT) or
  - Sleep Technologist (RST)
  - Respiratory Therapist (RRT, CRT)
  - Neurodiagnostic Technologist (REEGT, CLTM)
- Health Educator (CHES)
- Nurse (RN, LPN, MSN) or
- Nurse Practitioner (NP)
- Physician (MD, DO)
- Physician Assistant (PA)
- Dentist (DDS)
- Dental Hygiene (DH)
- Doctor of Philosophy (PhD) in health, counseling, science

The AAS degree is for those who hold a current license in any of the above areas, but do not have an associate (or higher) degree. Candidates for the national registry exam must hold a minimum of an associate degree.

## Computer Proficiency Requirement

The CSH Program is an online education program requiring basic computer proficiency to be successful.

## Clinical Requirements

All applicants must meet the general admissions requirements to enroll in the Polysomnographic Technology Program. To be eligible for admission into the Polysomnographic Technology Program, applicants must meet the following criteria:

1. Applicants for the certificate program must be licensed in one of the medical fields listed above and hold at least an associate degree. **All prospective candidates must be currently employed in a facility that treats patients with sleep disorders, and the medical director or clinical manager must agree to allow the candidate to complete 400 hours of externship under his or her direction.**
2. Candidates must provide proof of completion of either a Cardio Pulmonary Resuscitation (CPR) course or a Basic Cardiac Life Support (BCLS) course prior to enrollment.

## Graduation Requirements

Minimum graduation requirements for the A.A.S are the successful completion of 46 credit hours of general education courses and 45 credit hours in the area of specialization with a GPA of 2.0 or better. In addition, a final grade of "C" or better must be earned in all professional courses (CSH, BUS, and BIO), communication courses and science/mathematics course to continue in the program. This requirement also applies to the certificate program.

## Polysomnographic Technology

### Degree Offered

- Associate of Applied Science in Sleep Health

### Certificate Offered

- Polysomnographic Technology

Students must successfully complete the core courses required to sit for a national exam. Computer and Internet access is required. Successful completion of the certificate curriculum leads to eligibility to sit for the national Registered Polysomnographic Technologists examination (RPSGT).

## **Associate of Applied Science in Sleep Health – Polysomnographic Technology Option**

Students must successfully complete the courses in one of the certificate programs for Polysomnographic Technology or Clinical Sleep Health and other general education courses. The degree completion courses can be taken from Oregon Tech or transferred from another college. A minimum of 30 credit hours must be taken from Oregon Tech. Computer and Internet access are required.

Students who have completed the RPSGT or CCSH exams may pursue a Health Care Management, Clinical Option, BS . Students complete health management classes offered through the Oregon Tech Management Department either in the classroom or via the online education program while working in their hometown. See the Management Department for more information regarding this degree.

## **Accreditation**

The Polysomnographic Technology Certificate (not the AAS) is fully accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). The curriculum follows the guidelines suggested by the Board of Registered Polysomnographic Technologists. Inquiries regarding accreditation should be directed (CAAHEP). Commission on Accreditation of Allied Health Education Programs, (CoPSG) is a specialized accrediting body recognized by the Council for Higher Education Accreditation and/or the Secretary of the U.S., Department of Education. CAAHEP contact information: 1361 Park Street, Clearwater, FL 33756, Phone: (727) 210-2350

## **Career Opportunities**

Registered Polysomnographic technologists, under medical direction, conduct diagnostic testing and evaluation of sleep disorder patients. Their duties involve the use of highly advanced technology and compassionate patient care. Graduates are employed by hospitals, out-patient testing facilities and bio-medical equipment manufacturers. Currently, there is a severe nationwide shortage of Registered Polysomnographic Technologists.

## **Licensure**

Students are eligible to sit for the national RPSGT exam administered by the Board of Registered Polysomnographic Technologists following the completion of the courses in the certificate program.

## **Program Learning Outcomes**

- Demonstrate the ability to review patient information and prepare for a polysomnogram
- Demonstrate the ability to apply sensors correctly with acceptable impedances for data collection
- Demonstrates ability to calibrate signals, document, and troubleshoot recording artifact
- Demonstrates ability to accurately analyze and summarize adult PSG data
- Demonstrates understanding of PAP and O2 theory, application and contraindications
- Demonstrates knowledge of PAP therapy adherence, management, and patient education

## **Student Preparation**

A science background is beneficial to those entering any health sciences profession. It is recommended that the student considering a career in Polysomnography take a college bound course of study in high school that includes algebra, chemistry and biology or human anatomy and physiology. It is recommended that students take courses in Microsoft Word, Excel and PowerPoint in high school. Students are required to provide proof of completion either Cardio Pulmonary Resuscitation (CPR) or Basic Cardiac Life Support (BCLS) prior to admission.

## **Computer Proficiency Requirement**

Demonstrated computer proficiency is required by the Board of Registered Polysomnographic Technologists to be eligible to sit for the national exam. The PSG Program is an online education program requiring basic computer proficiency to be successful. Successful completion of the program therefore, indicates basic computer proficiency.

## **Degree Completion Program**

The associate degree program offers a degree completion program for Registered Polysomnographic Technologists who lack a degree. The courses for this program can be taken through the Online Education Department or in the classroom. Two of the required courses are not available online and must be taken either in the Oregon Tech classroom or a local college and transferred. The communication courses are offered through the online education program of other colleges in the Oregon University System.

Upon receipt of the necessary documentation, specific college credits will be awarded to qualified applicants for having passed the Registered Polysomnographic Technologists examination.

## **Clinical Requirements**

All applicants must meet the general admissions requirements to enroll in the Polysomnographic Technology Program. To be eligible for admission into the Polysomnographic Technology Program, applicants must meet the following criteria:

1. Applicants for the certificate program must be high school graduates. If a prospective candidate is not currently employed in a sleep facility, an appropriate site must be found and a clinical agreement between Oregon Tech and that facility must be established prior to beginning classes.
2. Candidates must provide proof of completion of either a Cardio Pulmonary Resuscitation (CPR) course or a Basic Cardiac Life Support (BCLS) course prior to enrollment.
3. Candidates must submit immunization records prior to their clinical placement.
4. Criminal background clearance is required prior to acceptance and some clinical sites may require drug screening.
5. One full shift of job shadowing is required prior to applying to the program.
6. All Prospective candidates must speak with the program director Dr. Jane Perri, (937) 750-5416, prior to submitting their application

## **Graduation Requirements**

Minimum graduation requirements for the A.A.S are the successful completion of 43 credit hours of general education courses and 47 credit hours in the area of specialization with a GPA of 2.0 or better. In addition, a final grade of "C" or better must be earned in all professional courses (PSG, ECHO, and RCP), communication courses and science/mathematics course to continue in the program. This requirement also applies to the certificate program.

In order to prepare for the national registry exam, students are required to participate in a practical exam and a comprehensive written exam at the conclusion of the certificate program. Students are required to come either to Medford Oregon or to Dayton, Ohio for one day of residency. Passage of these exams is required to complete the certificate program. Associate degree students who have already obtained their national licensure are not required to complete this requirement.

## **Clinical Sleep Health Certificate**

### **Curriculum**

A certificate will be awarded to students completing 45 credit hours of course work in Clinical Sleep Health.

### **Required courses:**

BIO 200 - Medical Terminology Credit Hours: 2  
BUS 337 - Prin of Health Care Marketing Credit Hours: 3  
BUS 317 - Health Care Management Credit Hours: 3  
CSH 201 - Human Development and Sleep Health Credit Hours: 3  
CSH 220 - Sleep Disord & Co-Morbid Credit Hours: 3  
CSH 225 - Imp of Neuro Disord on Slp Credit Hours: 3  
CSH 236 - Pharmacology of Sleep Credit Hours: 3  
CSH 242 - Evaluation & Measurement Tools Credit Hours: 3  
CSH 233 - Sleep Therapies & Compliance Credit Hours: 3  
CSH 268 - Lrng, Hlth Lit, & Comm Edu Credit Hours: 3  
CSH 276 - Capstone Project Credit Hours: 3  
CSH 277 - Clinical Sleep Health Extern Credit Hours: 13 (400 contact hours)

**Total for a Certificate in Clinical Sleep Health: 45 Credit Hours**

## **Polysomnographic Technology Certificate**

### **Curriculum**

A certificate will be awarded to students completing 47 credit hours of course work in Polysomnography. This program is fully accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Completion of the certificate will allow the graduate to sit for the national registry exam in Polysomnographic Technology.

### **Required Courses:**

BIO 200 - Medical Terminology Credit Hours: 2  
ECHO 227 - Basic ECG Recognition/Testing Credit Hours: 3  
PSG 211 - Fund of PSG & Patient Care Credit Hours: 3  
PSG 221 - Physiology of Sleep Credit Hours: 3  
PSG 231 - Sleep Disorders Pathology Credit Hours: 4  
PSG 246 - Sleep Disorders in Women Credit Hours: 3  
PSG 264 - Pediatric/Neonatal Psg Credit Hours: 4  
PSG 271A - Clinical Polysom Tech A Credit Hours: 6  
PSG 271B - Clinical Polysom Tech B Credit Hours: 6  
PSG 271C - Clinical Polysom Tech C Credit Hours: 6

or

PSG 272 - Clinical Polysomngphy Tech I Credit Hours: 9  
PSG 273 - Clinical Polysomngrophy Tech II Credit Hours: 9  
PSG 291 - Clinical Sleep Educator Credit Hours: 3  
RCP 120 - Interventions in Gas Exchange Credit Hours: 4

**Total for a Certificate in Polysomnographic Technology: 47 Credit Hours**

Demonstrated computer proficiency is required by the Board of RPGST. After completion of the Web-based program, the student will have demonstrated computer proficiency.

The clinical Polysomnographic technology courses require placement in clinical sites. Students are responsible for selecting an accredited sleep disorder facility prior to admission into the program. Site agreements between Oregon Tech and the accredited facility must be in place for the student to begin these courses. On-site preceptors will work in conjunction with Oregon Tech faculty to ensure an excellent training experience.

# Respiratory Care, BS

## Curriculum

Required courses and terms during which they may be taken.

### Pre-Respiratory Care

#### Freshman Year Fall

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
or  
MATH 243 - Introductory Statistics Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Spring

BIO 200 - Medical Terminology Credit Hours: 2  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Summer

COM 205 - Intercultural Comm Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Math/Science/Social Science Elective Credit Hours: 1

**Total: 10 Credit Hours**

### Professional Courses

#### Sophomore Year Fall

BIO 336 - Essentials of Pathophysiology Credit Hours: 3  
CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
RCP 100 - Matriculation Credit Hours: 2  
RCP 231 - Pulmonary Physiology Credit Hours: 4

**Total: 12 Credit Hours**

#### Winter

BIO 105 - Microbiology Credit Hours: 4  
RCP 235 - Arterial Blood Gases Credit Hours: 3  
RCP 236 - Cardiopulmonary Dynamics Credit Hours: 3

RCP 241 - Respiratory Gas Therapeutics Credit Hours: 4

**Total: 14 Credit Hours**

#### Spring

RCP 223 - Emergent Chest Radio Interpret Credit Hours: 2  
RCP 252 - Cardiopulmonary Pharmacology Credit Hours: 4  
RCP 336 - Hyperinflation Therapies Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 12 Credit Hours**

#### Junior Year Fall

RCP 337 - Pulmonary Pathology Credit Hours: 4  
RCP 351 - Mechanical Ventilation I Credit Hours: 4  
RCP 388 - Adv Neonatal Respiratory Care Credit Hours: 4

**Total: 12 Credit Hours**

#### Winter

RCP 352 - Mechanical Ventilation II Credit Hours: 4  
RCP 375 - Pediatric Care Credit Hours: 4  
RCP 386 - Critical Care I Credit Hours: 4

**Total: 12 Credit Hours**

#### Spring

RCP 326 - Preparedness, Ethics, and Leadership Credit Hours: 2  
RCP 335 - Exercise Physiol and Education Credit Hours: 2  
RCP 345 - Cardiopulmonary Diag & Monitor Credit Hours: 3  
RCP 353 - Mechanical Ventilation III Credit Hours: 4  
RCP 387 - Critical Care II Credit Hours: 2

**Total: 13 Credit Hours**

#### Senior Year Summer

RCP 350 - Introduction to Clinical Credit Hours: 9  
RCP 366 - Clinical Simulation Credit Hours: 3  
RCP 440 - Case Management I Credit Hours: 3

**Total: 15 Credit Hours**

#### Fall

RCP 441 - Case Management II Credit Hours: 3  
RCP 450 - Clinical Care I Credit Hours: 9

**Total: 12 Credit Hours**

#### Winter

RCP 442 - Case Management III Credit Hours: 3  
RCP 451 - Clinical Care II Credit Hours: 9

**Total: 12 Credit Hours**

#### Spring

RCP 452 - Clinical Care III Credit Hours: 12  
RCP 460 - Advanced Life Support Credit Hours: 2

**Total: 14 Credit Hours**

**Total for a B.S. in Respiratory Care: 187 Credit Hours**

## Respiratory Care, Degree Completion, BS

The Respiratory Care program offers a degree completion program for registered technologists in good standing, who wish to pursue a bachelor's degree in their field. The program is offered completely online. There is no on campus residency requirement.

### Curriculum

#### Courses granted for Registered Respiratory Therapist (RRT)

RCP 223 - Emergent Chest Radio Interpret Credit Hours: 2  
RCP 231 - Pulmonary Physiology Credit Hours: 4  
RCP 235 - Arterial Blood Gases Credit Hours: 3  
RCP 236 - Cardiopulmonary Dynamics Credit Hours: 3  
RCP 241 - Respiratory Gas Therapeutics Credit Hours: 4  
RCP 252 - Cardiopulmonary Pharmacology Credit Hours: 4  
RCP 336 - Hyperinflation Therapies Credit Hours: 3  
RCP 337 - Pulmonary Pathology Credit Hours: 4  
RCP 350 - Introduction to Clinical Credit Hours: 9  
RCP 351 - Mechanical Ventilation I Credit Hours: 4  
RCP 352 - Mechanical Ventilation II Credit Hours: 4  
RCP 386 - Critical Care I Credit Hours: 4  
RCP 450 - Clinical Care I Credit Hours: 9  
RCP 451 - Clinical Care II Credit Hours: 9  
RCP 452 - Clinical Care III Credit Hours: 12  
RCP 460 - Advanced Life Support Credit Hours: 2

#### Oregon Tech Degree Completion Courses

BIO 336 - Essentials of Pathophysiology Credit Hours: 3  
CHE 360 - Clinical Pharmacology/Hlth Prf Credit Hours: 3  
COM 205 - Intercultural Comm Credit Hours: 3  
RCP 100 - Matriculation Credit Hours: 2  
RCP 326 - Preparedness, Ethics, and Leadership Credit Hours: 2  
RCP 335 - Exercise Physiol and Education Credit Hours: 2  
RCP 345 - Cardiopulmonary Diag & Monitor Credit Hours: 3  
RCP 353 - Mechanical Ventilation III Credit Hours: 4  
RCP 366 - Clinical Simulation Credit Hours: 3  
RCP 387 - Critical Care II Credit Hours: 2  
RCP 388 - Adv Neonatal Respiratory Care Credit Hours: 4

RCP 440 - Case Management I Credit Hours: 3  
RCP 441 - Case Management II Credit Hours: 3  
RCP 442 - Case Management III Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 6  
Social Science Elective Credit Hours: 6

#### Prerequisite/Transfer Courses

BIO 105 - Microbiology Credit Hours: 4  
BIO 200 - Medical Terminology Credit Hours: 2  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BIO 232 - Human Anatomy/Physiology II Credit Hours: 4  
BIO 233 - Human Anatomy/Physiology III Credit Hours: 4  
CHE 101 - Intro to General Chemistry Credit Hours: 3  
CHE 104 - Intro to General Chemistry Lab Credit Hours: 1  
MATH 111 - College Algebra Credit Hours: 4  
or  
MATH 243 - Introductory Statistics Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
or  
PSY 202 - Psychology Credit Hours: 3  
or  
PSY 203 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
MATH/SCI/SS Elective Credit Hours: 1



## **Sleep Health, Clinical Sleep Health Option, AAS**

### **Curriculum**

All courses in the Certificate Program and all courses listed below are required to earn the A.A.S. degree:

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

BIO 233 - Human Anatomy/Physiology III Credit Hours: 4

MATH 243 - Introductory Statistics Credit Hours: 4

PSY 201 - Psychology Credit Hours: 3

or

PSY 202 - Psychology Credit Hours: 3

or

PSY 203 - Psychology Credit Hours: 3

SPE 111 - Public Speaking Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

WRI 227 - Technical Report Writing Credit Hours: 4

Math/Science/Social Science Elective Credit Hours: 6

Humanities Elective Credit Hours: 3

Electives Credit Hours: 6

**Total: 46 Credit Hours**

**Total for an A.A.S. Degree in Sleep Health, Option: Clinical Sleep Health: 91 Credit Hours**

**Clinical Sleep Health Certificate Courses Credit Hours: 45**

**Additional Courses Credit Hours: 46**

## **Sleep Health, Polysomnographic Technology Option, AAS**

### **Curriculum**

All courses in the Certificate Program and all courses listed below are required to earn the A.A.S. degree:

#### **Required Courses:**

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

BIO 232 - Human Anatomy/Physiology II Credit Hours: 4

BIO 233 - Human Anatomy/Physiology III Credit Hours: 4

MATH 243 - Introductory Statistics Credit Hours: 4

PSY 201 - Psychology Credit Hours: 3

or

PSY 202 - Psychology Credit Hours: 3

or

PSY 203 - Psychology Credit Hours: 3

SPE 111 - Public Speaking Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

WRI 227 - Technical Report Writing Credit Hours: 4

Math/Science/Social Science Elective Credit Hours: 6

Humanities Elective Credit Hours: 3

Electives Credit Hours: 3

**Total: 43 Credit Hours**

**Total for an A.A.S. Degree Sleep Health Polysomnographic Technology Option: 90 Credit Hours**

**Polysomnographic Technology Certificate Courses Credit Hours: 45**

**Additional Courses Credit Hours: 43**

# Engineering, Technology and Management

## Civil Engineering

Roger Lindgren, *Department Chair*

*Professors:* R. Lindgren, C. Riley, S. St.Clair

*Assistant Professors:* A Greer

Civil engineers design infrastructure—transportation networks, bridges, buildings, dams, communities, and water and waste management systems—for the enhancement of human welfare and protection of our environment. Oregon Tech's freshman-to-master's Civil Engineering degree program equips students to meet industry needs identified by the American Society of Civil Engineers (ASCE).

## Degrees Offered

- Master of Science in Civil Engineering
- Master of Science and Bachelor of Science in Civil Engineering (concurrent degrees)
- Bachelor of Science in Civil Engineering

## Career Opportunities

Upon completing the core curriculum, civil engineering students have a solid foundation in structural, transportation, water resources/ environmental, and geotechnical engineering. In their fourth and fifth years of study, students can then target specific careers with specialized technical electives. Graduates have career opportunities with consulting firms, government agencies, heavy construction contractors and industry.

Geotechnical engineering involves the design and construction of projects built on and of the earth. These projects include, but are not limited to, foundations for structures, earth embankments of soil and rock, dams, levees, and tunnels. In addition, geotechnical engineers predict reactions of the earth due to changes imposed by other engineered systems.

Structural engineering involves the planning, analysis and design of buildings and other structures using the principal construction materials of wood, steel, concrete and masonry. Graduates are familiar with current codes and standards, and methods of analysis and design.

Transportation engineering is concerned with the planning, design, construction, operation, performance, evaluation and rehabilitation of transportation systems and facilities, such as streets, highways, bicycle and pedestrian facilities, railroads, mass transit, and air transportation systems.

Water resources engineering addresses the spectrum of water issues including supply, transport, use, and discharge, and is at the junction of efforts to provide sustainable human and natural environments, in compliance with regulatory mandates. Graduates have opportunities in planning, design, and operation of hydraulic and water resource projects, floodplain management, or resource management issues.

Civil engineering graduates may consider a concurrent degree in environmental sciences to expand career opportunities with a broad spectrum of government agencies, consulting firms, and industry.

## Mission Statement

The mission of the Oregon Tech Civil Engineering program is to prepare students for professional practice. To be prepared to practice as professionals, engineers must be able to act responsibly and ethically, understand their limits and the limits of the tools they use, communicate effectively, work well in teams, and, amid the changing landscape of the field of civil engineering, be able to pursue graduate-level education.

## Objectives

Civil engineering graduates will be able to:

1. Practice as a professional civil engineer.
2. Pursue advanced education in civil engineering or related fields.
3. Act as responsible, effective and ethical citizens.
4. Understand and effectively communicate the realistic constraints of civil engineering.
5. Perform effectively in a multi-disciplinary environment.

Students enjoy a close relationship with full-time faculty with advanced engineering degrees who are also licensed professionals with many years of practical experience. Course offerings promote education in theory relevant to our civil engineering technical areas, engineering design and principles of sustainable development. These concepts are emphasized and integrated throughout the curriculum in a sequential manner.

Early in the curriculum, elements of the creative design process are introduced as students complete first-year design projects. While most freshman and sophomore courses are intended to provide a solid background in mathematics, communications, basic sciences, and engineering mechanics, certain courses provide additional concepts and methodologies supporting more advanced topics in engineering and professional practice.

At the junior level, students develop a broad civil engineering base. Junior courses include core topics in geotechnical, structural, transportation, and water resources engineering.

In the fourth year, students are required to complete an intensive engineering design project. This effort is focused on a professional-quality civil engineering design and includes essential elements of technical communications and group dynamics. The design project also involves realistic constraints including cost and sustainability considerations, socioeconomic concerns, aesthetic choices and ethical deliberations. Fourth-year students take technical electives and prepare for the Fundamentals of Engineering (FE) examination as a step toward licensure as professional engineers. In this year, concurrent (BS/MS) degree-seeking students also begin their selected program of graduate-level coursework leading to selection of their graduate project.

Finally, in the fifth year, concurrent students complete coursework and, optionally, individual graduate projects or theses leading to the concurrent bachelor's and master's degrees.

To ensure graduates become responsible, effective citizens and begin building a foundation for lifelong learning, students are required to satisfy Oregon Tech general education requirements in communication, humanities, social sciences, and science/mathematics.

## **Program Learning Outcomes**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Student Preparation**

Students interested in the field of civil engineering should emphasize mathematics and science in high school. Two years of algebra and one year each of geometry, trigonometry, chemistry and physics are preferred. Additional courses in mathematics and computer-aided drafting are desirable.

## **Accreditation**

The Civil Engineering Program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## **Graduation Requirements**

All courses listed in the curriculum for the current catalog year must be completed to be eligible for graduation, unless a student has already completed the requirements for a category that has changed. When changes are made to the curriculum, students who entered the program under a previous catalog will work with their academic advisors to transition to meet the requirements of the current catalog.

For the concurrent bachelor's and master's degrees in Civil Engineering, a minimum of 225 credits must be completed. Students must earn a 3.0 GPA by the end of the third year for progression to the fourth and fifth years of study. In addition, a final grade of "C" or better must be earned in all math and science courses and those with CE, ENGR, GIS, and GME prefixes, as well as all courses listed as prerequisites for these courses. At least 45 credits of graduate work must be completed. Students must maintain a 3.0 graduate-level GPA with a final grade of "C" or better in all graduate courses.

For the bachelor's degree in Civil Engineering, a minimum of 180 credits must be completed and students must maintain a 2.0 GPA to be eligible for graduation. In addition, a final grade of "C" or better must be earned in all math and science courses and those with CE, ENGR, GIS, and GME prefixes as well as all listed prerequisites for these courses.

The Master of Science in Civil Engineering requires completing 45 credits of approved graduate work. Students must maintain a 3.0 graduate-level GPA with a final grade of "C" or better in all graduate courses.

## **Level of Course Work**

All course work applied toward the master's degree must be earned in courses designed for graduate students; these courses are generally numbered 500 and above. Oregon Tech undergraduate seniors may enroll in 500 level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the department chair. Nine credits are applicable to a graduate degree. Undergraduate seniors may enroll in graduate-level courses for undergraduate credit subject to each department's policy. Oregon Tech offers some courses which are dual listed at the 400- and 500-level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply only to a graduate degree. Students enrolled in a dual-listed 500-level course will be required to complete additional work for graduate credit. Students may audit graduate courses subject to the policy described in the General Catalog. Audited courses cannot be used to meet degree requirements.

# Civil Engineering, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CHE 221 - General Chemistry I Credit Hours: 5  
ENGR 101 - Intro to Engineering I Credit Hours: 2  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

### Winter

CHE 222 - General Chemistry II Credit Hours: 5  
ENGR 102 - Intro to Engineering II Credit Hours: 2  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities (Literature) Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

CE 203 - Engineering Graphics Credit Hours: 3  
BIO/ENV/GEOL Elective Credit Hours: 3  
MATH 251 - Differential Calculus Credit Hours: 4  
Humanities Elective Credit Hours: 3<sup>a</sup>  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Sophomore Year Fall

CE 212 - Civil Engineering Materials Credit Hours: 4  
GME 161 - Plane Surveying I Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4  
GIS 134 - Geographic Info Systems Credit Hours: 3  
MATH 254 - Vector Calculus I Credit Hours: 4  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
or  
PHY 223 - General Physics w/Calculus Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

CE 205 - Computational Methods Credit Hours: 2  
ENGR 213 - Engr Mech: Strength of Mat Credit Hours: 4  
MATH 321 - Appl Diff Equation I Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Junior Year Fall

CE 311 - Intro to Geotechnical Engr Credit Hours: 5  
CE 331 - Structural Analysis Credit Hours: 4  
ENGR 318 - Engineering Mech: Fluids Credit Hours: 4  
MATH 361 - Statistical Methods I Credit Hours: 4

**Total: 17 Credit Hours**

### Winter

CE 308 - Princ of Professional Practice Credit Hours: 4  
CE 341 - Elementary Structural Design Credit Hours: 5  
CE 351 - Intro to Transportation Engr Credit Hours: 4  
CE 371 - Closed Conduit Design Credit Hours: 4

**Total: 17 Credit Hours**

### Spring

CE 312 - Earth Pressures & Foundations Credit Hours: 3  
CE 354 - Traffic Engineering Credit Hours: 3  
CE 374 - Hydrology Credit Hours: 4  
CE 442 - Adv Reinforced Concrete Design Credit Hours: 4  
or  
CE 444 - Intermediate Steel Design Credit Hours: 4

**Total: 14 Credit Hours**

### Senior Year

ANTH 452 - Globalization Credit Hours: 3  
CE 401/COM 401 - Civil Engineering Project I Credit Hours: 5  
CE 402 - Civil Engineering Project II Credit Hours: 4  
CE 405 - Sustainability & Infrastruct Credit Hours: 3  
Technical Electives Credit Hours: 15<sup>b</sup>  
Math/Science Elective Credit Hours: 4  
Social Science Elective Credit Hours: 6  
SPE/WRI/COM Elective Credit Hours: 3

**Total: 43 Credit Hours**

## Total for a B.S. in Civil Engineering: 180 Credit Hours

<sup>a</sup> No more than 3 credits of Humanities courses may be skill- or performance based.

<sup>b</sup> Technical electives are generally 400- and 500-level CE courses. A maximum of 2 non-CE technical elective courses (specified below) may be applied to the BSCE degree.

### Allowed Non-CE Technical Electives

ENV 314 - Environmental Law & Policy 3  
GME 351 - Constr/Engr Surveying 3  
GME 372 - Subdiv'n Planning and Platting 3  
GME 425 - Remote Sensing 4  
MATH 341 - Linear Algebra I 4  
MATH 452 - Numerical Methods II 4  
MATH 465 - Mathematical Statistics 4

# Civil Engineering, BS/MS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CHE 221 - General Chemistry I Credit Hours: 5  
ENGR 101 - Intro to Engineering I Credit Hours: 2  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

### Winter

CHE 222 - General Chemistry II Credit Hours: 5  
ENGR 102 - Intro to Engineering II Credit Hours: 2  
WRI 122 - Argumentative Writing Credit Hours: 4  
or  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities (Literature) Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

CE 203 - Engineering Graphics Credit Hours: 3  
BIO/ENV/GEOL Elective Credit Hours: 3  
MATH 251 - Differential Calculus Credit Hours: 4  
Humanities Elective Credit Hours: 3 <sup>a</sup>  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Sophomore Year Fall

CE 212 - Civil Engineering Materials Credit Hours: 4  
GME 161 - Plane Surveying I Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4  
GIS 134 - Geographic Info Systems Credit Hours: 3  
MATH 254 - Vector Calculus I Credit Hours: 4  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
or  
PHY 223 - General Physics w/Calculus Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

CE 205 - Computational Methods Credit Hours: 2  
ENGR 213 - Engr Mech: Strength of Mat Credit Hours: 4  
MATH 321 - Appl Diff Equation I Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Junior Year Fall

CE 311 - Intro to Geotechnical Engr Credit Hours: 5  
CE 331 - Structural Analysis Credit Hours: 4  
ENGR 318 - Engineering Mech: Fluids Credit Hours: 4  
MATH 361 - Statistical Methods I Credit Hours: 4

**Total: 17 Credit Hours**

### Winter

CE 308 - Princ of Professional Practice Credit Hours: 4  
CE 341 - Elementary Structural Design Credit Hours: 5  
CE 351 - Intro to Transportation Engr Credit Hours: 4  
CE 371 - Closed Conduit Design Credit Hours: 4

**Total: 17 Credit Hours**

### Spring

CE 312 - Earth Pressures & Foundations Credit Hours: 3  
CE 354 - Traffic Engineering Credit Hours: 3  
CE 374 - Hydrology Credit Hours: 4  
CE 442 - Adv Reinforced Concrete Design Credit Hours: 4  
or  
CE 444 - Intermediate Steel Design Credit Hours: 4

**Total: 14 Credit Hours**

### Fourth Year

CE 401 - Civil Engineering Project I Credit Hours: 2  
COM 401 - Civil Engineering Project I Credit Hours: 3  
CE 402 - Civil Engineering Project II Credit Hours: 4  
CE 405 - Sustainability & Infrastruct Credit Hours: 3  
CE 501 - Civil Engr Graduate Seminar Credit Hours: 1  
WRI 521 - Writing at the Grad Level Credit Hours: 3  
Technical Electives Credit Hours: 3 <sup>b</sup>  
Graduate Technical Electives Credit Hours: 12 <sup>c</sup>  
MATH 4XX - Math/Science Elective Credit Hours: 4  
Social Science Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
SPE/WRI/COM Elective Credit Hours: 3

**Year Total: 44 Credit Hours**

### Fifth Year

ANTH 452 - Globalization Credit Hours: 3  
CE 590 - Civil Engineering Grad Project Credit Hours: 9  
or  
CE 595 - Graduate Thesis Credit Hours: Varies (1-6)  
Technical Electives Credit Hours: 12<sup>b</sup>  
Graduate Technical Electives Credit Hours: varies<sup>c</sup>

**Year Total: 44 Credit Hours**

## Total Required for BS/MSCE: 225 Credit Hours

<sup>a</sup> No more than 3 credits of Humanities courses may be skill- or performance based.

<sup>b</sup> Technical electives are generally 400- and 500-level CE courses. A maximum of 2 non-CE technical elective courses (specified below) may be applied to the concurrent BSCE/MSCE degrees.

<sup>c</sup> Graduate technical electives are generally 500-level CE courses. At the discretion of the graduate advisor, up to 9 credits may be selected from 400-level CE and non-CE courses. Approved non-CE 500-level courses may be chosen as electives.

**Allowed Non-CE Technical Electives**

ENV 435 - Atmospheric Physics Credit Hours: 4

GME 351 - Constr/Engr Surveying Credit Hours: 3

or

GME 372 - Subdiv'n Planning and Platting Credit Hours: 3

GME 425 - Remote Sensing Credit Hours: 4

MATH 341 - Linear Algebra I Credit Hours: 4

MATH 451 - Numerical Methods I Credit Hours: 4

MATH 465 - Mathematical Statistics Credit Hours: 4

## **Civil Engineering, MS**

### **Curriculum**

For students who have previously completed a BSCE degree. <sup>e</sup>

ANTH 452 - Globalization Credit Hours: 3

CE 501 - Civil Engr Graduate Seminar Credit Hours: 1

CE 590/CE 595 - Graduate Project/Thesis Credit Hours: 0-12

MATH 4XX Credit Hours: 4

WRI 521 - Writing at the Grad Level Credit Hours: 3

Graduate Technical Electives Credit Hours: varies <sup>f</sup>

### **Total for a M.S. in Civil Engineering: 45 Credit Hours**

<sup>e</sup> Students with a BS degree in a closely-related field of study may be considered. These students will generally be required to complete additional course work.

<sup>f</sup> Graduate technical electives are generally 500-level CE courses. At the discretion of the graduate advisor, up to 9 credits may be selected from 400-level CE and non-CE courses. Approved non-CE 500-level courses may be chosen as electives.



## Civil Engineering/Environmental Sciences, BS

### Curriculum

Civil Engineering students have the opportunity to earn dual degrees in Civil Engineering and Environmental Sciences. Students complete all 180 credits required by the BS Civil Engineering, the additional degree requires 43 credits in Environmental Sciences courses, which can be taken concurrent to Civil Engineering courses or as an add-on year. The dual degree in Environmental Sciences places engineering projects in the context of environmental impacts and environmental regulations, and expands the range of job opportunities for Oregon Tech Civil Engineering graduates. The purpose of the concurrent programs is to challenge motivated students to become even better prepared for the engineering and environmental job markets. To obtain both degrees, students must complete the following listed courses along with the courses required for the Bachelor of Science in Civil Engineering.

BIO 211 - Principles of Biology Credit Hours: 4  
BIO 212 - Principles of Biology Credit Hours: 4  
CHE 223 - General Chemistry III Credit Hours: 5  
Ecology Elective, Credit Hours: 4b  
ENV 108 - Mentorship and Team Building Credit Hours: 1  
ENV 111 - Intro to Env Sciences Credit Hours: 4  
ENV 217 - Intro to Natural Resources Management Credit Hours: 4  
ENV 314 - Environmental Law & Policy Credit Hours: 3  
ENV 434 - Advanced Data Analysis Credit Hours: 4  
ENV 484 - Sustainable Human Ecology Credit Hours: 4  
Technical Elective Credit Hours: 7c  
**Total Needed: 43 Credit Hours**

*a* CHE 223 should be taken as Civil Engineering Math/Science electives

### Select one from Ecology Elective list

BIO 337 - Aquatic Ecology, Credit Hours: 4  
BIO 357 - Plant Ecology, Credit Hours: 4  
BIO 377 - Wildlife Ecology, Credit Hours: 4  
BIO 386 - Ornithology, Credit Hours: 4  
ENV 375 - Forest Ecology & Management, Credit Hours: 4  
ENV 465 - Ecological Resto. & Monitoring, Credit Hours: 4

### Select from Technical Elective list

BIO 107 BIO 207 BIO 307 BIO 407  
BIO 313 - Botany, Credit Hours: 4  
BIO 354 - Environmental Health, Credit Hours: 3  
BIO 366 - Zoology, Credit Hours: 4  
BIO 367 - Plant Ecology, Credit Hours: 4  
BIO 377 - Wildlife Ecology, Credit Hours: 4  
BIO 386 - Ornithology, Credit Hours: 4  
BIO 426 - Evolutionary Biology, Credit Hours: 3  
BIO 446 - Conservation Biology, Credit Hours: 3  
CHE 315 - Analytical Environmental Chem, Credit Hours: 3  
CHE 465 - Fate and Transport of Pollutants, Credit Hours: 4  
ENV 107 ENV 207 ENV 307 ENV 407  
ENV 375 - Forest Ecology & Management, Credit Hours: 4  
ENV 434 - Advanced Data Analysis, Credit Hours: 4  
ENV 465 - Ecological Resto. & Monitoring, Credit Hours: 4  
ENV 485 - Ecoregional Management, Credit Hours: 3  
ENV 495 - Research in Env. Sciences, Credit Hours: 1-4

# Computer Systems Engineering Technology Department

Todd Breedlove, *Department Chair*

*Professors:* T. Breedlove, C. Caldwell, D. Lynn, S. Yang

*Associate Professors:* P. Howard, P. Nguyen, T. Scevers

*Assistant Professors:* M. Healy, C. Heiner

*Instructors:* G. Drouant

## Degrees Offered

- Bachelor of Science in Computer Engineering Technology
- Bachelor of Science in Software Engineering Technology
- Bachelor of Science in Embedded Systems Engineering Technology

## Common First-Year Curriculum

The Bachelor of Science in Computer Engineering Technology, Bachelor of Science in Software Engineering Technology, Bachelor of Science in Embedded Systems Engineering Technology, the Associate of Engineering in Computer Engineering Technology and the Associate of Engineering in Software Engineering Technology all share a common first-year curriculum.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

CST 116 - C++ Programming I Credit Hours: 4

CST 162 - Digital Logic I Credit Hours: 4

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

CST 126 - C++ Programming II Credit Hours: 4

CST 130 - Computer Organization Credit Hours: 3

MATH 112 - Trigonometry Credit Hours: 4

SPE 111 - Public Speaking Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

CST 120 - Embedded C Credit Hours: 4

CST 131 - Computer Architecture Credit Hours: 3

CST 136 - OOP with C++ Credit Hours: 4

MATH 251 - Differential Calculus Credit Hours: 4

**Total: 15 Credit Hours**

## Required Student Equipment

Successful completion of these degrees requires intensive, hands-on use of computers. Therefore, all students are required to own their own computer with a laptop highly recommended. To ensure compatibility with campus-wide computers and networks, students should consult a department faculty member for a specification sheet. The departmental requirements are generally higher than the campus-wide specifications. Financial aid may be available to help defray the cost of this equipment. Please consult the Financial Aid Office at Oregon Tech.

**Note:** The Portland-Metro campus is a laptop-required campus. Please consult with the departmental Lab Manager for specific requirements.

## Accreditation

The Bachelor of Science in Computer Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <https://www.abet.org>

The Bachelor of Science in Software Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <https://www.abet.org>

The Bachelor of Science in Embedded Systems Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <https://www.abet.org>

ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## High School Preparation

Coursework in computer science, mathematics, and physical science will aid students in their progress in this program.

# Computer Engineering Technology

## Degree Offered

- Bachelor of Science in Computer Engineering Technology

Students who complete the curriculum requirements in Computer Engineering Technology will be knowledgeable in the theory and applications of both computer hardware and software.

## Career Opportunities

Work in the field of computer engineering technology includes: application specific integrated circuit development, firmware development, embedded systems design, software development, testing and applications of technology.

Computer Engineering Technology graduates will be involved in development of hardware, software and embedded applications that adapt digital logic and computer systems to solve problems in a wide range of industries from industrial manufacturing to consumer electronics. In addition, they may be involved in product testing and qualification or in application engineering, customer support, sales and public relations.

The curriculum goes beyond the associate's degree curriculum providing the greater depth and breadth of technical capability necessary for an engineer. The graduate is qualified to assume a responsible position in business or industry. Graduates may be responsible for the development, use and the maintenance of computing systems, and for the supervision of personnel.

New careers are constantly evolving in both the hardware and software branches of this field. A diversified study allows the graduate to quickly adapt to changing market conditions.

## Mission and Objectives

The mission of the Computer Engineering Technology (CET) Degree program in the Computer Systems Engineering Technology (CSET) Department at Oregon Institute of Technology is to provide an excellent education incorporating industry-relevant, applied laboratory-based design and analysis to our students. The program is to serve a constituency consisting of its graduates, employers in the high-technology industry and the members of our IAB. Major components of the CET program's mission in the CSET department are to:

- educate computer engineering technology students to meet current and future industrial challenges;
- promote a sense of scholarship, leadership and professional service among our graduates;
- enable students to create, develop, and disseminate knowledge for the applied engineering environment;
- expose students to a cross-disciplinary educational program;
- provide high tech industry employers with graduates in the computer engineering technology profession

## Program Learning Outcomes

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

# Embedded Systems Engineering Technology

## Degree Offered

- Bachelor of Science in Embedded Systems Engineering Technology

## Career Opportunities

The Department of Computer Systems Engineering Technology offers a Bachelor of Science degree in Embedded Systems Engineering Technology (ESET) designed to build and enhance student's knowledge and skills in this high demand field. Embedded systems play an important role in society. They are the products that contain computing capabilities which are found throughout a wide spectrum of applications. Examples of embedded systems can be found in areas ranging from the entertainment industry to office systems; health care to telecommunications. Embedded systems encompass such diverse products as interactive multimedia, printers, medical equipment, avionics equipment, kitchen appliances, mobile phones, and automotive engine management units. Engineering and technological challenges abound in the design and development of such innovative products due to the high level integration of hardware and software. As they become more complex and time to market shrinks there is increasing need for skill and creativity on the part of the Embedded System Engineering Technology graduate.

## Mission

The mission of the Embedded Systems Engineering Technology (ESET) bachelor's degree program within the Computer Systems Engineering Technology (CSET) Department at Oregon Institute of Technology is to prepare our students for productive careers in industry and government by providing an excellent education incorporating industry relevant, applied laboratory-based instruction in both the theory and application of embedded systems engineering technology. Our focus is educating students to meet the growing workforce demand in Oregon and elsewhere for graduates prepared in both hardware and software aspects of embedded systems. Major components of the ESET program's mission in the CSET Department are:

- to educate a new generation of ESET students to meet current and future industrial challenges and emerging embedded systems engineering technology trends
- to promote a sense of scholarship, leadership, and professional service among our graduates
- to enable our students to create, develop, apply, and disseminate knowledge within the embedded systems development environment
- to expose our students to cross-disciplinary educational programs
- to provide government and high tech industry employers with graduates in embedded systems engineering technology and related professions

## Program Learning Outcomes

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

# Software Engineering Technology

## Degree Offered

- Bachelor of Science in Software Engineering Technology

Students who complete the curriculum requirements in Software Engineering Technology will be qualified to step into software development and software engineering roles in a wide range of companies.

## Career Opportunities

Bachelor of Science in Software Engineering Technology degree graduates find employment as software developers, software engineers, systems engineers, software quality specialists, systems analysts, programmer/analysts, researchers and assistants, consultants, etc., responsible for the design, development, and implementation of software in all areas of industry, government and education.

## Mission

The mission of the Software Engineering Technology (SET) Bachelor's Degree Program within Computer Systems Engineering Technology (CSET) Department at Oregon Institute of Technology is to prepare our students for productive careers in industry and government by providing an excellent education incorporating industry-relevant, applied laboratory-based instruction in both the theory and application of software engineering. The program is to serve a constituency consisting of our graduates, our employers and our Industrial Advisory Board. Major components of the SET Program's mission in the CSET Department are:

- to educate a new generation of Software Engineering Technology students to meet current and future industrial challenges and emerging software trends
- to promote a sense of scholarship, leadership and professional service among our graduates
- to enable our students to create, develop, apply and disseminate knowledge within the field of software engineering technology
- to expose our students to cross-disciplinary educational programs
- to provide employers with graduates in software engineering technology and related professions

## Program Learning Outcomes

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

# Computer Engineering Technology, BS

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CST 116 - C++ Programming I Credit Hours: 4  
CST 162 - Digital Logic I Credit Hours: 4  
MATH 111 - College Algebra Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

CST 126 - C++ Programming II Credit Hours: 4  
CST 130 - Computer Organization Credit Hours: 3  
MATH 112 - Trigonometry Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

CST 120 - Embedded C Credit Hours: 4  
CST 131 - Computer Architecture Credit Hours: 3  
CST 136 - OOP with C++ Credit Hours: 4  
MATH 251 - Differential Calculus Credit Hours: 4

**Total: 15 Credit Hours**

### Sophomore Year Fall

CST 133 - Digital Logic II Credit Hours: 4  
CST 134 - Instrumentation Credit Hours: 1  
CST 250 - Computer Assembly Lang Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 17 Credit Hours**

### Winter

CST 204 - Intro to Microcontrollers Credit Hours: 4  
CST 231 - Digital Systems Design I Credit Hours: 4  
EE 221 - Circuits I Credit Hours: 4  
MATH 254 - Vector Calculus I Credit Hours: 4

**Total: 16 Credit Hours**

### Spring

CST 240 - Linux Programming Credit Hours: 4  
EET 237 - AC Circuits, Filters & Signals Credit Hours: 3  
EET 238 - AC Circuits, Filters Lab Credit Hours: 1  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Advanced Math Elective Credit Hours: 4<sup>b</sup>

**Total: 15 Credit Hours**

### Junior Year Fall

CST 337 - Embedded System Architecture Credit Hours: 5

**Total for a B.S. in Computer Engineering Technology: 186 Credit Hours**

CST 315 - Embedded Sensor Inter & I/O Credit Hours: 4  
CST 371 - Embedded Systems Development I Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4

**Total: 17 Credit Hours**

### Winter

CST 331 - Microproc Periph Interfacing Credit Hours: 5  
CST 372 - Embedded Systems Develop II Credit Hours: 3  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

CST 351 - Digital Systems Design II Credit Hours: 3  
CST 373 - Embedded Systems Develop III Credit Hours: 2  
CST 374 - Embedded Project Proposal Credit Hours: 1  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Senior Year Fall

BUS 304 - Engineering Management Credit Hours: 3  
CST 418 - Data Comm & Networks Credit Hours: 3  
CST 471 - Embedded Senior Project Credit Hours: 3  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
Technical Elective Credit Hours: 3<sup>a</sup>

**Total: 15 Credit Hours**

### Winter

CST 344 - Interm Computer Arch Credit Hours: 3  
CST 472 - Embedded Senior Project Credit Hours: 3  
MGT 345 - Engineering Economy Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Technical Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

ANTH 452 - Globalization Credit Hours: 3  
CST 473 - Embedded Senior Project Credit Hours: 2  
CST 442 - Adv Comp Architecture Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

<sup>a</sup> See your advisor for acceptable technical electives

<sup>b</sup> Electives: MATH 253, MATH 465, MATH 341 or MATH 321

# Computer Engineering Technology/Software Engineering Technology, BS

## Concurrent Degree

The CSET Department provides the opportunity for the interested student to earn a bachelor's degree in Computer Engineering Technology and Software Engineering Technology concurrently. Such concurrent degree holders are highly sought after in industry since they know and understand both the hardware and software aspects of computers. The purpose of the concurrent CET/SET degree program is to challenge the brightest and most motivated students to become even better prepared for the job market, extending their time in college by an additional year. To obtain both degrees, students must complete the following listed courses along with the courses required for the Bachelor of Science degree in Computer Engineering Technology, with the exception of WRI 327, the CST elective and the MATH elective.

## Curriculum

CST 136 - OOP with C++ Credit Hours: 4  
CST 211 - Data Structures Credit Hours: 4  
CST 229 - Introduction to Grammars Credit Hours: 3  
CST 236 - Engineering for Quality Software Credit Hours: 4  
CST 238 - GUI Programming Credit Hours: 4  
CST 276 - Software Design Pattern Credit Hours: 4  
CST 320 - Compiler Methods Credit Hours: 4  
CST 324 - Database Systems and Design Credit Hours: 4  
CST 334 - Project Proposal Credit Hours: 1  
CST 352 - Operating Systems Credit Hours: 4  
CST 412 - Senior Development Proj Credit Hours: 3  
CST 422 - Sr Development Project Credit Hours: 3  
CST 432 - Senior Development Proj Credit Hours: 2  
CST 415 - Computer Networks Credit Hours: 4  
CST Technical Electives Credit Hours: 9<sup>a</sup>  
MATH Elective Credit Hours: 3/4<sup>b</sup>  
MATH 465 - Mathematical Statistics Credit Hours: 4  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
or  
WRI 350 - Documentation Develop Credit Hours: 3

### Note:

<sup>a</sup> One Elective must be a CET hardware technical elective—a Hardware CST 407, or CST 456 **OR** one Elective must be a SET software technical elective—CST 346, CST 356, CST 405, a Software CST 407, CST 426, or CST 465

<sup>b</sup> MATH 321, MATH 322, MATH 327, MATH 341, MATH 342, or MATH 451

# Embedded Systems Engineering Technology, BS

## Degree Requirements

The Bachelor of Science in Embedded Systems Engineering Technology requires 189 credit hours as prescribed by the curriculum outline.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CST 116 - C++ Programming I Credit Hours: 4  
CST 162 - Digital Logic I Credit Hours: 4  
MATH 111 - College Algebra Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

CST 126 - C++ Programming II Credit Hours: 4  
CST 130 - Computer Organization Credit Hours: 3  
MATH 112 - Trigonometry Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

CST 120 - Embedded C Credit Hours: 4  
CST 131 - Computer Architecture Credit Hours: 3  
CST 136 - OOP with C++ Credit Hours: 4  
MATH 251 - Differential Calculus Credit Hours: 4

**Total: 15 Credit Hours**

### Sophomore Year Fall

CST 133 - Digital Logic II Credit Hours: 4  
CST 134 - Instrumentation Credit Hours: 1  
CST 250 - Computer Assembly Lang Credit Hours: 4  
CST 276 - Software Design Pattern Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4

**Total: 17 Credit Hours**

### Winter

CST 204 - Intro to Microcontrollers Credit Hours: 4  
CST 231 - Digital Systems Design I Credit Hours: 4  
EE 221 - Circuits I Credit Hours: 4  
MATH 254 - Vector Calculus I Credit Hours: 4

**Total: 16 Credit Hours**

### Spring

CST 211 - Data Structures Credit Hours: 4  
CST 240 - Linux Programming Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 14 Credit Hours**

### Junior Year Fall

CST 315 - Embedded Sensor Inter & I/O Credit Hours: 4

**Total for a B.S. in Embedded Systems Engineering Technology: 189 Credit Hours**

<sup>a</sup> One additional CST upper division course

CST 337 - Embedded System Architecture Credit Hours: 5  
CST 371 - Embedded Systems Development I Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
**Total: 17 Credit Hours**

### Winter

CST 347 - Real Time Embedded Op Systems Credit Hours: 4  
CST 372 - Embedded Systems Develop II Credit Hours: 3  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
MATH 465 - Mathematical Statistics Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

CST 373 - Embedded Systems Develop III Credit Hours: 2  
CST 374 - Embedded Project Proposal Credit Hours: 1  
CST 417 - Embedded Networking Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Laboratory Science Elective Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 18 Credit Hours**

### Senior Year Fall

BUS 304 - Engineering Management Credit Hours: 3  
CST 455 - System on a Chip Design Credit Hours: 4  
CST 471 - Embedded Senior Project Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

CST 456 - Embedded System Testing Credit Hours: 4  
CST 472 - Embedded Senior Project Credit Hours: 3  
MGT 345 - Engineering Economy Credit Hours: 3  
WRI 350 - Documentation Develop Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Spring

ANTH 452 - Globalization Credit Hours: 3  
CST 466 - Embedded System Security Credit Hours: 3  
CST 473 - Embedded Senior Project Credit Hours: 2  
Humanities Elective Credit Hours: 3  
Technical Elective Credit Hours: 3<sup>a</sup>

**Total: 14 Credit Hours**



# Software Engineering Technology, BS

## Degree Requirements

The Bachelor of Science in Software Engineering Technology degree requires 187 credit hours as prescribed by the curriculum outline.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

CST 116 - C++ Programming I Credit Hours: 4  
CST 162 - Digital Logic I Credit Hours: 4  
MATH 111 - College Algebra Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

CST 126 - C++ Programming II Credit Hours: 4  
CST 130 - Computer Organization Credit Hours: 3  
MATH 112 - Trigonometry Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

CST 120 - Embedded C Credit Hours: 4  
CST 131 - Computer Architecture Credit Hours: 3  
CST 136 - OOP with C++ Credit Hours: 4  
MATH 251 - Differential Calculus Credit Hours: 4

**Total: 15 Credit Hours**

#### Sophomore Year Fall

CST 250 - Computer Assembly Lang Credit Hours: 4  
CST 276 - Software Design Pattern Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

CST 211 - Data Structures Credit Hours: 4  
CST 240 - Linux Programming Credit Hours: 4  
MATH 254 - Vector Calculus I Credit Hours: 4  
PSY 201 - Psychology Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

CST 223 - Concepts of Programming Lang Credit Hours: 3  
CST 236 - Engineering for Quality Software Credit Hours: 4  
CST 238 - GUI Programming Credit Hours: 4  
MATH 327 - Discrete Mathematics Credit Hours: 4

**Total: 15 Credit Hours**

#### Junior Year Fall

CST 229 - Introduction to Grammars Credit Hours: 3

CST 316 - JR Team-Based Proj Dev I Credit Hours: 4  
CST 324 - Database Systems and Design Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 18 Credit Hours**

#### Winter

CST 320 - Compiler Methods Credit Hours: 4  
CST 326 - JR Team-Based Proj Dev II Credit Hours: 4  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
WRI 350 - Documentation Develop Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

CST 334 - Project Proposal Credit Hours: 1  
CST 336 - JR Team-Based Proj Dev III Credit Hours: 4  
CST 352 - Operating Systems Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Senior Year Fall

BUS 304 - Engineering Management Credit Hours: 3  
CST 412 - Senior Development Proj Credit Hours: 3  
CST 415 - Computer Networks Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Technical Elective Credit Hours: 3 <sup>a</sup>

**Total: 16 Credit Hours**

#### Winter

CST 422 - Sr Development Project Credit Hours: 3  
MATH 465 - Mathematical Statistics Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
Technical Elective Credit Hours: 3 <sup>a</sup>

**Total: 16 Credit Hours**

#### Spring

ANTH 452 - Globalization Credit Hours: 3  
CST 432 - Senior Development Proj Credit Hours: 2  
MGT 345 - Engineering Economy Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Technical Elective Credit Hours: 3 <sup>a</sup>

**Total: 14 Credit Hours**

**Total for a B.S. in Software Engineering Technology: 187 Credit Hours**

<sup>a</sup> Three additional CST upper division courses. One CST upper division elective course may be exchanged for an upper division MATH course

# Electrical Engineering and Renewable Energy Department

Scott Prahl, *Department Chair*

*Professors:* M. Aboy, C. Crespo, S. Petrovic, S. Prahl

*Associate Professors:* A. Douglas, E. Hossain, T. Jiru, E. Klopff, R.F. Melendy, A. Scher, M. Terry

*Assistant Professors:* J. Eastham, F. Shi, A. Scher, C. Venugopal

## Degrees Offered

- Master of Science in Engineering - Multiple Specialties (Portland-Metro and Online)
- Master of Science in Renewable Energy Engineering (Klamath Falls and Portland-Metro)
- Bachelor of Science in Electrical Engineering (Klamath Falls and Portland-Metro)
- Bachelor of Science in Electronics Engineering Technology (Portland-Metro)
- Bachelor of Science in Renewable Energy Engineering (Klamath Falls and Portland-Metro)

## Dual Majors Offered

- Robotics, Autonomous Systems, and Control Engineering (Portland-Metro)
- Optical Engineering (Portland-Metro)
- Systems Engineering and Technical Management (Online)

## Electrical Engineering

### Degrees Offered

- Master of Science in Engineering and Bachelor of Science in Electrical Engineering - Electrical Engineering
- Master of Science in Engineering and Bachelor of Science in Electrical Engineering - Embedded Engineering
- Master of Science in Engineering and Bachelor of Science in Electrical Engineering - Optical Engineering
- Master of Science in Engineering and Bachelor of Science in Electrical Engineering - Robotics, Autonomous Systems, and Control Engineering
- Master of Science in Engineering and Bachelor of Science in Electrical Engineering - Systems Engineering
- Master of Science in Engineering and Bachelor of Science in Electrical Engineering - Multiple Disciplines (4+1 or concurrent degree)
- Master of Science in Renewable Energy Engineering and Bachelor of Science in Electrical Engineering (concurrent degree)
- Bachelor of Science in Electrical Engineering
  
- Bachelor of Science in Electrical Engineering and Robotics, Autonomous Systems, and Control Engineering (dual major)
- Bachelor of Science in Electrical Engineering and Optical Engineering (dual major)
- Bachelor of Science in Electrical Engineering and Systems Engineering & Technical Management (dual major)
- Bachelor of Science in Electrical Engineering and Bachelor of Science in Renewable Energy Engineering (concurrent degree)

Note: The BS Electrical Engineering is offered at both the Klamath Falls and Portland-Metro campuses. The different degree options (technical emphases, dual majors, etc.) may vary by campus.

### Career Opportunities

The Bachelor of Science in Electrical Engineering (BSEE) at Oregon Tech is designed to prepare professionals to meet the needs of the growing Electrical Engineering industry. Electrical engineering is concerned with the use of electricity to transmit electric power, or to process information. Electrical engineers design, develop, test, and integrate electrical power systems and electrical machines, as well as electronic systems, including portable electronic devices, medical equipment, communication systems, radar and navigation systems, control and autonomous systems, to include robotics.

The program is designed around a set of core courses which provide a classical electrical engineering foundation, and a number of elective courses that allow students some flexibility to specialize in areas of particular interest, such as electronics, electrical power, optical engineering, renewable energy, etc. Emphasis is placed on practical application of engineering knowledge. The BSEE program at Oregon Tech can accommodate full-time students, transfer students, and working professionals, and provides a solid preparation for industry or graduate school.

Graduates of the Electrical Engineering Program are prepared to fulfill a wide range of functions within industry. Employers of electrical engineering graduates include research and development laboratories, electronic equipment manufacturers, public utilities, colleges and universities, government agencies, medical laboratories and hospitals, electronic equipment distributors, and semiconductor companies, among others.

The program also provides a solid preparation for students intending to continue to graduate school to pursue master's degrees in engineering, engineering management, MBAs, and JDs.

## **Program Learning Outcomes**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Student Preparation**

Students entering the Electrical Engineering program from high school should have a minimum of: 1) Two years of high-school algebra and one year of high-school geometry and trigonometry. 2) Two years of a physical science (physics, chemistry preferred). 3) Three years of English composition. Additional mathematics, science, English, electronics, and computer languages are helpful.

Students entering the Electrical Engineering program by transfer are requested to contact the department concerning transfer of technical coursework.

Note: The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## **Accreditation**

The BSEE program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## **Bachelor of Science in Electrical Engineering (Post-Baccalaureate)**

Oregon Tech Bachelor of Science in Electronics Engineering Technology graduates may complete 36 additional credits to receive a Bachelor of Science in Electrical Engineering (post-baccalaureate). Students will receive two diplomas: a BSEET degree (upon completion of the BSEET degree requirements), and a BSEE degree (upon completion of the BSEE degree requirements, which include a minimum of 36 credits from Oregon Tech beyond the BSEET requirements).

Students who have completed an ABET accredited BS degree in Electronics Engineering Technology from another university must complete a minimum of 45 Oregon Tech credits to receive the BS in Electrical Engineering from Oregon Tech. Students pursuing this option should contact an academic advisor to draft an academic plan that ensures all BSEE curriculum requirements are met.

## **Bachelor of Science in Electrical Engineering with a Dual Major**

Students completing the BSEE program have the option of selecting a dual major. The EERE department currently offers a dual major in Robotics, Autonomous Systems, and Control Engineering, a dual major in Optical Engineering, and a dual major in Systems Engineering & Technical Management. Students completing a BSEE degree with a dual major will receive a single BS degree with both majors listed on their diploma and transcript. The degree is issued upon completion of the requirements for each major (some courses may be used to meet the requirements for both majors). The requirements for the dual major in Optical Engineering, as well as the dual major in Systems Engineering & Technical Management are listed under the corresponding sections of the catalog.

## **Concurrent Degree in Electrical Engineering and Renewable Energy Engineering**

The EERE Department provides the opportunity for interested and motivated students to earn two Bachelor of Science degrees concurrently: a BS in Electrical Engineering & BS in Renewable Energy Engineering. The purpose of this concurrent degree is to provide the top students with a challenging academic program that will prepare them for career opportunities in the electronics, electrical engineering, power, and energy industries. The students receive a BS degree in a classical engineering discipline (Electrical Engineering), as well as an emerging high growth discipline (Renewable Energy Engineering). This concurrent degree program takes approximately an additional year beyond the BSEE degree program (or 4.5 years total by taking courses in Summer term).

## **Concurrent Accelerated MSREE/BSEE**

Students may earn both MSREE and BSEE degrees, awarded simultaneously upon completion of this curriculum. Students enrolled in the BSEE program who have a proven record of academic excellence have the option of completing the MSREE with one additional year of coursework.

To be eligible for this option, students must have a cumulative GPA of 3.0, and must contact the MSREE Program Director for admission into the graduate program by the end of Spring term of their junior year. Students will receive both their BSEE and MSREE degrees at the end of their fifth year. REE 599 requirement must be met by a design project supervised and approved by both EE and REE advisors. Students should contact their academic advisors for details.

## **Concurrent Accelerated MSE/BSEE**

Students may earn both MSE and BSEE degrees, awarded simultaneously upon completion of this curriculum. Students enrolled in the BSEE program who have a proven record of academic excellence have the option of completing the MSE with one additional year of coursework.

To be eligible for this option, students must have a cumulative GPA of 3.0, and must apply for admission into the graduate program by the end of Spring term of their junior year. Students will receive both their BSEE and MSE degrees at the end of their fifth year. Students pursuing this option gain some efficiency by using graduate-level coursework and a graduate project to also satisfy undergraduate coursework and senior capstone project requirements. Students can contact the MSE program director for details.

# **Electronics Engineering Technology**

## **Degree Offered**

- Bachelor of Science in Electronics Engineering Technology (Portland-Metro)

Oregon Institute of Technology offers an ABET accredited Bachelor of Science degree in Electronics Engineering Technology (BSEET). The program is conveniently offered at the Oregon Tech Portland-Metro campus, as well as the Willow Creek Center, in order to accommodate degree seeking professionals working for high-tech companies in the Portland Westside area. The Willow Creek Center is located in Hillsboro (OR), at the heart of the Portland Westside high-tech industry cluster (Silicon Forest), minutes away from companies such as Intel, Tektronix, MAXIM, Credence, Synopsis, Quorvo, and others. Some of the core and technical elective courses for the degree are also available online and at the Oregon Tech Portland-Metro campus.

## **Career Opportunities**

Electronics Engineering Technology is concerned with theory, concepts, and practice of applied electronics engineering. Emphasis is placed on the practical application of engineering knowledge. As a result, the Electronics Engineering Technology graduate possesses a combination of theoretical and practical understanding and requires minimal on-the-job training.

The BSEET program is designed to prepare graduates to assume engineering and technology positions in the electronics industry. Graduates of the BSEET program fulfill a wide range of functions within industry, typically assuming positions such as component and system design, test engineering, product engineering, field engineering, manufacturing engineering, sales or market engineering, quality control engineering, and other similar roles. The program also provides a solid preparation for students intending to continue to graduate school to pursue master's degrees in engineering, engineering management, and MBAs.

Employers of Electronics Engineering Technology graduates include research and development laboratories, electronic equipment manufacturers, public utilities, colleges and universities, government agencies, medical laboratories and hospitals, electronic equipment distributors, semiconductor companies, and automated electronic controlled processing companies. Recent graduates have been employed at companies such as MAXIM, Tektronix, Quorvo, MSEI/Biotronik, and Intel.

## **Program Learning Outcomes**

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

## Student Preparation

The BSEET degree at Oregon Tech is designed to accommodate working professionals with evening delivery of upper-division and custom bridging courses. It is especially suited for working professionals with an associate degree in Electronics Engineering Technology, Microelectronics Technology, or equivalent coursework. Students entering the BSEET program by transfer are requested to contact the BSEET Program Director concerning transfer of technical coursework. The BSEET program has articulation and transfer agreements with the Electronics, Microelectronics, and Renewable Energy Technology programs at various community colleges in Oregon. Students transferring to Oregon Tech with an AAS degree from these programs will not be required to take any lower-division electronics coursework. It is recommended (but not required) that students who are transferring with an AAS degree have completed Calculus II prior to transferring to the BSEET program at Oregon Tech, since Integral Calculus is a prerequisite for most upper-division BSEET courses.

We encourage transfer students to start the advising process with Oregon Tech upon completion of the first year of their AAS degree.

Note: The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Accreditation

The Electronics Engineering Technology program is accredited by the Engineering Technology Accreditation Commission (ETAC) of ABET, Inc., <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## Renewable Energy Engineering

### Degrees Offered

- Master of Science in Renewable Energy Engineering
- Bachelor of Science in Renewable Energy Engineering
- Bachelor of Science in Renewable Energy Engineering and Robotics, Autonomous Systems, and Control Engineering (dual major)
- Bachelor of Science in Renewable Energy Engineering and Optical Engineering (dual major)
- Bachelor of Science in Renewable Energy Engineering and Systems Engineering & Technical Management (dual major)
- Bachelor of Science in Renewable Energy Engineering and Bachelor of Science in Electrical Engineering (concurrent degree)
- Bachelor of Science in Renewable Energy Engineering and Bachelor of Science in Environmental Science (concurrent degree)
- Bachelor of Science in Renewable Energy Engineering and Master of Science in Engineering (concurrent degree)
- Bachelor of Science in Renewable Energy Engineering and Master of Science in Renewable Energy Engineering (concurrent degree)

Note: The BS Renewable Energy Engineering is offered in both the Klamath Falls and Portland-Metro campuses. The different degree options (dual majors, concurrent degrees, etc.) may vary by campus. The MS Renewable Energy Engineering is offered at both the Klamath Falls and Portland-Metro campuses.

### Career Opportunities

Program graduates will enter energy careers as power engineers, PV/semiconductor processing engineers, facilities and energy managers, energy system integration engineers, HVAC and M/E/P engineers, design and modeling engineers for net-zero energy buildings, biofuels plant and operations engineers, energy systems control engineers, power electronics engineers, utility program managers, as well as renewable energy planners and policy makers. Graduates of the program will be able to pursue a wide range of career opportunities, not only within the emerging field of renewable energy, but within more traditional areas of energy engineering as well.

Employers of Renewable Energy Engineering graduates include consulting engineering firms, fuel cell manufacturers, power converter manufacturers, public utilities, government agencies, photovoltaic manufacturers, and energy developers. Recent graduates have been employed at companies such as Advanced Energy, Jacobs Engineering, Power Engineers, and Iberdrola Renewables.

### Bachelor of Science in Renewable Energy Engineering

The Bachelor of Science in Renewable Energy Engineering (BSREE) prepares students for the challenges of designing, promoting and implementing renewable energy engineering in societies rapidly changing energy-related industries. Energy, in its many abundant forms, is the driving physical factor upon which industrial societies are founded. As geopolitical, environmental and geological factors act to constrain traditional resources, societies have been forced to re-think and redevelop their energy infrastructures. Renewable energy resources include solar thermal collectors, photovoltaics, ground-source heat pumps, geothermal resources, hydroelectric power, wind power, tidal and wave power, bio-energy, and fuel cells. Oregon Tech's Bachelor of Science in Renewable Energy Engineering prepares students for success in these rapidly developing fields.

The BSREE program is built upon a solid foundation in physics, chemistry, mathematics and communications. Added to this foundation are courses in electrical and mechanical engineering that establish a firm understanding of the fundamentals of energy. The engineering coursework prepares students for renewable energy-specific courses such as photovoltaics, wind power, biofuels, hydroelectric, fuel cells and solar thermal systems. These courses are then integrated into system-wide senior level courses such as energy system design, energy-efficient building systems, renewable energy transportation systems, energy management and energy systems control.

## **Program Learning Outcomes**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

## **Student Preparation**

High school students should be prepared to start their college academic work with at least college calculus and Freshman English composition. Typically, this means the successful new student has completed:

1. Four years of high school mathematics including algebra I and II, geometry and trigonometry
2. Four years of English composition/writing
3. Four years of science including physics and chemistry

Students entering the program by transfer are requested to contact the program director for evaluation of REE-related transfer courses.

Note: The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## **Accreditation**

The Renewable Energy Engineering baccalaureate program is accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## **Bachelor of Science in Renewable Energy Engineering with a Dual Major**

Students completing the BSREE program have the option of selecting a dual major. The EERE department currently offers a dual major in Robotics, Autonomous Systems, and Control Engineering, a dual major in Optical Engineering, and a dual major in Systems Engineering & Technical Management. Students completing a BSREE degree with a dual major will receive a single BS degree with both majors listed on their diploma and transcript. The degree is issued upon completion of the requirements for each major (some courses may be used to meet the requirements for both majors). The requirements for the dual major in Optical Engineering, as well as the dual major in Systems Engineering & Technical Management are listed under the corresponding sections of the catalog.

## **Concurrent Degree in Renewable Energy Engineering and Electrical Engineering**

The EERE Department provides the opportunity for interested and motivated students to earn two Bachelor of Science degrees: a BS in Renewable Energy Engineering and a BS in Electrical Engineering. The purpose of this concurrent degree is to provide the top students with a challenging academic program that will prepare them for career opportunities in the electronics, electrical engineering, power and energy industries. The students receive a BS degree in a classical engineering discipline (Electrical Engineering), as well as an emerging high-growth discipline (Renewable Energy Engineering). The degree program will take an additional year beyond the BSREE degree program (or 4.5 years total by taking courses in Summer term.)

## **Concurrent Degree in Renewable Energy Engineering and Environmental Sciences**

Renewable Energy Engineering students have the opportunity to earn a concurrent degree: a BS in Renewable Energy Engineering and a BS in Environmental Sciences. The additional degree requires 54 credits in Environmental Sciences courses, which can be taken concurrent to Renewable Energy Engineering courses or in an add-on year. A second degree in Environmental Sciences places engineering projects in the context of environmental impacts and environmental regulations, and greatly increases job opportunities for Oregon Tech Renewable Energy Engineering

graduates. The purpose of the concurrent programs is to challenge motivated students to become even better prepared for the engineering and environmental job markets.

### **Concurrent Accelerated MSE/BSREE Program**

Students enrolled in the BSREE program with a record of academic excellence have the option of earning both a BSREE and a MS Engineering (MSE) degree with an additional year of study. The MSE is a flexible multidisciplinary master's degree which is highly customizable to adapt to students' interests and industry needs. Students can select between different tracks or specialties, with the possibility of obtaining a more classical or more specialized graduate degree based on the track selected.

The accelerated and 4+1 options provide efficiency by allowing students to start their graduate level coursework in their senior year; and to use some of these courses to simultaneously meet degree requirements for both the BS and MS programs. In the accelerated/concurrent program, students are awarded the BS and MSE degree concurrently at the end of their fifth year of study. On the other hand, in the 4+1 program, the BS degree is awarded in the fourth year, and the MSE degree is awarded in the fifth year. The accelerated option offers the most efficiency in terms of overall credit requirements. To be eligible for the accelerated and 4+1 options, students must have a cumulative GPA of 3.0 and apply for admission into the graduate program by the end of Spring term of their junior year.

Students pursuing the accelerated or 4+1 options follow the standard BSREE curriculum for the first three years, start their graduate coursework in their senior year, and complete the MSE requirements during their fifth (graduate) year.

### **Concurrent Accelerated MSREE/BSREE Program**

Students may earn both MSREE and BSREE degrees, awarded simultaneously upon completion of this curriculum. Students who enrolled in the BSREE program who have a proven record of academic excellence have the option of completing the MSREE with one additional year of coursework.

To be eligible for this option, students must have a cumulative GPA of 3.0, and must contact the MSREE Program Director for admission into the graduate program by the end of Spring term of their junior year. Students will receive both their BSREE and MSREE degrees at the end of their fifth year. REE 599 requirement must be met by a design project supervised and approved by an REE advisor. Students should contact their academic advisors for details.

## **Master of Science in Engineering - Multiple Disciplines**

The Master of Science in Engineering (MSE) is a highly customizable and modular MS program, which enables students to choose coursework from multiple disciplines to design specialties typically not available in the classical engineering disciplines. MSE students have the ability to customize the MSE to be highly relevant to their professional interest. The flexibility to design a specialized or multidisciplinary degree program, while maintaining practical focus and academic rigor, is the defining element of the program and is what makes it such a close match to the interdisciplinary environment in today's fast changing industries. This ensures a relevant, up-to-date educational experience, and the ability to meet urgent industry needs in multidisciplinary technical fields. Depending on their interest and career goals, students can choose a multidisciplinary MSE, a specialized MSE, or a more classical MSE program, such as the MSE in Electrical Engineering. The MSE program can accommodate full-time students or working professionals.

### **Program Learning Outcomes**

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Note: The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Admission Requirements

In addition to Oregon Tech's graduate admission requirements, admission to the MS Engineering (MSE) program requires a BS degree in engineering, physical science, or related technical field. Applicants who do not meet this requirement and apply for admission may be asked to complete a series of undergraduate "bridge" courses prior to formal admission (contact MSE program director for details). Students enrolled in a bachelor's degree program in engineering or engineering technology at Oregon Tech may apply for admission to the accelerated BS + MSE program at the end of their junior year (students interested in this accelerated program are encouraged to contact the MSE program director for details).

## Level of Course Work

All course work applied toward the master's degree must be earned in courses designed for graduate students; these courses are generally numbered 500 and above. Oregon Tech undergraduate seniors may enroll in 500 level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the department chair. Nine credits are applicable to a graduate degree. Undergraduate seniors may enroll in graduate-level courses for undergraduate credit subject to each department's policy. Oregon Tech offers some courses which are dual listed at the 400- and 500-level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply only to a graduate degree. Students enrolled in a dual-listed 500-level course will be required to complete additional work for graduate credit. Students may audit graduate courses subject to the policy described in the General Catalog. Audited courses cannot be used to meet degree requirements.

## MSE/BS Concurrent Fast Track Degree (5 year Program)

Students enrolled in the EERE BS programs (BSEE, BSEET, BSREE) are eligible to apply for the concurrent Fast Track BS/MSE program. This enables students to potentially obtain both the BS and MS degrees in 5 years.

## MSE Coursework & Specialties

Students can complete a multidisciplinary program by taking courses in Systems Engineering, Research Methods & Innovation (covering peer-reviewed research, IP fundamentals, and technology commercialization), and one or more engineering disciplines including Electrical & Computer Engineering.

### Multidisciplinary MSE Program

- MSE (Multidisciplinary)
- MSE in Systems Engineering

### Engineering Discipline MSE Program

- MSE in Electrical Engineering

### Specialized MSE Programs

- MSE in Robotics, Autonomous Systems, and Control Engineering
- MSE in Embedded Systems
- MSE in Optical Engineering
- MSE in Power Engineering

## Accreditation

Oregon Institute of Technology is accredited by the Northwest Commission on Colleges and Universities, 8060 165th Ave. NE, Suite 100, Redmond, WA 98052-3981, an institutional accrediting body recognized by the Council for Higher Education Accreditation and/or the Secretary of the U.S. Department of Education.

## Master of Science in Renewable Energy Engineering (MSREE)

The Master of Science in Renewable Energy Engineering (MSREE) program is offered at both the Klamath Falls and Portland-Metro campuses. The MSREE program accommodates both full-time students and working professionals. The program is designed to prepare graduates to be energy engineering professionals who have advanced knowledge and skills that enable them to assume a broad range of technical leadership roles.

The MSREE curriculum is built upon core tracks in research methods & innovation and advanced energy engineering. These courses provide the foundation for three required specialized course sequences in renewable energy technologies and nine credits of thesis or graduate R&D project work.



In the second year of the program, students demonstrate mastery on a renewable energy-related topic through REE 599 - Graduate Thesis or Project Thesis. Thesis answer a question using scientific methods. Projects solve a problem using the engineering design process. In both cases, there should be an element of novelty in students work. Students who have previously received a BS in Engineering from an ABET accredited program may opt for either a Thesis or Project path, or a coursework only path in which REE 599 is substituted by technical courses.

## **Student Preparation**

Students should be prepared to start graduate academic work. Typically, this means the successful new student has the following:

1. A baccalaureate degree in engineering, the physical sciences (e.g., physics, chemistry), or a related technical discipline
2. Evidence of potential for graduate academic work, success or potential for success in industry, and demonstrated interest in energy engineering

## **Accreditation**

Oregon Institute of Technology is accredited by the Northwest Commission on Colleges and Universities, 8060 165th Ave. NE, Suite 100, Redmond, WA 98052-3981, an institutional accrediting body recognized by the Council for Higher Education Accreditation and/or the Secretary of the U.S. Department of Education.

## **Optical Engineering, BS Dual Major**

### **Degree Offered**

- Optical Engineering (Dual major)

The major in Optical Engineering is designed as a dual major degree option for students with an ABET-accredited primary major in an engineering discipline offered at Oregon Tech (e.g., Electrical Engineering, Mechanical Engineering). Students choose a primary ABET accredited engineering major and complete the additional specialized coursework to earn a second major in Optical Engineering. The Optical Engineering dual major is offered at the Portland-Metro campus.

### **Career Opportunities**

Optical Engineering is the branch of engineering that incorporates the production, modification, and detection of light into devices and processes. Graduates of the Optical Engineering program are employed as optical engineers, illumination engineers, metrology engineers, optomechanical engineers, optoelectronics engineers, laser engineers, and similar positions in the engineering industry. A dual major in Optical Engineering provides students with the opportunity to combine engineering disciplines. This provides a competitive advantage for graduates entering the workforce because optical subsystems are now common in many engineering applications. For example, a student seeking to become an optomechanical engineer might combine with mechanical engineering; an optoelectronics engineer would combine with electrical engineering; a solar energy engineer with renewable energy engineering.

Employers of Optical Engineering graduates include more than eighty Oregon companies that encompass a diverse range of applications. These include semiconductor inspection, infrared imaging, automation, surface coatings, laser manufacture, lighting, camera design, optical fiber communication, and colorimetry.

### **Student Preparation**

Students considering the Optical Engineering major must first select a primary engineering major and complete the freshman engineering coursework including calculus and calculus-based physics. Upon completion of the freshman primary major requirements, students interested in the Optical Engineering dual major should contact the Optical Engineering program director for an advising appointment. Students entering the Optical Engineering program by transfer are requested to contact their primary major department concerning transfer of technical coursework. Completing a year of calculus-based physics is mandatory before any optical engineering classes can be taken.

### **Accreditation**

Completion of a dual major in Optical Engineering is contingent upon finishing primary major in an ABET accredited program.

# Robotics, Autonomous Systems, and Control Engineering, BS Dual Major

## Degree Offered

- Robotics, Autonomous Systems, and Control Engineering (Dual major)

The major in Robotics, Autonomous Systems, and Control Engineering is designed as a dual major option for students with an ABET accredited primary major in an engineering discipline offered at Oregon Tech. Students first choose a primary ABET accredited major (e.g., Electrical Engineering, Renewable Energy Engineering, Mechanical Engineering), and complete additional specialized coursework to earn a second major in Robotics, Autonomous Systems, and Control Engineering. The program is designed so that both majors in the degree can be completed in 4 years by taking summer courses. ABET ETAC degree students may also pursue the dual major with departmental approval.

## Career Opportunities

Robotics, Autonomous Systems, and Control Engineering is a rich multidisciplinary engineering field concerned with the modeling, simulation, design, and control of automated machines, systems, and processes. Automated systems typically contain an assemblage of components, equipment, hardware, software, and humans. The discipline requires knowledge and an understanding of elements of electrical engineering, mechanical engineering, process engineering, coding, software programming, physics, and mathematics. Due to the multidisciplinary nature of the topics that make up the curriculum, graduates of the program are furnished with the necessary skills to design or manage systems that integrate diverse components and technologies. Engineers working in this field design solutions to address problems in areas such as factory automation, building automation, process control, motion control and robotics and mechanics, flight control systems, or autonomous vehicles.

## Student Preparation

Students interested in the Robotics, Autonomous Systems, and Control Engineering dual major should contact the Robotics, Autonomous Systems, and Control Engineering program director for an advising appointment early in their primary major programs to ensure timely completion of both majors.

## Accreditation

Completion of a dual major in Robotics, Autonomous Systems, and Control Engineering is contingent upon finishing a primary major in an ABET accredited program.

# Systems Engineering & Technical Management, BS Dual Major

## Degree Offered

- Systems Engineering & Technical Management (Dual major)

The major in Systems Engineering & Technical Management is designed as a dual major option for students with an ABET accredited primary major in an engineering discipline offered at Oregon Tech. Students first choose a primary ABET accredited major (e.g., Electrical Engineering, Renewable Energy Engineering, Mechanical Engineering, Civil Engineering), and complete additional specialized coursework to earn a second major in Systems Engineering & Technology Management. The program is designed so that both majors in the degree can be completed in 4 years by taking summer courses. ABET ETAC degree students may also pursue the dual major with departmental approval.

## Career Opportunities

Systems engineers address complex problems in areas such as electrical & electronic systems, information systems, renewable energy systems, economic and financial systems, telecommunications, transportation, project management, and manufacturing. Systems engineering is not about specific technologies, but how to put heterogeneous technologies together to formulate system solutions to complex problems. As such, systems engineering is a multidisciplinary engineering discipline concerned with the design, modeling, analysis, and management of technological systems that employ a combination of devices, software, hardware, firmware, materials, and humans for such diverse purposes as communications, energy engineering, health care, transportation or manufacturing. The dual major curriculum provides engineering students with design viewpoints and methodologies that emphasize system integration, and with subject matter and tools for modeling and analysis especially appropriate for large complex systems including system theory, simulation, computational data analysis and statistics, and engineering management. This dual major is designed to address the need for both systems engineering and T-shape individuals at the BS level. After 4 years, graduates of the dual degree program are technically competent in an engineering discipline and ready to enter the workforce as functional engineers but also have formal education, training and skills in systems engineering, project management, product development, strategy and innovation, and engineering management to assume functional managerial positions, such as project managers and technical team leaders.

## Student Preparation

Students considering the dual major in Systems Engineering & Technical Management must first select a primary engineering major and complete the freshman engineering coursework including calculus and calculus-based physics. Upon completion of the freshman primary major requirements,

students interested in the Systems Engineering & Technical Management dual major should contact the department chair for an advising appointment. Students who are planning to complete this dual major are encouraged to contact the department chair upon completion of the freshman year.

## **Accreditation**

Completion of a dual major in Systems Engineering & Technical Management is contingent upon finishing a primary major in an ABET accredited program.

## **Concurrent Accelerated BSEE/MSE**

Students enrolled in the BSEE program with a record of academic excellence have the option of earning both a BSEE and a MS Engineering (MSE) degree with an additional year of study (e.g., MSE in Electrical Engineering). The MSE is a flexible multidisciplinary master's degree which is highly customizable to adapt to students' interests and industry needs. Students can select between different tracks or specialties, with the possibility of obtaining a more classical or more specialized graduate degree based on the track selected.

The accelerated and 4+1 options provide efficiency by allowing students to start their graduate level coursework in their senior year, and use some of these courses to simultaneously meet degree requirements for both the BS and MS programs. In the accelerated/concurrent program, students are awarded the BS and MSE degree concurrently at the end of their fifth year of study. On the other hand, in the 4+1 program, the BS degree is awarded in the fourth year, and the MSE degree is awarded in the fifth year. The accelerated option offers the most efficiency in terms of overall credit requirements. To be eligible for the accelerated and 4+1 options, students must have a cumulative GPA of 3.0, and apply for admission into the graduate program by the end of Spring term of their junior year.

Students pursuing the accelerated or 4+1 options follow the standard BSEE curriculum for the first three years, start their graduate coursework in their senior year, and complete the MSE requirements during their fifth (graduate) year, according to the following guidelines:

To meet BSEE requirements:

- Replace 9 credits of undergraduate required or engineering elective courses with graduate-level courses (see MSE curriculum to select adequate courses based on desired MSE track)
- Replace 3 terms of ENGR 465 with 3 terms of ENGR 597

To meet additional MSE requirements:

- Research Methods and Innovation sequence (ENGR 511, ENGR 512, ENGR 513)
- Additional MSE required or elective courses (see MSE curriculum to select adequate courses based on desired MSE track)

## **Concurrent Accelerated BSEE/MSREE**

Students may earn both BSEE and MSREE degrees, awarded simultaneously upon completion of this curriculum. Students enrolled in the BSEE program who have a proven record of academic excellence have the option of completing the MSREE with one additional year of coursework.

To be eligible for this option, students must have a cumulative GPA of 3.0, and must contact the MSREE Program Director for admission into the graduate program by the end of Spring term of the junior year. Students will receive both their BSEE and MSREE degrees at the end of their fifth year. REE 599 requirement must be met by a design project supervised and approved by both EE and REE advisors. Students should contact their academic advisors for details.

## **Concurrent Accelerated BSEE/MSREE Program**

Students pursuing this option follow the standard BSEE curriculum map during the first three years, start their graduate-level courses in the senior undergraduate year, and complete the MSREE requirements during their fifth (graduate) year, according to the following guidelines:

To meet BSEE requirements:

- Replace 9 credits of engineering Electives with one graduate-level REE sequence in Electric Power (REE 529, REE 549, REE 569), PV Systems and Processing (REE 525, REE 545, REE 565), or another advisor-approved MSREE sequence.
- Replace 3 terms of ENGR 465 with 3 terms of Graduate Project (REE 599, 599, 599)

To meet additional MSREE requirements:

- Research Methods and Innovation sequence (REE 511, REE 512, REE 513)
- Energy Engineering sequence (REE 515, REE 516, REE 517) or approved specialization sequence or technical electives
- Graduate-level REE specialization sequence (REE 5xx, 5xx, 5xx)
- Graduate-level REE specialization sequence (REE 5yy, 5yy, 5yy)

## Concurrent Accelerated BSREE/MSE

Students enrolled in the BSREE program with a record of academic excellence have the option of earning both a BSREE and a MS Engineering (MSE) degree with an additional year of study. The MSE is a flexible multidisciplinary master's degree which is highly customizable to adapt to students' interests and industry needs. Students can select between different tracks or specialties, with the possibility of obtaining a more classical or more specialized graduate degree based on the track selected.

The accelerated and 4+1 options provide efficiency by allowing students to start their graduate level coursework in their senior year, and use some of these courses to simultaneously meet degree requirements for both the BS and MS programs. In the accelerated/concurrent program, students are awarded the BS and MSE degree concurrently at the end of their fifth year of study. On the other hand, in the 4+1 program, the BS degree is awarded in the fourth year, and the MSE degree is awarded in the fifth year. The accelerated option offers the most efficiency in terms of overall credit requirements. To be eligible for the accelerated and 4+1 options, students must have a cumulative GPA of 3.0, and apply for admission into the graduate program by the end of Spring term of their junior year.

Students pursuing the accelerated or 4+1 options follow the standard BSREE curriculum for the first three years, start their graduate coursework in their senior year, and complete the MSE requirements during their fifth (graduate) year, according to the following guidelines:

To meet BSREE requirements:

- Replace 9 credits of undergraduate required or engineering elective courses with graduate-level courses (see MSE curriculum to select adequate courses based on desired MSE track)
- Replace 3 terms of ENGR 465 with 3 terms of ENGR 597

To meet additional MSREE requirements:

- Research Methods and Innovation sequence (ENGR 511, ENGR 512, ENGR 513)
- Additional MSE required or elective courses (see MSE curriculum to select adequate courses based on desired MSE track)

## Concurrent Accelerated BSREE/MSREE Program

Students pursuing this option follow the standard BSREE curriculum map during the first three years, start their graduate-level courses in the senior undergraduate year, and complete the MSREE requirements during their fifth (graduate) year, according to the following guidelines:

To meet BSREE requirements:

- Replace 9 credits of REE senior sequence with one graduate-level REE sequence.
- Replace 3 terms of ENGR 465 with 3 terms of Graduate Project (REE 599, 599, 599).

To meet additional MSREE requirements:

- Research Methods and Innovation sequence (REE 511, REE 512, REE 513)
- Energy Engineering sequence (REE 515, REE 516, REE 517) or approved specialization sequence or technical electives
- Graduate-level REE specialization sequence (REE 5xx, 5xx, 5xx)
- Graduate-level REE specialization sequence (REE 5yy, 5yy, 5yy)

## Concurrent Degree in Electrical Engineering and Renewable Energy Engineering

To obtain both degrees (BSEE and BSREE) students must complete all of the courses required for the BSEE degree and the following BSREE courses. Consult with your advisor for details.

### Curriculum

<sup>a</sup> Can be used to meet BSEE degree requirements.

Students must complete a minimum of 36 credit hours in addition to the BSEE degree requirements in order to get a second degree.

CHE 202 - General Chemistry II Credit Hours: 3 <sup>a</sup>

CHE 205 - General Chemistry II Lab Credit Hours: 1 <sup>a</sup>

CHE 260 - Electrochemistry for RE Applic Credit Hours: 4

EE 419 - Power Electronics Credit Hours: 4 <sup>a</sup>

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4

ENGR 355 - Thermodynamics Credit Hours: 3

HIST 356 - A History of Energy Credit Hours: 3 <sup>a</sup>

or

HIST 357 - History of the Electric Grid Credit Hours: 3 <sup>a</sup>

MECH 318 - Fluid Mechanics Credit Hours: 4  
MECH 323 - Heat Transfer I Credit Hours: 3  
REE 243 - Electrical Power Credit Hours: 4 <sup>a</sup>  
REE 253 - Electromech Energy Conversion Credit Hours: 3  
REE 33X - REE Elective Credit Hours: 3  
REE 3XX - REE Elective Credit Hours: 3  
REE 412 - Photovoltaic Systems Credit Hours: 3 <sup>a</sup>  
REE 413 - Electric Power Conv Systems Credit Hours: 3  
REE 463 - Energy Systems Instrumentation Credit Hours: 3  
REE 4XX - REE Elective Credit Hours: 3

## **Concurrent Degree in Renewable Energy Engineering and Electrical Engineering**

To obtain both degrees (BSREE and BSEE) students must complete all of the courses required for the BSREE degree and the following BSEE courses. Consult with your advisor for details.

### **Courses**

CST 116 - C++ Programming I Credit Hours: 4  
EE 323 - Electronics II Credit Hours: 5  
EE 331 - Digital System Design w/HDL Credit Hours: 4  
EE 333 - Intro to Microcontrollers Credit Hours: 4 <sup>b</sup>  
EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4 <sup>b</sup>  
EE 343 - Solid State Electronic Devices Credit Hours: 3 <sup>a</sup>  
EE 347 - Digital Logic Credit Hours: 4 <sup>c</sup>  
EE 430 - Linear Sys & Digital Signal Credit Hours: 5  
EE 335 - Advanced Microcontrollers Credit Hours: 4  
MATH 253 - Sequences and Series Credit Hours: 4  
MATH 465 - Mathematical Statistics Credit Hours: 4 <sup>a</sup>  
MGT 345 - Engineering Economy Credit Hours: 3

### **Notes:**

<sup>a</sup> MATH 465 can be used in place of MATH 361 to meet BSREE degree requirements. EE 343 can be used in place of REE 337 to meet BSREE degree requirements

<sup>b</sup> Can be used as Renewable Energy Engineering Electives

<sup>c</sup> Students can substitute with EE 131/EE 133 sequence

**Students must complete a minimum of 36 credit hours in addition to the BSREE degree requirements in order to get a dual degree.**

## **Concurrent Degree in Renewable Energy Engineering and Environmental Sciences**

To obtain both degrees, students must complete the following listed courses along with the courses required for the Bachelor of Science in Renewable Energy Engineering.

### **Courses:**

BIO 211 - Principles of Biology Credit Hours: 4  
BIO 212 - Principles of Biology Credit Hours: 4  
BIO 213 - Principles of Biology Credit Hours: 4  
CHE 223 - General Chemistry III Credit Hours: 5 <sup>a</sup>  
CHE 315 - Environmental Analytical Chemistry Credit Hours: 3  
CHE 331 - Organic Chemistry I Credit Hours: 4  
CHE 465 - Fate/Transport of Pollutants Credit Hours: 4  
Ecology Elective Credit Hours: 4  
ENV 111 - Intro to Env Sciences Credit Hours: 4  
ENV 214 - Watershed Sci & Tech Credit Hours: 3  
ENV 224 - Scientific Reason & Method Credit Hours: 3  
ENV 314 - Environmental Law & Policy Credit Hours: 3  
ENV 484 - Sustainable Human Ecology Credit Hours: 4  
MATH 362 - Statistical Methods II Credit Hours: 4

### **Total Additional Credits Needed: 53**

<sup>a</sup> CHE 223 may be taken as BS Civil Engineering math/science elective

# Electrical Engineering (Klamath Falls Campus), BS

## Degree Requirements

The Bachelor of Science in Electrical Engineering follows a rigorous curriculum, requiring a minimum of 184 credit hours, which takes approximately four years to complete. To be eligible for graduation, students must maintain a 2.0 GPA. In addition, a final grade of "C" or better must be earned in all courses with CST, EE, ENGR, MATH, PHY prefixes, as well as in all technical elective courses.

All courses listed in the curriculum map for the catalog year of graduation must be completed to be eligible for graduation. Any deviations from the courses listed in the curriculum map require approval from the academic advisor, the department chair, and the Registrar's office. Approvals are not official until entered in the official student records. When changes are made to the curriculum, students who entered the program under a previous catalog will work with their academic advisors to transition to meet the requirements of the current catalog.

## Curriculum Klamath Falls Campus

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CHE 201 - General Chemistry I Credit Hours: 3 <sup>c</sup>  
CHE 204 - General Chemistry I Lab Credit Hours: 1 <sup>c</sup>  
ENGR 101 - Intro to Engineering I Credit Hours: 2  
MATH 251 - Differential Calculus Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

### Winter

CHE 202 - General Chemistry II Credit Hours: 3 <sup>d</sup>  
CHE 205 - General Chemistry II Lab Credit Hours: 1 <sup>d</sup>  
ENGR 102 - Intro to Engineering II Credit Hours: 2  
MATH 252 - Integral Calculus Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
EE 131 - Digital Electronics I Credit Hours: 4

**Total: 18 Credit Hours**

### Spring

EE 133 - Digital Electronics II Credit Hours: 4  
MATH 254 - Vector Calculus I Credit Hours: 4  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

### Sophomore Year Fall

EE 221 - Circuits I Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

CST 116 - C++ Programming I Credit Hours: 4  
EE 223 - Circuits II Credit Hours: 4  
MATH 321 - Appl Diff Equation I Credit Hours: 4  
MATH 261 - Introduction to Linear Algebra Credit Hours: 3 <sup>b</sup>

or

MATH 341 - Linear Algebra I Credit Hours: 4 <sup>b</sup>

**Total: 15-16 Credit Hours**

### Spring

EE 225 - Circuits III Credit Hours: 4 <sup>e</sup>

MATH 253 - Sequences and Series Credit Hours: 4

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Junior Year Fall

EE 321 - Electronics I Credit Hours: 5  
EE 331 - Digital System Design w/HDL Credit Hours: 4  
EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4  
MGT 345 - Engineering Economy Credit Hours: 3

**Total: 16 Credit Hours**

### Winter

EE 323 - Electronics II Credit Hours: 5  
EE 333 - Intro to Microcontrollers Credit Hours: 4  
EE 343 - Solid State Electronic Devices Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4 <sup>b</sup>  
or  
MATH 465 - Mathematical Statistics Credit Hours: 4 <sup>b</sup>

**Total: 16 Credit Hours**

### Spring

EE 335 - Advanced Microcontrollers Credit Hours: 4  
EE 461 - Control Engineering I: Classical Methods Credit Hours: 4  
ENGR 267 - Engineering Programming Credit Hours: 3  
Engineering Elective Credit Hours: 4 <sup>f</sup>

**Total: 15 Credit Hours**

### Senior Year Fall

EE 430 - Linear Sys & Digital Signal Credit Hours: 5  
ENGR 465 - Capstone Project Credit Hours: 2  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Engineering Elective Credit Hours: 4 <sup>f</sup>  
Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Winter

EE 401 - Communication Systems Credit Hours: 5  
ENGR 465 - Capstone Project Credit Hours: 2  
Engineering Elective Credit Hours: 3 <sup>f</sup>  
Humanities Elective Credit Hours: 3

Upper Division Writing Elective Credit Hours: 3 <sup>a</sup>

**Total: 16 Credit Hours**

Engineering Elective Credit Hours: 3 <sup>f</sup>

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 11 Credit Hours**

### Spring

ENGR 465 - Capstone Project Credit Hours: 2

**Total for a B.S. in Electrical Engineering: 183-184 Credit Hours**

<sup>a</sup> Select from: WRI 327, WRI 350, or WRI 410

<sup>b</sup> MATH 341 can be replaced with MATH 261. MATH 465 can be replaced with MATH 361

<sup>c</sup> CHE 201/CHE 204 can be substituted with CHE 221

<sup>d</sup> Select from: CHE 202/CHE 205, CHE 222, MATH 322, MATH 327, MATH 342, MATH 354, MATH 421, MATH 451, PHY 410, PHY 448, PHY 449, PHY 450, PHY 451, PHY 452, PHY 453, or an advisor approved Math/Science elective

<sup>e</sup> EE 225 can be substituted with EE 320

<sup>f</sup> Technical electives include upper division EE and REE courses (except EE 311, EE 320, EE 347, and EE 431), and courses listed for a specific BSEE technical emphasis. Other courses may be used with advisor approval

### Technical Emphases

Students in the BSEE program may choose to specialize in a particular area by selecting at least three of their engineering technical elective courses from the appropriate list below. These lists of courses are provided only for guidance. Students are not required to select a technical emphasis, and technical emphases will not appear on the students' transcripts. Some technical elective courses in the emphases may not be available in both campuses. Check course offerings with your advisor.

#### Electrical Power

Choose at least three engineering elective courses from the following list:

EE 419 - Power Electronics Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 453 - Power System Analysis Credit Hours: 3

REE 454 - Power Syst Protection & Cntrl Credit Hours: 3

or other approved technical Electives

#### Microelectronics

Choose at least three engineering elective courses from the following list:

EE 325 - Electronics III Credit Hours: 5

EE 421 - Analog Intgrted - Circuit Dsgn Credit Hours: 5

EE 423 - CMOS Digital Intg Circuit Dsgn Credit Hours: 5

EE 432 - Advanced Digital System Design Credit Hours: 4

or other approved technical Electives

#### Renewable Energy

Choose at least three engineering elective courses from the following list:

EE 419 - Power Electronics Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 346 - Biofuels and Biomass Credit Hours: 3

REE 412 - Photovoltaic Systems Credit Hours: 3

REE 413 - Electric Power Conv Systems Credit Hours: 3

REE 425 - Electricity Markets & Modeling Credit Hours: 3

REE 427 - Greenhouse Gas Acct/Footprints Credit Hours: 3

or other approved technical Electives

#### Robotics, Autonomous Systems, and Control Engineering

Choose at least three engineering elective courses from the following list:

ENGR 461 - Modeling and Simulation of Dynamic Systems Credit Hours: 4

ENGR 463 - Motion Control in Mechanisms and Robotics Credit Hours: 4

ENGR 464 - Autonomous Systems Credit Hours: 4

REE 463 - Energy Systems Instrumentation Credit Hours: 3  
or other approved technical Electives

**Note:** Optical Engineering emphasis only available at the Portland-Metro campus.



# Electrical Engineering (Portland-Metro Campus), BS

## Degree Requirements

The Bachelor of Science in Electrical Engineering follows a rigorous curriculum, requiring a minimum of 184 credit hours, which takes approximately four years to complete. To be eligible for graduation, students must maintain a 2.0 GPA. In addition, a final grade of "C" or better must be earned in all courses with CST, EE, ENGR, MATH, PHY prefixes, as well as in all technical elective courses.

All courses listed in the curriculum map for the catalog year of graduation must be completed to be eligible for graduation. Any deviations from the courses listed in the curriculum map require approval from the academic advisor, the department chair, and the Registrar's office. Approvals are not official until entered in the official student records. When changes are made to the curriculum, students who entered the program under a previous catalog will work with their academic advisors to transition to meet the requirements of the current catalog.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Curriculum – Portland-Metro Campus

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CHE 201 - General Chemistry I Credit Hours: 3 <sup>c</sup>  
CHE 204 - General Chemistry I Lab Credit Hours: 1 <sup>c</sup>  
EE 131 - Digital Electronics I Credit Hours: 4  
MATH 251 - Differential Calculus Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
**Total: 16 Credit Hours**

### Winter

CHE 202 - General Chemistry II Credit Hours: 3 <sup>d</sup>  
CHE 205 - General Chemistry II Lab Credit Hours: 1 <sup>d</sup>  
EE 133 - Digital Electronics II Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 15 Credit Hours**

### Spring

MATH 321 - Appl Diff Equation I Credit Hours: 4  
MATH 254 - Vector Calculus I Credit Hours: 4  
MGT 345 - Engineering Economy Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Humanities Elective Credit Hours: 3  
**Total: 18 Credit Hours**

### Sophomore Year Fall

CST 116 - C++ Programming I Credit Hours: 4  
EE 221 - Circuits I Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
**Total: 16 Credit Hours**

### Winter

EE 223 - Circuits II Credit Hours: 4  
ENGR 267 - Engineering Programming Credit Hours: 3  
MATH 341 - Linear Algebra I Credit Hours: 4 <sup>b</sup>  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
Humanities Elective Credit Hours: 3  
**Total: 18 Credit Hours**

### Spring

EE 225 - Circuits III Credit Hours: 4 <sup>e</sup>  
MATH 253 - Sequences and Series Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 15 Credit Hours**

### Junior Year Fall

EE 321 - Electronics I Credit Hours: 5  
EE 333 - Intro to Microcontrollers Credit Hours: 4  
EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
**Total: 16 Credit Hours**

### Winter

EE 323 - Electronics II Credit Hours: 5  
EE 331 - Digital System Design w/HDL Credit Hours: 4  
EE 335 - Advanced Microcontrollers Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Spring

EE 343 - Solid State Electronic Devices Credit Hours: 3  
EE 432 - Advanced Digital System Design Credit Hours: 4 <sup>f</sup>  
Engineering Elective Credit Hours: 4 <sup>g</sup>  
Upper Division Writing Elective Credit Hours: 3 <sup>a</sup>  
**Total: 14 Credit Hours**

### Senior Year Fall

EE 461 - Control Engineering I: Classical Methods Credit Hours: 4  
ENGR 465 - Capstone Project Credit Hours: 2  
MATH 465 - Mathematical Statistics Credit Hours: 4 <sup>b</sup>  
Engineering Elective Credit Hours: 4 <sup>g</sup>  
**Total: 14 Credit Hours**

### Winter

EE 430 - Linear Sys & Digital Signal Credit Hours: 5  
ENGR 465 - Capstone Project Credit Hours: 2  
Engineering Elective Credit Hours: 3 <sup>g</sup>

Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

ENGR 465 - Capstone Project Credit Hours: 2

Engineering Elective Credit Hours: 3 <sup>g</sup>

Social Science Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Spring

EE 401 - Communication Systems Credit Hours: 5

**Total for a B.S. in Electrical Engineering: 184 Credit Hours**

<sup>a</sup> Select from: WRI 327, WRI 350, or WRI 410

<sup>b</sup> MATH 341 can be replaced with MATH 261. MATH 465 can be replaced with MATH 361

<sup>c</sup> CHE 201/CHE 204 can be substituted with CHE 221

<sup>d</sup> Select from: CHE 202/CHE 205, CHE 222, MATH 322, MATH 327, MATH 342, MATH 354, MATH 421, MATH 451, PHY 410, PHY 448, PHY 449, PHY 450, PHY 451, PHY 452, PHY 453, or an advisor approved Math/Science elective

<sup>e</sup> EE 225 can be substituted with EE 320

<sup>f</sup> EE 207 Engineering Design and Invention, EE 432, or other advisor approved technical elective

<sup>g</sup> Technical electives include upper division EE and REE courses (except EE 311, EE 320, EE 347, and EE 431), and courses listed for a specific BSEE technical emphasis. Other courses may be used with advisor approval

### Technical Emphases

Students in the BSEE program may choose to specialize in a particular area by selecting at least three of their engineering technical elective courses from the appropriate list below. These lists of courses are provided only for guidance. Students are not required to select a technical emphasis, and technical emphases will not appear on the students' transcripts. Some technical elective courses in the emphases may not be available in both campuses. Check course offerings with your advisor.

#### Electrical Power

Choose at least three engineering elective courses from the following list:

EE 419 - Power Electronics Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 453 - Power System Analysis Credit Hours: 3

REE 454 - Power Syst Protection & Cntrl Credit Hours: 3

or other approved Technical Electives

#### Microelectronics

Choose at least three engineering elective courses from the following list:

EE 325 - Electronics III Credit Hours: 5

EE 421 - Analog Intgrted - Circuit Dsgn Credit Hours: 5

EE 423 - CMOS Digital Intg Circuit Dsgn Credit Hours: 5

EE 432 - Advanced Digital System Design Credit Hours: 4

or other approved Technical Electives

#### Optical Engineering

Choose at least three engineering elective courses from the following list:

EE 448 - Geometric Optics Credit Hours: 4

EE 449 - Radiometry & Optical Detect Credit Hours: 4

EE 450 - Physical Optics Credit Hours: 4

EE 451 - Lasers Credit Hours: 4

EE 452 - Waveguides and Fiber Optics Credit Hours: 4

EE 453 - Optical Metrology Credit Hours: 4

or other approved Technical Electives

#### Renewable Energy

Choose at least three engineering elective courses from the following list:

EE 419 - Power Electronics Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 346 - Biofuels and Biomass Credit Hours: 3

REE 412 - Photovoltaic Systems Credit Hours: 3

REE 413 - Electric Power Conv Systems Credit Hours: 3

REE 425 - Electricity Markets & Modeling Credit Hours: 3

REE 427 - Greenhouse Gas Acct/Footprints Credit Hours: 3

or other approved Technical Electives

**Robotics, Autonomous Systems, and Control Engineering**

Choose at least three engineering elective courses from the following list:

ENGR 461 - Modeling and Simulation of Dynamic Systems Credit Hours: 4

ENGR 463 - Motion Control in Mechanisms and Robotics Credit Hours: 4

ENGR 464 - Autonomous Systems Credit Hours: 4

REE 463 - Energy Systems Instrumentation Credit Hours: 3

or other approved Technical Electives

**Note:** Optical Engineering emphasis only available at the Portland-Metro campus.

## **Electrical Engineering (Post-Baccalaureate), BS**

The following is a list of additional courses that Oregon Tech BSEET graduates are required to complete in order to meet the BSEE degree requirements.

### **Curriculum**

#### **Mathematics and Science**

CHE 201 - General Chemistry I Credit Hours: 3 <sup>a</sup>

CHE 204 - General Chemistry I Lab Credit Hours: 1 <sup>a</sup>

CHE 202 - General Chemistry II Credit Hours: 3 <sup>a</sup>

CHE 205 - General Chemistry II Lab Credit Hours: 1 <sup>a</sup>

MATH 253 - Sequences and Series Credit Hours: 4

MATH 341 - Linear Algebra I Credit Hours: 4

MATH 465 - Mathematical Statistics Credit Hours: 4

#### **Electrical Engineering**

EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4

EE 343 - Solid State Electronic Devices Credit Hours: 3

#### **Engineering Technical Electives**

Engineering Elective (EE, REE) Credit Hours: 3 <sup>b</sup>

Engineering Elective (EE, REE) Credit Hours: 3 <sup>b</sup>

**Total needed if a BSEET degree awarded by Oregon Tech: 36 Credit Hours**

**Additional credits needed for students who completed a BSEET degree from another institution: 45 Credit Hours**

Engineering Elective (EE, REE) Credit Hours: 3 <sup>b</sup>

Engineering Elective (EE, REE) Credit Hours: 3 <sup>b</sup>

Engineering Elective (EE, REE) Credit Hours: 3 <sup>b</sup>

<sup>a</sup> CHE 201/CHE 204 and CHE 202/CHE 205 can be substituted with CHE 221 and CHE 222 respectively. CHE 202/CHE 205 can be substituted with an approved 4 credit Math/Science Elective

<sup>b</sup> Requires approval

# Electronics Engineering Technology, BS

## Degree Requirements

The Bachelor of Science in Electronics Engineering Technology follows a rigorous curriculum, requiring a minimum of 188 credit hours, which takes approximately four years to complete. To be eligible for graduation, students must maintain a 2.0 GPA. In addition, a final grade of "C" or better must be earned in all courses with CST, EE, ENGR, MATH, PHY prefixes, as well as in all technical elective courses.

All courses listed in the curriculum map for the catalog year of graduation must be completed to be eligible for graduation. Any deviations from the courses listed in the curriculum map require approval from the academic advisor, the department chair, and the Registrar's office. Approvals are not official until entered in the official student records. When changes are made to the curriculum, students who entered the program under a previous catalog will work with their academic advisors to transition to meet the requirements of the current catalog.

## Curriculum

The curriculum map below shows the required courses, recommended sequence, and recommended terms during which they should be taken for students transferring into the program with an accredited AAS degree or equivalent lower division coursework (freshman and sophomore years).

Transfer students and part-time students should contact the BSEET program director to develop a customized curriculum tailored to their individual needs.

## Freshman and Sophomore Years

The degree requirements for the first two years can be fulfilled by completing an accredited Associate of Applied Science degree in Electronics Engineering Technology, Microelectronics Engineering Technology, Microelectronics Technology, Electrical Engineering Transfer, Renewable Energy Technology, or equivalent coursework. Oregon Tech has articulation agreements with various community colleges throughout Oregon. Students transferring to Oregon Tech with an AAS degree from these programs will not be required to take any lower-division electronics courses at Oregon Tech. In addition to the electronics courses, students should complete the programming, math and science, communication, and general education courses specified below during the Freshman and Sophomore years while completing their AAS degree in order to be able to complete the upper-division (Junior and Senior) BSEET courses at Oregon Tech in two years. Below is a list of courses to satisfy the requirements for the first two years of the degree. Completion of all these courses is not required to be able to transfer, but it is recommended for 2+2 transferability.

### Communication

SPE 111 - Public Speaking Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 12 Credit Hours**

### General Education

Humanities Elective Credit Hours: 9

Social Science Elective Credit Hours: 12

**Total: 21 Credit Hours**

### Mathematics and Science

MATH 111 - College Algebra Credit Hours: 4

MATH 112 - Trigonometry Credit Hours: 4

MATH 251 - Differential Calculus Credit Hours: 4

MATH 252 - Integral Calculus Credit Hours: 4

PHY 221 - General Physics w/Calculus Credit Hours: 4

PHY 222 - General Physics w/Calculus Credit Hours: 4

PHY 223 - General Physics w/Calculus Credit Hours: 4

Statistics Elective Credit Hours: 4 <sup>a</sup>

**Total: 32 Credit Hours**

### Electronics

EE 121 - Fund of Electric Circuits I Credit Hours: 4

EE 123 - Fund of Electric Circuits II Credit Hours: 4

EE 131 - Digital Electronics I Credit Hours: 4

EE 133 - Digital Electronics II Credit Hours: 4

EE 219 - Intro Semiconduct Device & Amp Credit Hours: 4

200-level Technical Electives Credit Hours: 16 <sup>b</sup>

**Total: 36 Credit Hours**

### Programming

CST 116 - C++ Programming I Credit Hours: 4

**Total: 4 Credit Hours**

## Upper Division Courses

### Junior Year Fall

EE 320 - Adv Circuit Systems Analysis Credit Hours: 5 <sup>c</sup>

EE 321 - Electronics I Credit Hours: 5

MATH 321 - Appl Diff Equation I Credit Hours: 4

MGT 345 - Engineering Economy Credit Hours: 3

**Total: 17 Credit Hours**

### Winter

EE 323 - Electronics II Credit Hours: 5

EE 331 - Digital System Design w/HDL Credit Hours: 4

ENGR 267 - Engineering Programming Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

EE 325 - Electronics III Credit Hours: 5

EE 432 - Advanced Digital System Design Credit Hours: 4 <sup>e</sup>

MATH 254 - Vector Calculus I Credit Hours: 4

**Total: 12 Credit Hours**

**Senior Year Fall**

EE 333 - Intro to Microcontrollers Credit Hours: 4

ENGR 465 - Capstone Project Credit Hours: 2

Engineering Elective Credit Hours: 3<sup>d</sup>

Upper Division Writing Elective Credit Hours: 3

**Total: 12 Credit Hours****Winter**

EE 335 - Advanced Microcontrollers Credit Hours: 4

EE 430 - Linear Sys &amp; Digital Signal Credit Hours: 5

ENGR 465 - Capstone Project Credit Hours: 2

Engineering Elective Credit Hours: 3<sup>d</sup>**Total: 14 Credit Hours****Spring**

EE 401 - Communication Systems Credit Hours: 5

ENGR 465 - Capstone Project Credit Hours: 2

Engineering Elective Credit Hours: 3<sup>b</sup>

Elective Credit Hours: 2

**Total: 13 Credit Hours****Total for a B.S. in Electronics Engineering Technology: 188 Credit Hours**<sup>a</sup> Choose from MATH 243, MATH 361, and MATH 465.<sup>b</sup> Lower Division Technical electives include CST 126, CST 136, and other approved 200-level engineering or engineering technology courses.<sup>c</sup> Choose from WRI 327, WRI 350, and WRI 410.<sup>d</sup> Upper division EE or REE courses (except EE 311, EE 320, and EE 347), or courses included in the list for a specific degree option (students must satisfy course pre- and co-requisites). Other courses may be used as engineering electives with advisor and department chair approval. Students must complete a minimum of 9 credits of engineering elective coursework.<sup>e</sup> EE 320 can be substituted with EE 225. EE 432 can be substituted with an approved technical elective.**Technical Emphases**

Students in the BSEET program may choose to specialize in a particular area by selecting their engineering elective courses from the appropriate list below. These lists of courses are provided only for guidance. Students are not required to select a technical emphasis, and technical emphases will not appear on the students' transcripts. Some technical elective courses in the emphases may not be available in both campuses. Check course offerings with your advisor.

**Electrical Power**

Choose technical elective courses from the following list:

EE 419 - Power Electronics Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 453 - Power System Analysis Credit Hours: 3

REE 454 - Power Syst Protection &amp; Ctnrl Credit Hours: 3

or approved technical electives

**Microelectronics**

Choose technical elective courses from the following list:

EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4

EE 343 - Solid State Electronic Devices Credit Hours: 3

EE 421 - Analog Intgrted - Circuit Dsgn Credit Hours: 5

EE 423 - CMOS Digital Intg Circuit Dsgn Credit Hours: 5

or approved technical electives

**Optical Engineering**

Choose technical elective courses from the following list:

EE 448 - Geometric Optics Credit Hours: 4

EE 449 - Radiometry &amp; Optical Detect Credit Hours: 4

EE 450 - Physical Optics Credit Hours: 4

EE 451 - Lasers Credit Hours: 4

EE 452 - Waveguides and Fiber Optics Credit Hours: 4

EE 453 - Optical Metrology Credit Hours: 4

or approved technical electives

**Note:** Optical Engineering emphasis only available at Portland-Metro campus.

**Renewable Energy**

Choose technical elective courses from the following list:

EE 419 - Power Electronics Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 346 - Biofuels and Biomass Credit Hours: 3

REE 412 - Photovoltaic Systems Credit Hours: 3

REE 413 - Electric Power Conv Systems Credit Hours: 3

REE 425 - Electricity Markets & Modeling Credit Hours: 3

REE 427 - Greenhouse Gas Acct/Footprints Credit Hours: 3

or advisor approved technical electives

**Robotics, Autonomous Systems, and Control Engineering**

Choose technical Elective courses from the following list:

ENGR 461 - Modeling and Simulation of Dynamic Systems Credit Hours: 4

ENGR 463 - Motion Control in Mechanisms and Robotics Credit Hours: 4

ENGR 464 - Autonomous Systems Credit Hours: 4

REE 463 - Energy Systems Instrumentation Credit Hours: 3

or other approved technical electives

**Note:** Robotics, Autonomous Systems, and Control Engineering emphasis only available at Portland-Metro campus.

## Engineering (Multiple Disciplines), MS

Depending on their interest and career goals students can choose a multidisciplinary MSE, a specialized MSE, or a more classical MSE program such as the MSE in Electrical Engineering.

The multidisciplinary MSE program is designed as a highly customizable and modular MS engineering degree, which enables students to choose coursework from multiple disciplines to design specialties typically not available in the classical engineering MS degrees.

The flexibility in the MS in Engineering degree ensures a relevant, up-to-date educational experience, and the ability to meet urgent industry needs in multidisciplinary technical fields. The program is designed to provide maximum flexibility while maintaining academic rigor.

### Program Design

The MSE is designed as a "Flexible/Multidisciplinary Engineering Degree." As such, the students have the flexibility to customize the MSE to be highly relevant to their professional interests. The flexibility to design specialized or multidisciplinary degree programs is the defining element of the program and is what makes it such a close match to the interdisciplinary environment in today's fast changing industries. Through a faculty advisory committee, coursework is personally customized for the student or industry partner company to best match the desired outcomes based on a thorough needs assessment.

### Program Mission and Objectives

The MSE at Oregon Tech is designed to prepare engineering professionals with advanced knowledge and skills in high-demand multi-disciplinary engineering fields who are ready to assume a broad range of technical and leadership roles.

### Student Preparation

Students should be prepared to start graduate engineering academic work. Typically, this means the successful new student has the following:

1. A baccalaureate degree in engineering, the physical sciences, or a related technical discipline.
2. Evidence of potential for graduate academic work, success or potential for success in industry, and demonstrated interest in their chosen specialty.

### BS/MSE Concurrent Fast Track Degree (5 year Program)

Students enrolled in the EERE BS programs are eligible to apply for the concurrent Fast Track BS/MSE program. This enables students to potentially obtain both the BS and MSE degrees in 5 years.

### MSE Coursework & Specialties

Students can complete a multidisciplinary program by taking courses in Systems Engineering, Research Methods & Innovation (covering peer-reviewed research, IP fundamentals, and technology commercialization), and one or more engineering disciplines including Electrical & Computer Engineering.

#### *Multidisciplinary MSE Program*

- MSE (Multidisciplinary)
- MSE in Systems Engineering

#### *Engineering Discipline MSE Program*

- MSE in Electrical Engineering

#### *Specialized MSE Programs*

- MSE in Embedded Systems
- MSE in Automation, Robotics & Control
- MSE in Optical Engineering
- MSE in Power Engineering



# Optical Engineering, BS Dual Major

## Degree Requirements

A dual major in Optical Engineering requires 40 specialized credits in optics and electrical engineering. Some of these courses may be used to meet requirements in the primary major also. The capstone project required in the student's primary major is expected to incorporate elements from both the primary and optical engineering majors. Since the required courses for Optical Engineering must be taken along with those for the primary major, a full curriculum map is not provided. Students should carefully plan each term in consultation with their primary major advisor and with their Optical Engineering advisor. To obtain a dual major in optical engineering, students must complete the courses required for the Bachelor of Science degree in their primary engineering major as well as the following list of specialized Optical Engineering courses:

EE 221 - Circuits I Credit Hours: 4

EE 223 - Circuits II Credit Hours: 4

EE 225 - Circuits III Credit Hours: 4

EE 343 - Solid State Electronic Devices Credit Hours: 3

EE 448 - Geometric Optics Credit Hours: 4

or

PHY 448 - Geometric Optics Credit Hours: 4

EE 449 - Radiometry & Optical Detect Credit Hours: 4

or

PHY 449 - Radiometry & Optical Detect Credit Hours: 4

EE 450 - Physical Optics Credit Hours: 4

or

PHY 450 - Physical Optics Credit Hours: 4

EE 451 - Lasers Credit Hours: 4

or

PHY 451 - Lasers Credit Hours: 4

EE 452 - Waveguides and Fiber Optics Credit Hours: 4

or

PHY 452 - Waveguides and Fiber Optics Credit Hours: 4

EE 453 - Optical Metrology Credit Hours: 4

or

PHY 453 - Optical Metrology Credit Hours: 4

# Renewable Energy Engineering (Klamath Falls Campus), BS

## Degree Requirements

The Bachelor of Science in Renewable Energy Engineering follows a rigorous curriculum, requiring a minimum of 184/185 credit hours, which takes approximately four years to complete. To be eligible for graduation, students must maintain a 2.0 GPA. In addition, a final grade of "C" or better must be earned in all courses with MATH, CHE, PHY, EE, ENGR, MECH, and REE prefixes. Students must also earn a grade of "C" or better in all courses listed as prerequisites for these courses.

All courses listed in the curriculum map for the catalog year of graduation must be completed to be eligible for graduation. Any deviations from the courses listed in the curriculum map require approval from the academic advisor, the department chair, and the Registrar's office. Approvals are not official until entered in the official student records. When changes are made to the curriculum, students who entered the program under a previous catalog will work with their academic advisors to transition to meet the requirements of the current catalog.

## Curriculum – Klamath Falls Campus

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CHE 201 - General Chemistry I Credit Hours: 3 <sup>a</sup>  
CHE 204 - General Chemistry I Lab Credit Hours: 1 <sup>a</sup>  
ENGR 101 - Intro to Engineering I Credit Hours: 2 <sup>d</sup>  
MATH 251 - Differential Calculus Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
**Total: 14 Credit Hours**

### Winter

CHE 202 - General Chemistry II Credit Hours: 3 <sup>a</sup>  
CHE 205 - General Chemistry II Lab Credit Hours: 1 <sup>a</sup>  
ENGR 102 - Intro to Engineering II Credit Hours: 2 <sup>d</sup>  
MATH 252 - Integral Calculus Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 17 Credit Hours**

### Spring

CHE 260 - Electrochemistry for RE Applic Credit Hours: 4  
ENGR 267 - Engineering Programming Credit Hours: 3  
MATH 254 - Vector Calculus I Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
**Total: 15 Credit Hours**

### Sophomore Year Fall

ECO 201 - Principles of Microeconomics Credit Hours: 3  
or  
ECO 202 - Principles of Macroeconomics Credit Hours: 3  
EE 221 - Circuits I Credit Hours: 4  
MATH 321 - Appl Diff Equation I Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
**Total: 15 Credit Hours**

### Winter

EE 223 - Circuits II Credit Hours: 4  
ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4  
HIST 356 - A History of Energy Credit Hours: 3  
or  
HIST 357 - History of the Electric Grid Credit Hours: 3  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
**Total: 15 Credit Hours**

### Spring

EE 225 - Circuits III Credit Hours: 4  
MATH 361 - Statistical Methods I Credit Hours: 4  
or  
MATH 465 - Mathematical Statistics Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
REE 243 - Electrical Power Credit Hours: 4  
**Total: 16 Credit Hours**

### Junior Year Fall

EE 321 - Electronics I Credit Hours: 5  
MATH 261 - Introduction to Linear Algebra Credit Hours: 3  
or  
MATH 341 - Linear Algebra I Credit Hours: 4  
MECH 318 - Fluid Mechanics Credit Hours: 4  
or  
ENGR 318 - Engineering Mech: Fluids Credit Hours: 4  
REE 253 - Electromech Energy Conversion Credit Hours: 3  
**Total: 15-16 Credit Hours**

### Winter

REE 337 - Materials for RE Applications Credit Hours: 3  
or  
EE 343 - Solid State Electronic Devices Credit Hours: 3  
EE 461 - Control Engineering I: Classical Methods Credit Hours: 4  
ENGR 355 - Thermodynamics Credit Hours: 3  
Upper Division Writing Elective Credit Hours: 3 <sup>e</sup>  
Renewable Energy Engineering Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Spring

EE 419 - Power Electronics Credit Hours: 4  
MECH 323 - Heat Transfer I Credit Hours: 3  
REE 331 - Fuel Cells Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Renewable Energy Engineering Elective Credit Hours: 3  
**Total: 16 Credit Hours**

### Senior Year Fall

ENGR 465 - Capstone Project Credit Hours: 2  
REE 4XX - Senior Sequence I Credit Hours: 3  
REE 412 - Photovoltaic Systems Credit Hours: 3

Renewable Energy Engineering Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
**Total: 17 Credit Hours**

#### **Winter**

ENGR 465 - Capstone Project Credit Hours: 2  
REE 4XX - Senior Sequence II Credit Hours: 3  
REE 413 - Electric Power Conv Systems Credit Hours: 3  
Renewable Energy Engineering Elective Credit Hours: 3

Humanities Elective Credit Hours: 3  
**Total: 14 Credit Hours**

#### **Spring**

ENGR 465 - Capstone Project Credit Hours: 2  
REE 4XX - Senior Sequence III Credit Hours: 3  
REE 463 - Energy Systems Instrumentation Credit Hours: 3  
Renewable Energy Engineering Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3  
**Total: 14 Credit Hours**

### **Total for a B.S. in Renewable Energy Engineering: 184-185 Credit Hours**

<sup>a</sup> CHE 201/CHE 204 and CHE 202/CHE 205 can be substituted with CHE 221 and CHE 222 respectively

<sup>b</sup> Course may be repeated multiple times for credit with approval

<sup>c</sup> Choose from WRI 327, WRI 350, and WRI 410

<sup>d</sup> With advisor approval students may take REE 201 in place of ENGR 101 and ENGR 102

#### **Renewable Energy Engineering Electives**

Students in the BSREE program are required to complete 15 credits of technical electives classes. At least 3 of these classes must be REE 300-level or above and up to two courses from the following list: 300- or 400-level EE courses (except for EE 320), ENGR42X, or SEM42X. No more than three 1-credit courses are allowed. Enrollment in graduate-level courses at the undergraduate level requires special approval. Examples of acceptable elective courses are:

EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4  
EE 347 - Digital Logic Credit Hours: 4  
EE 343 - Solid State Electronic Devices Credit Hours: 3  
MECH 433 - HVAC Credit Hours: 3  
REE 331 - Fuel Cells Credit Hours: 3  
REE 333 - Batteries Credit Hours: 3  
REE 335 - Hydrogen Credit Hours: 3  
REE 337 - Materials for RE Applications Credit Hours: 3  
REE 344 - Nuclear Energy Credit Hours: 3  
REE 345 - Wind Power Credit Hours: 3  
REE 346 - Biofuels and Biomass Credit Hours: 3  
REE 347 - Hydroelectric Power Credit Hours: 3  
REE 348 - Solar Thermal Energy Systems Credit Hours: 3  
REE 307 - Seminar Credit Hours: 12 <sup>b</sup>  
or  
REE 407 - Seminar Credit Hours: 12 <sup>b</sup>  
REE 425 - Electricity Markets & Modeling Credit Hours: 3  
REE 427 - Greenhouse Gas Acct/Footprints Credit Hours: 3  
REE 439 - Energy Systems Auditing and Management Credit Hours: 3  
REE 451 - Geo Enrgy & direct use app Credit Hours: 3  
REE 453 - Power System Analysis Credit Hours: 3  
REE 454 - Power Syst Protection & Ctnrl Credit Hours: 3  
REE 455 - Energy Efficient Building Dsgn Credit Hours: 3  
REE 465 - Renewable Energy Transport Sys Credit Hours: 3  
REE 469 - Grid Integration of Renewables Credit Hours: 3

#### **Senior Sequences:**

With approval, students can complete a graduate-level REE sequence to meet the senior sequence requirement. Enrollment in graduate-level courses at the undergraduate level requires special approval.

Students are required to complete a minimum of one sequence of technical courses (all three courses) from the list below:

#### **Green Building:**

MECH 433 - HVAC Credit Hours: 3

REE 439 - Energy Systems Auditing and Management Credit Hours: 3

REE 455 - Energy Efficient Building Dsgn Credit Hours: 3

**Power Systems:**

REE 453 - Power System Analysis Credit Hours: 3

REE 454 - Power Syst Protection & Ctnrl Credit Hours: 3

REE 469 - Grid Integration of Renewables Credit Hours: 3

**Geothermal:**

REE 431 - Geotherm Heat Pump Desgn Credit Hours: 3

REE 451 - Geo Enrgy & direct use app Credit Hours: 3

REE 471 - Geothermal Powr Plnt Desgn Credit Hours: 3

# Renewable Energy Engineering (Portland-Metro Campus), BS

## Degree Requirements

The Bachelor of Science in Renewable Energy Engineering follows a rigorous curriculum, requiring a minimum of 184/185 credit hours, which takes approximately four years to complete. To be eligible for graduation, students must maintain a 2.0 GPA. In addition, a final grade of "C" or better must be earned in all courses with MATH, CHE, PHY, EE, ENGR, MECH, and REE prefixes. Students must also earn a grade of "C" or better in all courses listed as prerequisites for these courses.

All courses listed in the curriculum map for the catalog year of graduation must be completed to be eligible for graduation. Any deviations from the courses listed in the curriculum map require approval from the academic advisor, the department chair, and the Registrar's office. Approvals are not official until entered in the official student records. When changes are made to the curriculum, students who entered the program under a previous catalog will work with their academic advisors to transition to meet the requirements of the current catalog.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Curriculum – Wilsonville Campus

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

CHE 201 - General Chemistry I Credit Hours: 3 <sup>a</sup>

CHE 204 - General Chemistry I Lab Credit Hours: 1 <sup>a</sup>

REE 201 - Intro to Renewable Energy Credit Hours: 3

MATH 251 - Differential Calculus Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

### Winter

CHE 202 - General Chemistry II Credit Hours: 3 <sup>a</sup>

CHE 205 - General Chemistry II Lab Credit Hours: 1 <sup>\*</sup>

ECO 201 - Principles of Microeconomics Credit Hours: 3

or

ECO 202 - Principles of Macroeconomics Credit Hours: 3

MATH 252 - Integral Calculus Credit Hours: 4

SPE 111 - Public Speaking Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

MATH 254 - Vector Calculus I Credit Hours: 4

CHE 260 - Electrochemistry for RE Applic Credit Hours: 4

WRI 227 - Technical Report Writing Credit Hours: 4

Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Sophomore Year Fall

EE 221 - Circuits I Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4

or

MATH 465 - Mathematical Statistics Credit Hours: 4

PHY 221 - General Physics w/Calculus Credit Hours: 4

Upper Division Writing Elective Credit Hours: 3 <sup>c</sup>

**Total: 15 Credit Hours**

### Winter

EE 223 - Circuits II Credit Hours: 4

ENGR 267 - Engineering Programming Credit Hours: 3

MATH 261 - Introduction to Linear Algebra Credit Hours: 3

or

MATH 341 - Linear Algebra I Credit Hours: 4

PHY 222 - General Physics w/Calculus Credit Hours: 4

**Total: 14-15 Credit Hours**

### Spring

EE 225 - Circuits III Credit Hours: 4

MATH 321 - Appl Diff Equation I Credit Hours: 4

PHY 223 - General Physics w/Calculus Credit Hours: 4

REE 243 - Electrical Power Credit Hours: 4

**Total: 16 Credit Hours**

### Junior Year Fall

EE 321 - Electronics I Credit Hours: 5

EE 343 - Solid State Electronic Devices Credit Hours: 3

or

REE 337 - Materials for RE Applications Credit Hours: 3

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4

ENGR 355 - Thermodynamics Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 18 Credit Hours**

### Winter

ENGR 318 - Engineering Mech: Fluids Credit Hours: 4

or

MECH 318 - Fluid Mechanics Credit Hours: 4

HIST 356 - A History of Energy Credit Hours: 3

or

HIST 357 - History of the Electric Grid Credit Hours: 3

REE 412 - Photovoltaic Systems Credit Hours: 3

REE 463 - Energy Systems Instrumentation Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Spring

EE 461 - Control Engineering I: Classical Methods Credit Hours: 4

MECH 323 - Heat Transfer I Credit Hours: 3

REE 253 - Electromech Energy Conversion Credit Hours: 3

REE 42X - Global Energy Issues Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

**Senior Year Fall**

ENGR 465 - Capstone Project Credit Hours: 2

REE 331 - Fuel Cells Credit Hours: 3

REE 4XX - Senior Sequence I Credit Hours: 3

REE XXX - Thermal Energy Elective Credit Hours: 3

Renewable Energy Engineering Elective Credit Hours: 3

**Total: 14 Credit Hours**

**Winter**

EE 419 - Power Electronics Credit Hours: 4

ENGR 465 - Capstone Project Credit Hours: 2

REE 4XX - Senior Sequence II Credit Hours: 3

Renewable Energy Engineering Elective Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

**Spring**

ENGR 465 - Capstone Project Credit Hours: 2

REE 413 - Electric Power Conv Systems Credit Hours: 3

REE 4XX - Senior Sequence III Credit Hours: 3

REE 3XX - Hydro Energy Elective Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 14 Credit Hours**

**Total for a B.S. in Renewable Energy Engineering: 183-184 Credit Hours**

<sup>a</sup> CHE 201/CHE 204 and CHE 202/CHE 205 can be substituted with CHE 221 and CHE 222 respectively

<sup>b</sup> Course may be repeated multiple times for credit with approval

<sup>c</sup> Choose from WRI 327, WRI 350, and WRI 410

**Renewable Energy Engineering Electives**

Students in the BSREE program are required to complete 15 credits of technical electives classes. At least 3 of these classes must be REE 300-level or above and up to two courses from the following list: 300- or 400-level EE courses (except for EE 320), ENGR42X, or SEM42X. No more than three 1-credit courses are allowed. Enrollment in graduate-level courses at the undergraduate level requires special approval. Examples of acceptable elective courses are:

EE 341 - Electricity/Magnetism w/Transm Credit Hours: 4

EE 347 - Digital Logic Credit Hours: 4

EE 343 - Solid State Electronic Devices Credit Hours: 3

MECH 433 - HVAC Credit Hours: 3

REE 331 - Fuel Cells Credit Hours: 3

REE 333 - Batteries Credit Hours: 3

REE 335 - Hydrogen Credit Hours: 3

REE 337 - Materials for RE Applications Credit Hours: 3

REE 344 - Nuclear Energy Credit Hours: 3

REE 345 - Wind Power Credit Hours: 3

REE 346 - Biofuels and Biomass Credit Hours: 3

REE 347 - Hydroelectric Power Credit Hours: 3

REE 348 - Solar Thermal Energy Systems Credit Hours: 3

REE 307 - Seminar Credit Hours: 12 <sup>b</sup>

or

REE 407 - Seminar Credit Hours: 12 <sup>b</sup>

REE 425 - Electricity Markets & Modeling Credit Hours: 3

REE 427 - Greenhouse Gas Acct/Footprints Credit Hours: 3

REE 439 - Energy Systems Auditing and Management Credit Hours: 3

REE 451 - Geo Enrgy & direct use app Credit Hours: 3

REE 453 - Power System Analysis Credit Hours: 3

REE 454 - Power Syst Protection & Ctnrl Credit Hours: 3

REE 455 - Energy Efficient Building Dsgn Credit Hours: 3

REE 465 - Renewable Energy Transport Sys Credit Hours: 3

REE 469 - Grid Integration of Renewables Credit Hours: 3

**Senior Sequences:**

With approval, students can complete a graduate-level REE sequence to meet the senior sequence requirement. Enrollment in graduate-level courses at the undergraduate level requires special approval.

Students are required to complete a minimum of one sequence of technical courses (all three courses) from the list below:

**Green Building:**

MECH 433 - HVAC Credit Hours: 3

REE 439 - Energy Systems Auditing and Management Credit Hours: 3

REE 455 - Energy Efficient Building Dsgn Credit Hours: 3

**Power Systems:**

REE 453 - Power System Analysis Credit Hours: 3

REE 454 - Power Syst Protection & Ctnrl Credit Hours: 3

REE 469 - Grid Integration of Renewables Credit Hours: 3

**Geothermal:**

REE 431 - Geotherm Heat Pump Desgn Credit Hours: 3

REE 451 - Geo Enrgy & direct use app Credit Hours: 3

REE 471 - Geothermal Powr Plnt Desgn Credit Hours: 3

# Renewable Energy Engineering, MS

## Degree Requirements

The Master of Science in Renewable Energy Engineering is a rigorous curriculum that requires 54 credit hours and approximately two years to complete.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Curriculum

Required courses and recommended terms during which they should be taken:

### First Year Fall

REE 511 - Research Methods/Innovation I Credit Hours: 3

REE 515 - Energy Engineering I Credit Hours: 3

REE 5xx REE Specialization Sequence X: Course 1 of 3 Credit Hours: 3

**Total: 9 Credit Hours**

### Winter

REE 512 - Research Methods/Innov II Credit Hours: 3

REE 516 - Energy Engineering II Credit Hours: 3

REE 5xx REE Specialization Sequence X: Course 2 of 3 Credit Hours: 3

**Total: 9 Credit Hours**

### Spring

REE 513 - Research Methods/Innov III Credit Hours: 3

REE 517 - Energy Engineering III Credit Hours: 3

REE 5xx REE Specialization Sequence X: Course 3 of 3 Credit Hours: 3

**Total: 9 Credit Hours**

### Second Year Fall

REE 599 Graduate Research or Project 3

REE 5yy REE Specialization Sequence Y: Course 1 of 3 Credit Hours: 3

REE 5zz REE Specialization Sequence Z: Course 1 of 3 Credit Hours: 3

or

Elective Credit Hours: 3

**Total: 9 Credit Hours**

### Winter

REE 599 Graduate Research or Project 3

REE 5yy REE Specialization Sequence Y: Course 2 of 3 Credit Hours: 3

REE 5zz REE Specialization Sequence Z: Course 2 of 3 Credit Hours: 3

or

Elective Credit Hours: 3

**Total: 9 Credit Hours**

### Spring

REE 599 Graduate Research or Project 3

REE 5yy REE Specialization Sequence Y: Course 3 of 3 Credit Hours: 3

REE 5zz REE Specialization Sequence Z: Course 3 of 3 Credit Hours: 3

or

Elective Credit Hours: 3

**Total: 9 Credit Hours**

## Total for a M.S. in Renewable Energy Engineering: 54 Credit Hours

## Renewable Energy Specialization Sequences

Students must complete REE specialization sequences from the list below. One sequence constitutes three courses under the titles below. Other sequences may be used to satisfy this requirement with advisor and department chair approval. Not all sequences are offered every year. Some sequences are campus specific.

### Advanced Energy Storage

REE 591 - Hydrogen Prod & Storage Credit Hours: 3

REE 592 - Advanced Batteries Credit Hours: 3

REE 593 - Advanced Fuel Cells Credit Hours: 3

### Biofuels and Biomass

REE 521 - Production of Biomass/Biofuels Credit Hours: 3

REE 541 - Utiliztn Strategies/Bioenergy Credit Hours: 3

REE 561 - Process Desgn/Econ Eval f/BES Credit Hours: 3

### Electrical Power Systems

REE 529 - Power System Analysis Credit Hours: 3



REE 549 - Power System Protection/Contrl Credit Hours: 3  
REE 569 - Grid Integration of Renewables Credit Hours: 3

#### **Electrochemical Systems**

REE 523 - Hydrogen Productn and Storage Credit Hours: 3  
REE 543 - Materials f/Electrochemical Proc Credit Hours: 3  
REE 563 - Batteries Credit Hours: 3

#### **Energy Efficient Building Systems**

REE 533 - Heating, Ventilation/Air Condi Credit Hours: 3  
REE 553 - Energy Systems Mgmt/Auditing Credit Hours: 3  
REE 573 - Energy-Efficient Bldg Design Credit Hours: 3

#### **Energy Storage**

REE 581 - Energy Storage Fundamentals Credit Hours: 3  
REE 582 - Introduction to Batteries Credit Hours: 3  
REE 583 - Intro to Fuel Cells Credit Hours: 3

#### **Fuel Cell Systems**

REE 535 - Fuel Cell Fundamentals Credit Hours: 3  
REE 555 - Stationary Fuel Cells Credit Hours: 3  
REE 575 - Transporation Fuel Cells Credit Hours: 3

#### **Geothermal Energy**

REE 531 - Ground-Source Heat Pumps Credit Hours: 3  
REE 551 - Advanced Geothermal Energy Credit Hours: 3  
REE 571 - Geothermal Power Generation Credit Hours: 3

#### **Global Energy Issues**

REE 537 - Sustainability/Energy Systems Credit Hours: 3  
REE 557 - Costing Renewable Energy Credit Hours: 3  
REE 577 - Renewable Energy Integration Credit Hours: 3

#### **Hydro Power Systems and Integration**

REE 539 - Hydraulics/Fluid Mech/Hydropow Credit Hours: 3  
REE 559 - Develop of Hydropower Proj Credit Hours: 3  
REE 579 - Econ/Reg/Envir Aspects Hydrop Credit Hours: 3

#### **Photovoltaic Systems and Processes**

REE 525 - Solid-State Physics/Photov Mat Credit Hours: 3  
REE 545 - Applied Photovoltaics Credit Hours: 3  
REE 565 - Semiconductor Process Enginrng Credit Hours: 3

#### **Wind Power Systems and Integration**

REE 527 - Wind Power Generators Credit Hours: 3  
REE 547 - Electric Power Conversion Credit Hours: 3  
REE 567 - Wind Energy Systems Integratr Credit Hours: 3

# Robotics, Autonomous Systems, and Control Engineering, BS Dual Major

## Degree Requirements

A dual major in Robotics, Autonomous Systems, and Control Engineering requires 91 credits in automation and other engineering coursework. Many of these course credits may be used to meet requirements in the primary major; depending upon selection of primary major it is estimated that only 28-36 additional credits will be needed beyond the primary major requirements. The capstone project required in the student's primary major is expected to incorporate elements from both the primary and the Robotics, Autonomous Systems, and Control Engineering majors. Since the required courses for Robotics, Autonomous Systems, and Control Engineering must be taken along with those for the primary major, a full curriculum map is not provided. Students should carefully plan each term in consultation with their primary major advisor and with their Robotics, Autonomous Systems, and Control Engineering advisor. To obtain a dual major in Robotics, Autonomous Systems, and Control Engineering, students must complete the courses required for the Bachelor of Science degree in their primary engineering major as well as the following list of specialized Robotics, Autonomous Systems, and Control Engineering courses:

### Electrical Engineering and Computer Science Requirements

CST 116 - C++ Programming I Credit Hours: 4  
EE 131 - Digital Electronics I Credit Hours: 4  
EE 133 - Digital Electronics II Credit Hours: 4  
EE 221 - Circuits I Credit Hours: 4  
EE 223 - Circuits II Credit Hours: 4  
EE 225 - Circuits III Credit Hours: 4  
EE 333 - Intro to Microcontrollers Credit Hours: 4  
EE 430 - Linear Sys & Digital Signal Credit Hours: 5  
ENGR 267 - Engineering Programming Credit Hours: 3

**Total: 36 Credit Hours**

### Robotics, Autonomous Systems, and Control Engineering Major Core

EE 461 - Control Engineering I: Classical Methods Credit Hours: 4  
ENGR 461 - Modeling and Simulation of Dynamic Systems Credit Hours: 4  
ENGR 462 - Control Engineering II: Modern Methods Credit Hours: 4  
ENGR 463 - Motion Control in Mechanisms and Robotics Credit Hours: 4  
ENGR 464 - Autonomous Systems Credit Hours: 4  
REE 463 - Energy Systems Instrumentation Credit Hours: 3

**Total: 23 Credit Hours**

### Supporting Engineering Requirements

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4  
ENGR 212 - Engineering Mech: Dynamics Credit Hours: 3  
ENGR 355 - Thermodynamics Credit Hours: 3  
MECH 318 - Fluid Mechanics Credit Hours: 4  
MECH 323 - Heat Transfer I Credit Hours: 3  
REE 243 - Electrical Power Credit Hours: 4  
REE 253 - Electromech Energy Conversion Credit Hours: 3  
SEM 421 - Systems Engineering Credit Hours: 4  
SEM 422 - Advanced Systems Engineering Credit Hours: 4

**Total: 32 Credit Hours**

# Systems Engineering and Technical Management, BS Dual Major

## Degree Requirements

To obtain a dual major in Systems Engineering & Technical Management, students must complete the courses required for the Bachelor of Science degree in their primary engineering major, as well as the dual major requirements listed below. Some of these courses may be used to meet requirements in the primary major also.

### SE Major Core Requirements

SEM 421 - Systems Engineering Credit Hours: 4

SEM 422 - Advanced Systems Engineering Credit Hours: 4

SEM 425 - Advanced Engineering Mgmt Credit Hours: 4

**Total: 12 Credit Hours**

### Mathematics Requirements

MATH 321 - Appl Diff Equation I Credit Hours: 4

MATH 341 - Linear Algebra I Credit Hours: 4

MATH 465 - Mathematical Statistics Credit Hours: 4

or

MATH 362 - Statistical Methods II Credit Hours: 4

**Total: 12 Credit Hours**

### Systems Electives

[Select 9 credit hours from the following electives or advisor approved Elective courses]

EE 430 - Linear Sys & Digital Signal Credit Hours: 5

EE 432 - Advanced Digital System Design Credit Hours: 4

EE 401 - Communication Systems Credit Hours: 5

CST 236 - Engineering for Quality Software Credit Hours: 4

CST 316 - JR Team-Based Proj Dev I Credit Hours: 4

CST 324 - Database Systems and Design Credit Hours: 4

MFG 447 - Lean Manufacturing Credit Hours: 3

MIS 311 - Intro to Systems Analysis Credit Hours: 3

MIS 341 - Relational Database Design I Credit Hours: 4

MIS 375 - Decision Support Systems Credit Hours: 3

**Total: 9 Credit Hours**

### Management Electives

[Select 9 credit hours from the following electives or advisor approved elective courses]

ACC 203 - Prin of Managerial Acct Credit Hours: 4

BUS 223 - Marketing I Credit Hours: 3

BUS 226 - Business Law Credit Hours: 3

BUS 304 - Engineering Management Credit Hours: 3

BUS 308 - Prin of International Business Credit Hours: 3

MGT 321 - Operations Management I Credit Hours: 3

MGT 345 - Engineering Economy Credit Hours: 3

MGT 461 - Lean/Six Sigma Management I Credit Hours: 3

MGT 462 - Lean/Six Sigma Management II Credit Hours: 3

MGT 463 - Lean/Six Sigma Management III Credit Hours: 3

**Total: 9 Credit Hours**

**Total for a B.S. (Dual) in Systems Engineering and Technical Management: 42 Credit Hours**

**Note:** Many courses may be part of the primary major.

# Geomatics Department

Jack Walker, *Department Chair*

*Professors: J. Ritter, J. Walker*

## Degree Offered

- Bachelor of Science in Geomatics with options in:
  - Surveying
  - Geographic Information Systems

## Minors Offered

- Geographic Information Systems
- Surveying

The department is seeking formal approval to offer both of these degrees fully online! Please inquire for further information.

Geomatics is the modern surveying, engineering, geoscience, and IT-related discipline which employs an integrated approach to the measurement, mathematical modeling, and management of geospatial data. Geospatial data is obtained from a variety of sources including ground-based instruments, mobile mapping technologies, drones, hydrographic, and earth-orbiting satellite systems. Geospatial data is used to create a detailed but understandable picture of the Earth's physical features. This data enables the design and development of land administration systems for sustainable planning and management of the built environment.

Geomatics provides the opportunity to work primarily outdoors, exclusively in an office, or in some combination of the two. Geomatics attracts individuals who enjoy mathematics, history, making maps, using advanced software and high-tech instruments. Career employment is available in rural and urban areas throughout the nation.

The United Nations has adopted its first resolution, *A Global Geodetic Reference Frame for Sustainable Development*, recognizing the importance of a globally coordinated approach to geodesy – the geomatics discipline focused on accurately measuring the shape, rotation, and gravitational field of the earth.

Students within the Geomatics Program must choose between either an option in Surveying or Geographic Information Systems (GIS). Students may, with consent of their advisor, complete both options.

## Program Learning Outcomes

1. an ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline;
2. an ability to formulate or design a system, process, procedure or program to meet desired needs;
3. an ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgement to draw conclusions;
4. an ability to communicate effectively with a range of audiences;
5. an ability to understand ethical and professional responsibilities and the the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts;
6. an ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

## Student Preparation

It is recommended that students prepare for entrance into the program by emphasizing mathematics and science in high school. Two years of algebra and one year each of geometry, trigonometry and physics are desirable prerequisites.

## Bachelor of Science in Geomatics, Surveying Option

The department offers a nationally-recognized professional degree program that prepares students for employment within the geomatics profession and licensure as a Professional Land Surveyor (PLS). Students enjoy small classes taught by licensed professionals that emphasize fundamental theory and problem solving in a computer-intensive curriculum. Field laboratory experiences integrated throughout the curriculum provide practical skills, and offer extensive opportunities to prepare students to work in teams using state-of-the art technology. Upon completing the freshman year, students often have enough experience to obtain summer employment as a survey crew member.

Completion of the program qualifies graduates to take the Fundamentals of Surveying (FS) exam during the spring term of the senior year. The broad-based nature of the curriculum ensures that graduates will be prepared to fulfill both the traditional and contemporary roles of the profession.

## **Cooperative Education**

Geomatics students may, upon completion of the freshman year, apply for student career experience programs (Pathways) with the U.S. Bureau of Land Management, Bonneville Power Administration, U.S. Forest Service, or other appropriate federal employers. Work experiences are paid and may be for three or six month periods. Students may earn two or four credits for work experience periods. A maximum of four credits may be applied toward the bachelor's degree.

Geomatics students are also eligible for the Civil Engineering Cooperative Program (CECOP), offering high-quality, paid industrial experience and related academic activities while students pursue their degree. The Oregon State Board of Examiners for Engineering and Land Surveying (OSBEELS) counts this internship time toward PLS licensure requirements.

## **Scholarships**

Approximately 40 scholarships are available to geomatics students each year through an endowed Geomatics Department Scholarship, CLSA, PLSO, LSAW, WESTFED, NSPS, and other organizations.

## **Career Opportunities**

The employment forecast for graduates in this field is exceptional. As an increasing number of licensed surveyors across the nation retire, a personnel shortage has been created within the geomatics profession. Graduates are prepared for a wide variety of career opportunities in the fields of surveying, engineering, construction, remote sensing, GIS, and land information management.

## **Accreditation**

The Geomatics Program (surveying option) is accredited by the Applied and Natural Science Accreditation Commission (ANSAC) of ABET, Inc., <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## **Bachelor of Science in Geomatics, Geographic Information Systems (GIS) Option**

Geographic Information Systems (GIS) is a systematic approach to the management, analysis, and display of geospatial information. Management of such information requires application of advanced RDBMS techniques, the ability to see a project through to completion requires fundamental project management skills as well. The analysis of geodata sets is predicated on a firm understanding of geospatial reference/coordinate systems, topological relationships, and statistical methods. Techniques for displaying geospatial information take various forms such as maps, geographic datasets, and data models. Students graduating from this course of study will understand how to manipulate geospatial data in order to solve political, economic, engineering, and ecological problems and how to use and create online resources to effectively communicate their results.

Students learn in a project-based environment to manage the flow of data through the project in terms of data acquisition, processing, analysis, and presentation. Within the GIS option, students are able to select individual areas of focus based on independent study and/or online courses.

## **Career Opportunities**

The list of opportunities for students in the field of GIS is continuing to show substantial growth. As our society becomes more data centered, the importance of understanding the spatial location of this data and its geospatial relationship to other data is becoming increasingly apparent. Understanding such geospatial relationships is fundamental to areas such as health care, land records management, transportation modeling, environmental engineering/science, and urban planning, to name only a few. Local, state, and federal agencies are embracing GIS more each year as these agencies realize that GIS is the appropriate tool to solve long-standing geospatial problems. Private industry is also embracing GIS since it can be used to streamline delivery and/or response routes. Both private and public entities have also realized that GIS provides an excellent decision support framework structure.

## **Geographic Information Systems Minor**

The Geographic Information Systems (GIS) minor is open to all majors and is especially recommended for students majoring in Geomatics (Surveying Option), Environmental Sciences, Business/Management/ Information Systems, Computer Software Engineering, Renewable Energy Engineering and Health Care. The minor provides the essential kernel of knowledge and skill necessary to approach geospatial issues pertaining to these disciplines. An advisor in the Geomatics Department must approve any substitution of courses from those listed. Preparation for this course of study entails a functional level of computer literacy that can be evaluated in consultation with an advisor. Students must also have successfully completed MATH 111 prior to enrolling in upper-division classes.

The Minor in Geographic Information Systems (GIS) acknowledges the achievement of 22 credits taken from the following GIS course listing.

**Requirements of Minor**

GIS 103 - The Digital Earth Credit Hours: 3

GIS 134 - Geographic Info Systems Credit Hours: 3

**Elective Courses: 16 Credits Required**

GIS 306 - Geospatial Raster Analysis Credit Hours: 4

GIS 316 - Geospatial Vector Analysis I Credit Hours: 4

GIS 332 - Customizing the GIS Environ I Credit Hours: 4

GIS 407 - Seminar Credit Hours: 4

GIS 426 - Geospatial Vector Analysis II Credit Hours: 4

GIS 432 - Customizing the GIS Environ II Credit Hours: 4

GIS 446 - GIS Database Development Credit Hours: 2

# Geomatics, Geographic Information Systems (GIS) Option, BS

## Degree Requirements

A minimum of 180 term hours must be completed for the GIS option, of which 80 term hours must be in the GIS and geomatics area. A minimum of 181 term hours must be completed for the GIS option, of which 74 term hours must be in the GIS and geomatics area.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

GIS 103 - The Digital Earth Credit Hours: 3  
GME 161 - Plane Surveying I Credit Hours: 4  
MATH 111 - College Algebra Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
**Total: 15 Credit Hours**

#### Winter

CE 203 - Engineering Graphics Credit Hours: 3  
GIS 134 - Geographic Info Systems Credit Hours: 3  
GME 175 - Computations and Platting Credit Hours: 3  
MATH 112 - Trigonometry Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Spring

GIS 205 - Mobile and Web GIS Credit Hours: 2  
GME 162 - Plane Surveying II Credit Hours: 4  
MATH 251 - Differential Calculus Credit Hours: 4  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
**Total: 14 Credit Hours**

#### Sophomore Year Fall

GIS 306 - Geospatial Raster Analysis Credit Hours: 4  
GME 241 - Boundary Law I Credit Hours: 3  
MATH 252 - Integral Calculus Credit Hours: 4  
MIS 118 - Intro to Programming in C# Credit Hours: 4  
**Total: 15 Credit Hours**

#### Winter

GIS 316 - Geospatial Vector Analysis I Credit Hours: 4  
GME 242 - Land Descrip & Cadastre Credit Hours: 2  
MATH 254 - Vector Calculus I Credit Hours: 4  
MIS 218 - Intermediate Programming in C# Credit Hours: 4  
**Total: 14 Credit Hours**

#### Spring

BUS 226 - Business Law Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4  
MGT 345 - Engineering Economy Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 17 Credit Hours**

#### Junior Year Fall

GIS 332 - Customizing the GIS Environ I Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
**Total: 15 Credit Hours**

#### Winter

GIS 432 - Customizing the GIS Envirn II Credit Hours: 4  
Math Elective Credit Hours: 3 <sup>a</sup>  
MIS 341 - Relational Database Design I Credit Hours: 4  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
**Total: 15 Credit Hours**

#### Spring

GIS 426 - Geospatial Vector Analysis II Credit Hours: 4  
MIS 442 - Adv Database App Programming Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3  
**Total: 14 Credit Hours**

#### Senior Year Fall

BUS 304 - Engineering Management Credit Hours: 3  
GIS 446 - GIS Database Development Credit Hours: 2  
GME 425 - Remote Sensing Credit Hours: 4  
GME 451 - Geodesy Credit Hours: 4  
Social Science Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Winter

GME 452 - Map Projections Credit Hours: 3  
GME 455 - GNSS Surveying for GIS Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Science Elective Credit Hours: 4  
**Total: 14 Credit Hours**

#### Spring

GME 468 - Geomatics Practicum Credit Hours: 2  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
Business Elective Credit Hours: 3 (upper-division) <sup>b</sup>  
Humanities Elective Credit Hours: 3  
Science Elective Credit Hours: 4  
**Total: 15 Credit Hours**

**Note:** Humanities and Social Science Electives must be approved by the department.

**Total for a B.S. in Geomatics, Geographic Information Systems Option: 180 Credit Hours**

<sup>a</sup> Students must demonstrate advancement in educational content, courses must not be lower level than courses in the required curriculum. **MATH** 341 or **MATH** 362 recommended

<sup>b</sup> **BUS** 356 recommended

# Geomatics, Surveying Option, BS

## Degree Requirements

A minimum of 180 term hours must be completed for the Surveying option, of which 80 term hours must be in the GIS and geomatics area. A minimum of 180 term hours must be completed for the GIS option, of which 74 term hours must be in the GIS and geomatics area.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

GIS 103 - The Digital Earth Credit Hours: 3  
GME 161 - Plane Surveying I Credit Hours: 4  
MATH 112 - Trigonometry Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

#### Winter

CE 203 - Engineering Graphics Credit Hours: 3  
GIS 134 - Geographic Info Systems Credit Hours: 3  
GME 175 - Computations and Platting Credit Hours: 3  
MATH 251 - Differential Calculus Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

GIS 205 - Mobile and Web GIS Credit Hours: 2  
GME 162 - Plane Surveying II Credit Hours: 4  
MATH 252 - Integral Calculus Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

#### Sophomore Year Fall

GME 163 - Route Surveying Credit Hours: 4  
GME 241 - Boundary Law I Credit Hours: 3  
MATH 254 - Vector Calculus I Credit Hours: 4  
PHY 221 - General Physics w/Calculus Credit Hours: 4

**Total: 15 Credit Hours**

#### Winter

GME 242 - Land Descrip & Cadastre Credit Hours: 2  
GME 264 - Digital Design for Surveying Credit Hours: 2  
PHY 222 - General Physics w/Calculus Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

GME 372 - Subdiv'n Planning and Platting Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Junior Year Fall

GIS 306 - Geospatial Raster Analysis Credit Hours: 4  
GME 343 - Boundary Surveys Credit Hours: 4  
MIS 113 - Intro to Database Systems Credit Hours: 3  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Winter

GIS 316 - Geospatial Vector Analysis I Credit Hours: 4  
GME 466 - Boundary Law II Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
ENV/GIS/GME Elective Credit Hours: 4  
Math Elective Credit Hours: 3<sup>a</sup>

**Total: 17 Credit Hours**

#### Spring

BUS 226 - Business Law Credit Hours: 3  
GME 351 - Constr/Engr Surveying Credit Hours: 3  
MGT 345 - Engineering Economy Credit Hours: 3  
GME 444 - Adjustment by Least Squares Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Senior Year Fall

BUS 304 - Engineering Management Credit Hours: 3  
GME 425 - Remote Sensing Credit Hours: 4  
GME 451 - Geodesy Credit Hours: 4  
MIS 118 - Intro to Programming in C# Credit Hours: 4

**Total: 15 Credit Hours**

#### Winter

GME 452 - Map Projections Credit Hours: 3  
GME 454 - GNSS Surveying Credit Hours: 4  
Science Elective Credit Hours: 4  
Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Spring

GME 468 - Geomatics Practicum Credit Hours: 2  
Business Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Science Elective Credit Hours: 4<sup>b</sup>

**Total: 12 Credit Hours**

**Note:** Humanities and Social Science Electives must be approved by the department.

**Total for a B.S. in Geomatics, Surveying Option: 180 Credit Hours**



<sup>a</sup> Students must demonstrate advancement in educational content, courses must not be lower level than courses in the required curriculum. MATH 341 or MATH 362 recommended

<sup>b</sup> GEOL 201 recommended

## Surveying Minor

The Surveying minor is open to all engineering majors, and is especially recommended for students majoring in Civil Engineering and Geomatics (GIS option). The minor provides the essential knowledge and skills which meet OSBEELS requirements (OAR 820-010-0226) allowing engineering students to sit for the Fundamentals of Surveying (FS) examination, and pursue licensure as a Professional Surveyor (PS). An advisor in the Geomatics Department must approve substitution of courses from those listed.

The Minor in Surveying acknowledges the achievement of 27 credits taken from the following geomatics course listing.

### Requirements of Minor

- GIS 134 - Geographic Info Systems Credit Hours: 3 <sup>°</sup>
- GME 162 - Plane Surveying II Credit Hours: 4 <sup>c,d</sup>
- GME 241 - Boundary Law I Credit Hours: 3 <sup>°</sup>
- GME 242 - Land Descrip & Cadastre Credit Hours: 2 <sup>°</sup>
- GME 264 - Digital Design for Surveying Credit Hours: 2 <sup>a</sup>
- GME 343 - Boundary Surveys Credit Hours: 4

### Elective Courses: 8 Credits Required

- GME 163 - Route Surveying Credit Hours: 4
- GME 351 - Constr/Engr Surveying Credit Hours: 3 <sup>b</sup>
- GME 372 - Subdiv'n Planning and Platting Credit Hours: 3
- GME 425 - Remote Sensing Credit Hours: 4 <sup>°</sup>
- GME 444 - Adjustment by Least Squares Credit Hours: 4
- GME 451 - Geodesy Credit Hours: 4 <sup>°</sup>
- GME 452 - Map Projections Credit Hours: 3 <sup>°</sup>
- GME 455 - GNSS Surveying for GIS Credit Hours: 4 <sup>°</sup>
- GME 466 - Boundary Law II Credit Hours: 3

### Notes:

- <sup>a</sup> CIV 415 will substitute for GME 264
- <sup>b</sup> CE 351 will substitute for the GME 163 prerequisite
- <sup>°</sup> Required course for GIS majors
- <sup>d</sup> MATH 221 will substitute for the GME 175 prerequisite

# Management Department

Hallie Neupert, *Department Chair*

*Professors:* R. Bailey, S. Bailey, H. Neupert, M. Seigny

*Associate Professors:* S. Beaudry, G. Kirby, C. Morgan, P. Schaeffer, L. Stewart, K. Weidman

*Assistant Professors:* D. Carrere, D. DaSaro, J. Emard, G. Lompfrey, L. Yates

## Degrees Offered

- Bachelor of Science in Accounting
- Bachelor of Science in Business, with options in:
  - Management
  - Marketing
- Bachelor of Science in Cybersecurity
- Bachelor of Science in Health Care Management, with options in:
  - Administration
  - Clinical
  - Radiologic Science Management
- Bachelor of Science in Health Informatics
  
- Bachelor of Science in Information Technology
- Bachelor of Science in Operations Management
- Bachelor of Applied Science in Technology and Management

## Minors Offered

- Business
- Health Informatics
- Information Technology
- Innovation & Entrepreneurship
- International Business

## Specializations Offered

- Accounting
- Management
- Marketing

## Certificate Offered

- Accounting (post baccalaureate)

## Emphases Offered

- Six Sigma Green Belt Certification
- Renewable Energy Management

The Management Department's tech-infused degrees empower graduates through innovative, hands-on, and multi-disciplinary learning experiences, and prepares students to take their place as leaders and managers in contemporary public and private organizations. Faculty members have been selected for their managerial experience and expertise in a diverse array of production and service industries.

Coursework in the Management programs builds upon foundational core courses including management, marketing, accounting, finance, information technology, economics, ethics, globalization, business law, and business presentations. These courses, along with program-specific courses, prepare students for their senior year which includes a senior experience and a capstone course. The senior experience provides management students with an opportunity to integrate and synthesize their educational experience within the context of a "real-world" business problem or project.

As a result of this unique combination of resources and coursework, the Management degree programs remain vital and up-to-date, providing students with both the technical tools of management and the interpersonal skills that employers most desire. Equally important, each graduate will be poised to positively contribute to society as well as to today's culturally diverse, global work place.

## Department Learning Outcomes

Upon graduating, Management Department graduates should be able to:

1. Apply core concepts in a business environment.
2. Apply the legal, social, ethical, and, economic environments of business in a global context.
3. Contribute to the development of a team-oriented and collaborative environment.
4. Solve business problems using decision-support tools and/or research skills.
5. Demonstrate professional communication and behavior using a variety of delivery methods.
6. Apply business concepts and apply strategic planning skills to effect change in an integrated manner.

## Degree Completion and Co-enrollment at Community Colleges

The Management Department, in partnership with many Oregon community colleges, offers joint enrollment, transfer credit (articulation) agreements and course sequences so that students may complete a degree with coursework taken from multiple institutions. See the Oregon Tech Registrar Office's website, or a management department faculty advisor for additional information.

## Oregon Tech Online

Many of the management degrees and core management courses are available online to facilitate the needs of degree completion students. Online courses are particularly appropriate for students capable of self-directed educational activities. Online degrees and courses are offered utilizing Internet delivery and collaborative learning. Degrees available online are: BS in Business, Management Option, BS in Health Care Management, Administration Option, Clinical Option, and Radiologic Sciences Management Option; BS in Operations Management; BS in Health Informatics; BS in Information Technology; BAS in Technology and Management.

## Required Student Equipment

Successful completion of these degrees requires intensive, hands-on use of computers.

Therefore, all students are required to own their own computer. Financial aid may be available to help defray the cost of this equipment. Please consult the Financial Aid Office at Oregon Tech.

**Note:** The Portland-Metro campus is a laptop-required campus. Laptop specifications, financial aid, and helpful instructions may be found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Accreditation

Oregon Tech has received specialized accreditation for its business programs through the International Accreditation Council for Business Education (IACBE).

## Accounting

### Degree Offered

- Bachelor of Science in Accounting

### Objectives

The BS in Accounting is designed to prepare students for careers in public or private accounting. Students become familiar with computerized accounting applications and skilled in the principles of tax, financial, and cost accounting. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project. Upon graduation students should have sufficient knowledge to sit for the Certified Public Accountant (CPA) and the Certified Management Accountant (CMA) exams.

The BS in Accounting is offered in Klamath Falls.

### Program Learning Outcomes

Upon graduating, Accounting graduates should be able to:

1. Integrate GAAP in financial reporting and analysis.
2. Demonstrate taxation compliance and planning.

3. Apply assurance concepts.

Apply managerial accounting concepts

## **Career Opportunities**

Many students take the CPA and CMA exams upon graduating, go on to graduate school, and/or find employment in this continuously growing, stable and in-demand career field. Job titles include certified public accountant, financial analyst, accountant, tax preparer.

## **Student Preparation and Admissions**

Students must meet Oregon Tech general admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

## **Business**

### **Degree Offered**

- Bachelor of Science in Business, with options in:
  - Management
  - Marketing

### **Objectives**

The BS in Business prepares leaders to manage organizations in the high technology environments of the 21st century. Students develop their abilities to contribute to an organization's performance through hands-on experience built on a solid theoretical base. The Business curriculum skillfully integrates technology-enhanced coursework with a solid core of business courses. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project. Students will also be prepared for graduate level education, such as the Master's in Business Administration (MBA) degree.

The BS in Business - Management option is offered in Klamath Falls, and through Oregon Tech Online. The BS in Business - Marketing option is offered in Klamath Falls.

### **Program Learning Outcomes**

Upon graduating, Business-Management graduates should be able to:

1. Apply business strategies to plan for achieving specific goals in an organization based on analysis of internal and external factors.

Upon graduating, Business-Marketing graduates should be able to:

1. Analyze an organization's activities to develop/implement a marketing strategy.

## **Career Opportunities**

The BS in Business develops graduates with relevant skills preparing students for entry into careers in business, government, public, or social service organizations.

Job titles include business unit manager, supervisor, marketing specialist, sales manager, marketing researcher, business analyst, and human resource manager.

## **Student Preparation and Admissions**

Students must meet Oregon Tech general admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

## **Cybersecurity**

### **Degree Offered**

- Bachelor of Science in Cybersecurity

## Objectives

The BS in Cybersecurity provides students with the knowledge and skills necessary to competently scan, assess, report, and mitigate cybersecurity threats, vulnerabilities, and exploits on information systems and technology. A graduate of the BS in Cybersecurity program is prepared to assess the security needs of computer and network systems, recommend safeguard solutions, and manage the implementation and maintenance of security devices, systems, and procedures. Includes instruction in computer architecture, scripting, systems analysis, networking, cryptography, security system design, applicable law and regulations, risk assessment and policy analysis, contingency planning, user access issues, investigation techniques, and troubleshooting. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project.

The BS in Cybersecurity is offered in Klamath Falls and Portland-Metro.

## Program Learning Outcomes

Upon graduating, Cybersecurity graduates should be able to:

1. Describe the tactics, techniques, and procedures used throughout the vulnerability assessment process.
2. Evaluate risk in information systems and apply mitigation techniques to reduce impact to business operations.
3. Perform information system vulnerability scanning and report findings.
4. Identify information system exploits and apply proper incident response.

## Career Opportunities

The BS in Cybersecurity develops graduates with relevant skills preparing students for entry into careers in business, government, public, or social service organizations.

Job titles include IT Security Specialist, Information Security Analyst and Intelligence Analyst.

## Student Preparation and Admissions

Students must meet Oregon Tech general admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

**Note:** The Portland-Metro campus is a laptop-required campus. Laptop specifications, financial aid, and helpful instructions may be found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Health Care Management

### Degree Offered

- Bachelor of Science in Health Care Management with options in:
  - Administration
  - Clinical
  - Radiologic Sciences Management

### Objectives

The BS in Health Care Management prepares graduates for a variety of career options in the rapidly growing health care industry, where health service managers are in high demand. Students will learn the knowledge and skills necessary to become effective managers of health systems and operations and will be prepared to assume managerial positions in hospitals, medical clinics, and medical practices. Health care managers plan, direct, and coordinate medical and health services; and might manage an entire facility, a specific clinical area or department, or a medical practice for a group of providers. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project. Oregon Tech's Health Care Management degree includes three options to meet the student's specific needs and interests.

The BS in Health Care Management is offered in Klamath Falls and through Oregon Tech Online.

### Program Learning Outcomes

Upon graduating, Health Care Management graduates should be able to:

1. Interpret health policy and systems.
2. Assess the sustainability of healthcare organizations.

## Student Preparation and Admissions

Students must meet the standard Oregon Tech admission requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

### For the Health Care Management, Clinical Option

Students must provide documentation of a current state and/or national registry, license, or certificate in an approved allied health field. Each prospective student's academic credits and registry, license, or certificate will be individually evaluated to determine transferability and acceptability of the coursework.

### For the Health Care Management, Radiologic Science Management Option

Students must be registered through the ARRT and be in good standing.

## Health Informatics

### Degree Offered

- Bachelor of Science in Health Informatics

### Objectives

Health Informatics is a rapidly developing scientific field that utilizes computer technology to improve the quality and safety of patient care. This program incorporates the sub disciplines of clinical and computational informatics; emphasizing the integration of computer science and the impact of clinical outcomes. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project.

The BS in Health Informatics is offered in Klamath Falls, Portland-Metro, and through Oregon Tech Online.

### Program Learning Outcomes

Upon graduating, Health Informatics graduates should be able to:

1. Interpret health systems and policy.
2. Design and implement information systems.
3. Apply statistical concepts to analyze data.

### Career Opportunities

Health Informatics professionals work as quality managers, business intelligence and epic analyst/developers, data analysts, data scientists, and in health care information technology positions. These professionals are called upon to design and use emerging information technologies with the goal of helping providers and patients access and utilize information to provide improved health care.

Health Informatics professionals provide support in clinical decision making, data architecture, application interfacing, clinical analytics, data analysis, systems analysis and project management.

## Student Preparation and Admissions

Students must meet Oregon Tech general admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

**Note:** The Portland-Metro campus is a laptop-required campus. Laptop specifications, financial aid, and helpful instructions may be found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Information Technology

### Degree Offered

- Bachelor of Science in Information Technology

### Objectives

Information Technology powers modern business. This field is interdisciplinary, with applications to all aspects of the economy. Students solve real-

world business problems and gain critical skills and hands-on experience in networking, server administration, programming, databases, information security, and systems analysis. Graduating students are prepared to bridge the technology and management disciplines in their organizations. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project.

The BS in Information Technology is offered in Klamath Falls, Portland-Metro, and through Oregon Tech Online.

## **Program Learning Outcomes**

Upon graduating, Cybersecurity graduates should be able to:

1. Solve business problems through the use of information systems and technology.
2. Design and implement information systems.

## **Career Opportunities**

The BS in Information Technology prepares students for a wide range of professions including accounting information systems, database administration, systems analyst, business systems consultant, network analyst, software applications specialist, PC support technician, technical writer, Web administrator and vendor representative for either hardware- or software-based firms. Equipped with both technical skills and business understanding, Information Technology graduates are uniquely prepared for faster advancement than many of their contemporaries.

## **Student Preparation and Admissions**

Students must meet Oregon Tech general admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

**Note:** The Portland-Metro campus is a laptop-required campus. Laptop specifications, financial aid, and helpful instructions may be found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## **Operations Management**

### **Degree Offered**

- Bachelor of Science in Operations Management

### **Objectives**

Operations Managers coordinate equipment, materials, human capital and information across businesses to profitably meet or exceed customer expectations. Students in Operations Management successfully blend the art of management with applied science through creativity, people skills, rational analysis and application of technology.

Operations Management students develop mastery of concepts, tools, and skills in management sciences and specialties tailored to the industries of interest to the student. Particular emphasis is directed toward development of skills in problem solving, project management, communication, and managing effectively in team-based work environments. Students are also prepared for graduate level education, such as the MBA (Master's in Business Administration) degree. Internship opportunities are available during the senior year. Students will complete a capstone course and a senior project.

The BS in Operations Management is offered in Klamath Falls, Portland-Metro, and through Oregon Tech online.

## **Program Learning Outcomes**

Upon graduating, Cybersecurity graduates should be able to:

1. Apply knowledge of fundamental concepts of operations management.
2. Apply knowledge of approaches to operational performance improvement.

## **Career Opportunities**

The BS in Operations Management prepares students for leadership positions within a wide variety of product and service industries. Initial job titles include: production planner, inventory control analyst, industrial engineer, production supervisor, and quality control manager. Typical departments in which graduates find themselves working are manufacturing, manufacturing engineering, industrial engineering, production control, finance, and quality assurance.



Upon graduation, students should be prepared to address critical issues related to productivity management in a global competitive economy and play leadership roles in the design and implementation of quality control and management programs. They will have mastered a wide array of microcomputer technology and software applications, giving them a competitive edge in the job market.

## **Student Preparation and Admissions**

Students must meet Oregon Tech general admissions requirements. Transfer students must arrange for official transcripts from each college and university attended to be sent to Oregon Tech.

**Note:** The Portland-Metro campus is a laptop-required campus. Laptop specifications, financial aid, and helpful instructions may be found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## **Technology and Management**

### **Degree Offered**

- Bachelor of Applied Science in Technology and Management

### **Objectives**

The Bachelor of Applied Science (BAS) in Technology and Management provides a path to a bachelor's degree for those students who have completed a technical Associate of Applied Science (AAS) or Associate of Science (AS) degree from an accredited institution recognized by the Council for Higher Education (CHEA) and are seeking career advancement into management or in their technical career fields. The BAS builds on a core of 60 credits of career and technical education (CTE) courses taken as part of the AAS or AS degree, adding 65 credits of business, management, and information technology courses and 55 credits of broad-based general education courses to enable the BAS graduate to advance in the workplace or continue on to graduate school. The management core includes a three-term capstone senior project to enable the student to demonstrate successful integration of technical and managerial coursework.

The BAS in Technology and Management is offered in Klamath Falls, Portland-Metro, and through Oregon Tech online.

### **Program Learning Outcomes**

Upon graduating, Technology and Management graduates should be able to:

1. Apply knowledge of approaches to operational performance improvement.

### **Graduation Requirements**

The BAS in Technology and Management requires 180 credits including 60 upper-division credits and up to 60 lower-division career and technical education (CTE) credits transferred from an AAS or AS degree. In addition, the BAS includes 55 general education credits including 18 credits in communication, 12 credits of social science, 9 credits in humanities, and 16 credits of math and science including 4 credits of mathematics with a prerequisite of intermediate algebra or higher and 4 credits of laboratory science.

Accounting Post Baccalaureate Certificate

## Six Sigma Green Belt Emphasis

The Management Department offers students the opportunity to earn a Six Sigma Green Belt Certificate. The Green Belt Certificate is an emphasis under the BS in Business, Management and Marketing options, the BS in Health Care Management, Administration option, and the BS in Operations Management. In addition to the fundamental management curriculum, the emphasis requires the completion of a Lean/Six Sigma project. Those attaining the emphasis will be well-positioned to work in companies that deploy Lean Six Sigma.

Additionally, employees of companies that deploy Lean Six Sigma may complete the course work and project to obtain their certificate.

Students completing the Six Sigma Green Belt Emphasis must complete the following courses and their prerequisites. Prerequisites may be waived for industry students depending on their individual backgrounds and abilities.

### Courses

BUS 457 - Business Research Methods II Credit Hours: 3

BUS 496 - Senior Project Credit Hours: 3

BUS 497 - Senior Project Credit Hours: 3

MGT 335 - Project Management Credit Hours: 3

MGT 461 - Lean/Six Sigma Management I Credit Hours: 3

MGT 462 - Lean/Six Sigma Management II Credit Hours: 3

MGT 463 - Lean/Six Sigma Management III Credit Hours: 3

**Note:** It should be noted that for OM majors, all of these courses are currently in the curriculum map. No additional coursework is required. With approval, the student's senior project may also be considered for the Six Sigma Green Belt Certificate.

## Renewable Energy Management Emphasis

The Management Department offers students the opportunity to complete a Renewable Energy Management emphasis under the BS in Business, Management option or the BS in Operations Management. In addition to the fundamental management curriculum, the emphasis requires additional coursework in chemistry, management information systems, humanities, history, and economics. Those attaining the emphasis will be prepared to successfully integrate skills in the social, environmental, economic, business and management aspects of energy management.

### Requirement of Emphasis

CHE 201 - General Chemistry I Credit Hours: 3

CHE 204 - General Chemistry I Lab Credit Hours: 1

or

PHY 201 - General Physics Credit Hours: 4

ECO 357 - Energy Economics & Policy Credit Hours: 3

HIST 356 - A History of Energy Credit Hours: 3

HUM 125 - Intro Tech, Soc, Value Credit Hours: 3

MATH 112 - Trigonometry Credit Hours: 4

MIS 115 - Visual BASIC Programming Credit Hours: 4

MGT 212 - Fund of Renewable Energy Mgt Credit Hours: 3

REE 201 - Intro to Renewable Energy Credit Hours: 3

## Accounting Post Baccalaureate Certificate

This certificate is available to students who have a baccalaureate degree and are continuing their education in accounting. Completion of the certificate will allow students to meet the requirements for admission to the Certified Public Accountant (CPA) exam and prepare them for a variety of career paths including CPA and Certified Management Accountant (CMA).

### Required Courses (32 credits)

ACC 320 - Cost Accounting I Credit Hours: 4

ACC 331 - Intern Accounting I Credit Hours: 4

ACC 332 - Intern Accounting II Credit Hours: 4

ACC 333 - Intern Accounting III Credit Hours: 4

ACC 405 - Accounting Info Sys Credit Hours: 4

ACC 411 - Income Tax Procedures Credit Hours: 4

ACC 431 - Advanced Accounting I Credit Hours: 4

ACC 435 - Auditing Credit Hours: 4

### Elective Courses

(Choose at least 15 credits from the following courses)

ACC 321 - Cost Accounting II Credit Hours: 4

ACC 325 - Finance Credit Hours: 4

ACC 412 - Corporate Taxation Credit Hours: 4

ACC 432 - Advanced Accounting II Credit Hours: 4

ACC 465 - Case Studies in Accounting Credit Hours: 4

BUS 226 - Business Law Credit Hours: 3

BUS 345 - Fraud Examination Credit Hours: 3

MIS 312 - Systems Analysis I Credit Hours: 4

**Note:** At least 36 credits must be taken at Oregon Tech

# Accounting, BS

The Accounting degree is designed to prepare students for careers in public or private accounting. Students become familiar with computerized accounting applications and skilled in the principles of tax, financial, and cost accounting. Upon graduation students selecting this option should have sufficient knowledge to sit for the Certified Public Accountant (CPA) and the Certified Management Accountant (CMA) exams.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

BUS 215 - Principles of Management Credit Hours: 3

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Winter

ECO 201 - Principles of Microeconomics Credit Hours: 3

MIS 102 - Spreadsheet Software Lab Credit Hours: 1

SPE 111 - Public Speaking Credit Hours: 4

Elective Credit Hours: 3

Lab Science Elective Credit Hours: 4

**Total: 15 Credit Hours**

### Spring

ECO 202 - Principles of Macroeconomics Credit Hours: 3

BUS 223 - Marketing I Credit Hours: 3

Humanities Elective Credit Hours: 3

Social Science Elective Credit Hours: 3

Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4

Elective Credit Hours: 3

COM Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Winter

ACC 202 - Prin of Accounting II Credit Hours: 4

BUS 226 - Business Law Credit Hours: 3

Elective Credit Hours: 3

Elective Credit Hours: 3

COM Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4

ACC 205 - Computerized Accounting Credit Hours: 4

MIS 275 - Intro to Relational Databases Credit Hours: 4

Math/Science Elective Credit Hours: 4

**Total: 15 Credit Hours**

### Junior Year Fall

ACC 331 - Interm Accounting I Credit Hours: 4

**Total for a B.S. in Accounting: 180/183 Credit Hours**

BUS 308 - Prin of International Business Credit Hours: 3

BUS 356 - Business Presentations Credit Hours: 4

MGT 321 - Operations Management I Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

**Total: 17 Credit Hours**

### Winter

ACC 320 - Cost Accounting I Credit Hours: 4

ACC 325 - Finance Credit Hours: 4

ACC 332 - Interm Accounting II Credit Hours: 4

WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 16 Credit Hours**

### Spring

ACC 321 - Cost Accounting II Credit Hours: 4

ACC 333 - Interm Accounting III Credit Hours: 4

ACC 405 - Accounting Info Sys Credit Hours: 4

MGT 335 - Project Management Credit Hours: 3

**Total: 15 Credit Hours**

### Senior Year Fall

ACC 411 - Income Tax Procedures Credit Hours: 4

ACC 435 - Auditing Credit Hours: 4

ACC 496 - Senior Project Credit Hours: 3

PHIL 342 - Business Ethics Credit Hours: 3

or

PHIL 331 - Ethics in the Professions Credit Hours: 3

**Total: 14 Credit Hours**

### Winter

ACC 412 - Corporate Taxation Credit Hours: 4

ACC 431 - Advanced Accounting I Credit Hours: 4

ACC 497 - Senior Project Credit Hours: 3

BUS 349 - Human Resource Management I Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

ACC 432 - Advanced Accounting II Credit Hours: 4

ACC 465 - Case Studies in Accounting Credit Hours: 4

or

BUS 478 - Strategic Management Credit Hours: 3

Elective Credit Hours: 3/4

MIS 375 - Decision Support Systems Credit Hours: 3

**Total: 13/15 Credit Hours**

## **Business Minor**

The Minor in Business recognizes the achievement of 21 to 24 credits in business and other courses related to the student's chosen profession. Some of the courses may be included in the student's requirements for a bachelor's degree from Oregon Tech. The Minor in Business may prove valuable to a technical or healthcare student who ventures into management or consulting in his or her career field. It may enhance employability and improve graduate school possibilities. This minor is open to all majors except Business, Health Care Management, Operations Management, and Technology and Management.

### **Requirements of Minor:**

ACC 201 - Prin of Accounting I Credit Hours: 4

BUS 215 - Principles of Management Credit Hours: 3

or

BUS 304 - Engineering Management Credit Hours: 3

or

BUS 317 - Health Care Management Credit Hours: 3

BUS 223 - Marketing I Credit Hours: 3

or

BUS 337 - Prin of Health Care Marketing Credit Hours: 3

BUS 226 - Business Law Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

### **Elective Courses:**

BUS 313 - Health Care Systems & Policy Credit Hours: 3

BUS 314 - Entrepreneurship I Credit Hours: 3

BUS 318 - Marketing II Credit Hours: 3

BUS 349 - Human Resource Management I Credit Hours: 3

BUS 356 - Business Presentations Credit Hours: 4

BUS 441 - Leadership I Credit Hours: 3

DH 465 - Independent Dental Hygiene Practice Credit Hours: 3

MGT 321 - Operations Management I Credit Hours: 3

MGT 335 - Project Management Credit Hours: 3

MIS 311 - Intro to Systems Analysis Credit Hours: 3

SOC 305 - Rural Health Credit Hours: 3

or

SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3

PSY 410 - Organiz Change/Develop Credit Hours: 3

**Note:** A passing grade and a cumulative GPA of 2.0 or better in the business minor courses is required. Students are encouraged to consult with a Management Department advisor to select business courses that would be most applicable to their major and/or career goals.

## Business, Management Option, BS

Students selecting the management option will equip themselves to be managers with complete understanding of all aspects of a business. This option provides students with an array of paths to build just the right business tool box to meet their professional goals including business analytics, innovation and entrepreneurship or a customized path.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

BUS 215 - Principles of Management Credit Hours: 3

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Laboratory Science Elective Credit Hours: 4

Psychology Elective Hours: 3

**Total: 18 Credit Hours**

#### Winter

BUS 223 - Marketing I Credit Hours: 3

ECO 201 - Principles of Microeconomics Credit Hours: 3

MIS 102 - Spreadsheet Software Lab Credit Hours: 1

SPE 111 - Public Speaking Credit Hours: 4

Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Spring

ECO 202 - Principles of Macroeconomics Credit Hours: 3

MIS 206 - Intro to Mgmt Info Sys Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4

or

MATH 243 - Introductory Statistics Credit Hours: 4

MIS 113 - Intro to Database Systems Credit Hours: 3

or

MIS 275 - Intro to Relational Databases Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 14/15 Credit Hours**

#### Winter

BUS 226 - Business Law Credit Hours: 3

BUS 349 - Human Resource Management I Credit Hours: 3

PHIL 331 - Ethics in the Professions Credit Hours: or

PHIL 342 - Business Ethics Credit Hours: 3

Program Elective Credit Hours: 3

Math/Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4

BUS 456 - Business Research Methods Credit Hours: 3

MIS 375 - Decision Support Systems Credit Hours: 3

Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Junior Year Fall

BUS 467 - Service Management Credit Hours: 3

GIS 207 - Seminar Credit Hours: 1

MGT 321 - Operations Management I Credit Hours: 3

MGT 421 - Quality Management Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 13 Credit Hours**

#### Winter

ACC 325 - Finance Credit Hours: 4

BUS 307 - Seminar Credit Hours: 3

BUS 356 - Business Presentations Credit Hours: 4

MIS 334 - Business Analytics Credit Hours: 4

Communication Elective Credit Hours: 3

**Total: 18 Credit Hours**

#### Spring

BUS 390 - Applied Management Internship Credit Hours: 3  
or

BUS Elective Credit Hours: 3

MGT 335 - Project Management Credit Hours: 3

Elective Credit Hours: 3

Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Senior Year Fall

BUS 308 - Prin of International Business Credit Hours: 3

BUS 441 - Leadership I Credit Hours: 3

BUS 457 - Business Research Methods II Credit Hours: 3

BUS 495 - Senior Project Proposal Credit Hours: 3

MGT 461 - Lean/Six Sigma Management I Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

ANTH 452 - Globalization Credit Hours: 3

or

HIST 452 - Globalization & Pac NW Credit Hours: 3

BUS 496 - Senior Project Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BUS 478 - Strategic Management Credit Hours: 3

BUS 497 - Senior Project Credit Hours: 3

Elective Credit Hours: 3

Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 15 Credit Hours**

## **Program Electives**

ACC 205 - Computerized Accounting Credit Hours: 4  
ART 315 - Design Thinking Credit Hours: 3  
BUS 101 - Introduction to Business Credit Hours: 3  
BUS 107 - Seminar Credit Hours: 15  
BUS 256 - Business Communications Credit Hours: 3  
BUS 314 - Entrepreneurship I Credit Hours: 3  
BUS 318 - Marketing II Credit Hours: 3  
BUS 319 - Integrated Marketing Comm. Credit Hours: 3  
BUS 326 - Sales/Sales Management Credit Hours: 3  
BUS 335 - Entrepreneurship II Credit Hours: 3  
BUS 390 - Applied Management Internship Credit Hours: 3  
BUS 399 - Marketing Special Topics Credit Hours: 3  
BUS 434 - Global Marketing Credit Hours: 3  
BUS 447 - Controversial Issues in Mgmt Credit Hours: 3  
COM 237 - Intro to Visual Communication Credit Hours: 3  
COM 248 - Digital Media Production Credit Hours: 3  
COM 256 - Public Relations Credit Hours: 3  
COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3  
GIS 134 - Geographic Info Systems Credit Hours: 3  
MGT 462 - Lean/Six Sigma Management II Credit Hours: 3  
MGT 463 - Lean/Six Sigma Management III Credit Hours: 3  
MIS 118 - Intro to Programming in C# Credit Hours: 4  
MIS 225 - Business on the Internet Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4  
MIS 344 - Business Intelligence Credit Hours: 3  
MIS 446 - Data Mining Credit Hours: 3  
WRI 350 - Documentation Develop Credit Hours: 3

**Total for a B.S. in Business, Management Option: 185/186 Credit Hours**

## Business, Marketing Option, BS

The marketing option provides students with a broad business education and includes a strong emphasis in modern marketing concepts and practices. This degree option focuses on data-driven analytical skills sought by employers including social media and digital marketing. Students learn to analyze an organization's activities to develop and implement a marketing strategy. Marketing graduates enjoy careers in advertising, marketing research, social media marketing, distribution, and sales.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

BUS 215 - Principles of Management Credit Hours: 3

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Laboratory Science Elective Credit Hours: 4

**Total: 15 Credit Hours**

BUS 467 - Service Management Credit Hours: 3

GIS 207 - Seminar Credit Hours: 1

MGT 321 - Operations Management I Credit Hours: 3

Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

BUS 223 - Marketing I Credit Hours: 3

ECO 201 - Principles of Microeconomics Credit Hours: 3

MIS 102 - Spreadsheet Software Lab Credit Hours: 1

PSY 201 - Psychology Credit Hours: 3

SPE 111 - Public Speaking Credit Hours: 4

**Total: 14 Credit Hours**

#### Winter

ACC 325 - Finance Credit Hours: 4

BUS 226 - Business Law Credit Hours: 3

BUS 307 - Seminar Credit Hours: 3

Communication Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

ECO 202 - Principles of Macroeconomics Credit Hours: 3

MIS 206 - Intro to Mgmt Info Sys Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

BUS 390 - Applied Management Internship Credit Hours: 3  
or

BUS Elective Credit Hours: 3

BUS 435 - Marketing III Credit Hours: 3

BUS 473 - Marketing Plan Development Credit Hours: 3

MGT 335 - Project Management Credit Hours: 3

Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4

MATH 361 - Statistical Methods I Credit Hours: 4

MIS 113 - Intro to Database Systems Credit Hours: 3

or

MIS 275 - Intro to Relational Databases Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 14/15 Credit Hours**

#### Senior Year Fall

BUS 308 - Prin of International Business Credit Hours: 3

BUS 414 - Marketing Research Credit Hours: 3

or

BUS 457 - Business Research Methods II Credit Hours: 3

BUS 441 - Leadership I Credit Hours: 3

BUS 495 - Senior Project Proposal Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

BUS 256 - Business Communications Credit Hours: 3

BUS 318 - Marketing II Credit Hours: 3

BUS 349 - Human Resource Management I Credit Hours: 3

MATH 371 - Finite Math/Calc I Credit Hours: 4

PHIL 331 - Ethics in the Professions Credit Hours: 3

or

PHIL 342 - Business Ethics Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

ANTH 452 - Globalization Credit Hours: 3

BUS 356 - Business Presentations Credit Hours: 4

BUS 496 - Senior Project Credit Hours: 3

Elective Credit Hours: 3

Program Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4

BUS 456 - Business Research Methods Credit Hours: 3

MIS 225 - Business on the Internet Credit Hours: 4

MIS 375 - Decision Support Systems Credit Hours: 3

**Total: 14 Credit Hours**

#### Spring

BUS 478 - Strategic Management Credit Hours: 3

BUS 497 - Senior Project Credit Hours: 3

Program Elective Credit Hours: 3

Program Elective Credit Hours: 3

Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Junior Year Fall

BUS 319 - Integrated Marketing Comm. Credit Hours: 3

## **Program Electives**

ACC 205 - Computerized Accounting Credit Hours: 4  
ART 215 - Design Arts and Aesthetics Credit Hours: 3  
ART 226 - Digital Photography Credit Hours: 3  
ART 315 - Design Thinking Credit Hours: 3  
BUS 107 - Seminar Credit Hours: 15  
BUS 314 - Entrepreneurship I Credit Hours: 3  
BUS 326 - Sales/Sales Management Credit Hours: 3  
BUS 335 - Entrepreneurship II Credit Hours: 3  
BUS 390 - Applied Management Internship Credit Hours: 3  
BUS 399 - Marketing Special Topics Credit Hours: 3  
BUS 434 - Global Marketing Credit Hours: 3  
BUS 447 - Controversial Issues in Mgmt Credit Hours: 3  
COM 237 - Intro to Visual Communication Credit Hours: 3  
COM 248 - Digital Media Production Credit Hours: 3  
COM 256 - Public Relations Credit Hours: 3  
COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3  
GIS 134 - Geographic Info Systems Credit Hours: 3  
MGT 461 - Lean/Six Sigma Management I Credit Hours: 3  
MGT 462 - Lean/Six Sigma Management II Credit Hours: 3  
MGT 463 - Lean/Six Sigma Management III Credit Hours: 3  
MIS 118 - Intro to Programming in C# Credit Hours: 4  
MIS 334 - Business Analytics Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4  
MIS 344 - Business Intelligence Credit Hours: 3  
MIS 446 - Data Mining Credit Hours: 3  
WRI 350 - Documentation Develop Credit Hours: 3

**Total for a B.S. in Business, Marketing Option: 182/183 Credit Hours**



## Cybersecurity, BS

The BS in Cybersecurity provides students with the knowledge and skills necessary to competently scan, assess, report, and mitigate cybersecurity threats, vulnerabilities, and exploits on information systems and technology. A graduate of the BS in Cybersecurity program is prepared to assess the security needs of computer and network systems, recommend safeguard solutions, and manage the implementation and maintenance of security devices, systems, and procedures. Includes instruction in computer architecture, scripting, systems analysis, networking, cryptography, security system design, applicable law and regulations, risk assessment and policy analysis, contingency planning, user access issues, investigation techniques, and troubleshooting.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

MATH 111 - College Algebra Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Laboratory Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

CYB 201 - Cybersecurity Fundamentals Credit Hours: 3  
ECO 201 - Principles of Microeconomics Credit Hours: 3  
MATH 112 - Trigonometry Credit Hours: 4  
MIS 102 - Spreadsheet Software Lab Credit Hours: 1  
MIS 145 - Intro to PC Hardware/Software Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

BUS 215 - Principles of Management Credit Hours: 3  
MIS 251 - Networking I Credit Hours: 4  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
MIS 285 - Python Programming Credit Hours: 4

**Total: 15 Credit Hours**

#### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4  
MIS 118 - Intro to Programming in C# Credit Hours: 4  
MIS 273 - Systems Administration I Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

BUS 226 - Business Law Credit Hours: 3  
CYB 201 - Cybersecurity Fundamentals Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4  
MIS 218 - Intermediate Programming in C# Credit Hours: 4  
PHIL 331 - Ethics in the Professions Credit Hours: 3

or

PHIL 342 - Business Ethics Credit Hours: 3

**Total: 17 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4  
ECO 202 - Principles of Macroeconomics Credit Hours: 3  
MGT 335 - Project Management Credit Hours: 3  
MIS 240 - Intro to Linux OS Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 17 Credit Hours**

#### Junior Year Fall

ACC 325 - Finance Credit Hours: 4  
CYB 301 - Hacker Tools and Techniques Credit Hours: 4  
MIS 311 - Intro to Systems Analysis Credit Hours: 3  
MIS 351 - Enterprise Networking Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 18 Credit Hours**

#### Winter

CYB 302 - System Defenses and Incident Response Credit Hours: 4  
MIS 312 - Systems Analysis I Credit Hours: 4  
MIS 334 - Business Analytics Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4  
WRI 327 - Advanced Tech Writing Credit Hours: 3

or

WRI 350 - Documentation Develop Credit Hours: 3

**Total: 19 Credit Hours**

#### Spring

BUS 223 - Marketing I Credit Hours: 3  
CYB 303 - Security Operations and Analysis Credit Hours: 4  
CYB 351 - Network Security Credit Hours: 4  
MIS 322 - Systems Analysis II Credit Hours: 4  
MIS 495 - Senior Project Selection Credit Hours: 1

**Total: 16 Credit Hours**

#### Senior Year Fall

CYB 411 - Managing Risk in Information Systems Credit Hours: 3  
MGT 321 - Operations Management I Credit Hours: 3  
MIS 365 - Cloud Computing Credit Hours: 4  
MIS 496 - Senior Project Management Credit Hours: 3

**Total: 13 Credit Hours**

#### Winter

BUS 349 - Human Resource Management I Credit Hours: 3  
BUS 356 - Business Presentations Credit Hours: 4  
MIS 497 - Senior Project II Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3

**Total: 13 Credit Hours**

#### Spring

ANTH 452 - Globalization Credit Hours: 3  
BUS 478 - Strategic Management Credit Hours: 3  
MIS 498 - Senior Project III Credit Hours: 3  
Humanities Elective Credit Hours: 3

**Total: 12 Credit Hours**

**Total for a B.S. in Cybersecurity: 187 Credit Hours**

# Health Care Management, Administration Option, BS

## Administration Option

This program offers a BS in Health Care Management to students whose interests lie in business and health care administration. The curriculum is designed to prepare the graduate for entry- and mid-level management positions and/or for graduate programs in Health Care Administration, Hospital Administration or Public Health. Based on a core of common management courses, the program builds a broader base of understanding of health care in the U.S. and its systems, policies and challenges. Students selecting the Administration option will complete a Health Informatics Minor as part of their studies. Students will also choose a second minor/series of focused program electives in: Applied Health Data Analytics, Applied Medical Sociology, or Psychology.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

BIO 200 - Medical Terminology Credit Hours: 2  
MATH 111 - College Algebra Credit Hours: 4  
MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
**Total: 13 Credit Hours**

#### Winter

BUS 223 - Marketing I Credit Hours: 3  
or  
BUS 337 - Prin of Health Care Marketing Credit Hours: 3  
ECO 201 - Principles of Microeconomics Credit Hours: 3  
MIS 102 - Spreadsheet Software Lab Credit Hours: 1  
PSY 201 - Psychology Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
**Total: 14 Credit Hours**

#### Spring

ECO 202 - Principles of Macroeconomics Credit Hours: 3  
SOC 204 - Intro to Sociology Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 227 - Technical Report Writing Credit Hours: 4  
Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4  
BIO 103 - Intro to Human Anat & Phys Credit Hours: 4  
or  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
MIS 113 - Intro to Database Systems Credit Hours: 3  
or  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
**Total: 14/15 Credit Hours**

#### Winter

BUS 316 - Total Quality Health Care Credit Hours: 3  
COM 205 - Intercultural Comm Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Program Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4

BUS 317 - Health Care Management Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
Elective Credit Hours: 3  
Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Junior Year Fall

ACC 325 - Finance Credit Hours: 4  
BUS 308 - Prin of International Business Credit Hours: 3  
MGT 321 - Operations Management I Credit Hours: 3  
MIS 445 - Legal/Eth/Soc Iss in HC Tech Credit Hours: 3  
Program Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Winter

BUS 349 - Human Resource Management I Credit Hours: 3  
PHIL 342 - Business Ethics Credit Hours: 3  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
Program Elective Credit Hours: 3  
Program Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Spring

BUS 356 - Business Presentations Credit Hours: 4  
MGT 335 - Project Management Credit Hours: 3  
Humanities Elective Credit Hours: 3  
Program Elective Credit Hours: 3  
Program Elective Credit Hours: 3  
**Total: 16 Credit Hours**

#### Senior Year Fall

BUS 441 - Leadership I Credit Hours: 3  
BUS 457 - Business Research Methods II Credit Hours: 3  
BUS 467 - Service Management Credit Hours: 3  
BUS 495 - Senior Project Proposal Credit Hours: 3  
MIS 345 - Health Care Info Systms Mgmt Credit Hours: 3  
**Total: 15 Credit Hours**

#### Winter

BUS 496 - Senior Project Credit Hours: 3  
MIS 357 - Info & Comm Systs in Hlth Care Credit Hours: 3  
Elective Credit Hours: 3  
Elective Credit Hours: 3  
Program Elective Credit Hours: 3  
**Total: 15 Credit Hours**

**Spring**

BUS 478 - Strategic Management Credit Hours: 3  
BUS 497 - Senior Project Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3

Elective Credit Hours: 3  
Program Elective Credit Hours: 3  
**Total: 15 Credit Hours**

**Program Electives**

Students may choose to mix and match these.

**Health Data Analytics Track:**

MIS 118 - Intro to Programming in C# Credit Hours: 4  
MIS 334 - Business Analytics Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4  
MIS 344 - Business Intelligence Credit Hours: 3  
MIS 446 - Data Mining Credit Hours: 3  
BUS Elective Credit Hours: 3  
COM Elective Credit Hours: 3

**Medical Sociology Track:**

BUS 256 - Business Communications Credit Hours: 3  
BUS 397 - Human Resource Management II Credit Hours: 3  
BUS 442 - Leadership II Credit Hours: 3  
COM 346 - Health Communication Credit Hours: 3  
PSY 336 - Health Psychology I Credit Hours: 3  
SOC 325 - Global Population Health Credit Hours: 3  
SOC 335 - Hlth Inequal & Cult Competency Credit Hours: 3  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

**Psychology Track:**

PSY 202 - Psychology Credit Hours: 3  
PSY 203 - Psychology Credit Hours: 3  
BUS Elective Credit Hours: 3  
COM Elective Credit Hours: 3  
Lower/Upper PSY Elective Credit Hours: 3  
Upper Division Elective Credit Hours: 3  
Upper Division PSY Elective Credit Hours: 3  
Upper Division PSY Elective Credit Hours: 3

**Total for a B.S. in Health Care Management, Administration Option: 182/183 Credit Hours**

# Health Care Management, Clinical Option, BS

## Clinical Option

This program bridges two disciplines; Allied Health and Management. The clinical option requires a current state and/or national registry, license or certificate in an approved allied health field. The degree prepares Allied Health professionals for advancement to management or supervisory roles.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Prior Learning

Registry Transfer Credits Credit Hours: 44

#### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4

BIO 103 - Intro to Human Anat & Phys Credit Hours: 4

or

BIO 231 - Human Anatomy/Physiology I Credit Hours: 4

SPE 111 - Public Speaking Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

MATH 111 - College Algebra Credit Hours: 4

MIS 102 - Spreadsheet Software Lab Credit Hours: 1

Elective Credit Hours: 3

Math/Science Elective Credit Hours: 4

**Total: 12 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4

BUS 226 - Business Law Credit Hours: 3

BUS 317 - Health Care Management Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Junior Year Fall

ACC 325 - Finance Credit Hours: 4

BUS 308 - Prin of International Business Credit Hours: 3

BUS 313 - Health Care Systems & Policy Credit Hours: 3

MIS 113 - Intro to Database Systems Credit Hours: 3

PSY 201 - Psychology Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

BIO 200 - Medical Terminology Credit Hours: 2

BUS 349 - Human Resource Management I Credit Hours: 3

ECO 201 - Principles of Microeconomics Credit Hours: 3

MATH 243 - Introductory Statistics Credit Hours: 4

**Total for a B.S. in Health Care Management, Clinical Option: 181 Credit Hours**

or

MATH 361 - Statistical Methods I Credit Hours: 4

PHIL 331 - Ethics in the Professions Credit Hours: 3

or

PHIL 342 - Business Ethics Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BUS 356 - Business Presentations Credit Hours: 4

BUS 223 - Marketing I Credit Hours: 3

or

BUS 337 - Prin of Health Care Marketing Credit Hours: 3

ECO 202 - Principles of Macroeconomics Credit Hours: 3

MGT 335 - Project Management Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 16 Credit Hours**

#### Senior Year Fall

BUS 441 - Leadership I Credit Hours: 3

BUS 457 - Business Research Methods II Credit Hours: 3

BUS 467 - Service Management Credit Hours: 3

BUS 495 - Senior Project Proposal Credit Hours: 3

MIS 345 - Health Care Info Systms Mgmt Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

BUS 316 - Total Quality Health Care Credit Hours: 3

BUS 496 - Senior Project Credit Hours: 3

COM 205 - Intercultural Comm Credit Hours: 3

Upper Division Elective Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BUS 478 - Strategic Management Credit Hours: 3

BUS 497 - Senior Project Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

WRI 410 - Proposal & Grant Writing Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15 Credit Hours**

# Health Care Management, Radiological Science Management Option, BS

This program offers a BS in Health Care Management to students who hold a current registry through the American Registry of Radiologic Technologists (ARRT) and who wish to enhance their career by obtaining a management degree with emphasis on management of a medical imaging facility or department. It is designed for the radiologic technologist seeking skills and credentials that enable advancement to positions of middle management.

The BS degree in Health Care Management, Radiologic Science Management Option is fully online with no requirement to come to campus and does not require clinical practice involving patient contact.

## Curriculum

This curriculum map is arranged in the typical term by term format; however, online degree completion students should consult with their academic advisor regarding course scheduling.

### Prior Learning

Registry Transfer Credits Credit Hours: 89

### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4  
MIS 102 - Spreadsheet Software Lab Credit Hours: 1  
MIS 113 - Intro to Database Systems Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4

**Total: 12 Credit Hours**

### Winter

BIO 200 - Medical Terminology Credit Hours: 2  
MATH 111 - College Algebra Credit Hours: 4  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4

**Total: 13 Credit Hours**

### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4  
BUS 223 - Marketing I Credit Hours: 3  
or  
BUS 337 - Prin of Health Care Marketing Credit Hours: 3  
ECO 201 - Principles of Microeconomics Credit Hours: 3  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 14 Credit Hours**

### Junior Year Fall

ACC 325 - Finance Credit Hours: 4  
BIO 103 - Intro to Human Anat & Phys Credit Hours: 4  
or  
BIO 231 - Human Anatomy/Physiology I Credit Hours: 4  
BUS 313 - Health Care Systems & Policy Credit Hours: 3  
MATH 243 - Introductory Statistics Credit Hours: 4  
or  
MATH 361 - Statistical Methods I Credit Hours: 4

**Total: 15 Credit Hours**

### Winter

ECO 202 - Principles of Macroeconomics Credit Hours: 3

**Total for a B.S. in Health Care Management, Radiologic Science Option: 205 Credit Hours**

PSY 201 - Psychology Credit Hours: 3

or

PSY 202 - Psychology Credit Hours: 3

or

PSY 203 - Psychology Credit Hours: 3

Math/Science Elective Credit Hours: 4

Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Spring

BUS 226 - Business Law Credit Hours: 3

BUS 317 - Health Care Management Credit Hours: 3

BUS 356 - Business Presentations Credit Hours: 4

MGT 335 - Project Management Credit Hours: 3

**Total: 13 Credit Hours**

### Senior Year Fall

BUS 308 - Prin of International Business Credit Hours: 3

BUS 457 - Business Research Methods II Credit Hours: 3

BUS 495 - Senior Project Proposal Credit Hours: 3

MIS 345 - Health Care Info Systms Mgmt Credit Hours: 3

**Total: 12 Credit Hours**

### Winter

BUS 316 - Total Quality Health Care Credit Hours: 3

BUS 496 - Senior Project Credit Hours: 3

PHIL 331 - Ethics in the Professions Credit Hours: 3

or

PHIL 342 - Business Ethics Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

**Total: 12 Credit Hours**

### Spring

BUS 478 - Strategic Management Credit Hours: 3

BUS 497 - Senior Project Credit Hours: 3

WRI 410 - Proposal & Grant Writing Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 12 Credit Hours**

## **Health Informatics Minor**

The Minor in Health Informatics may prove valuable to allied health students who will likely be expected to interact with technology in their profession. The minor exposes students to the database systems, health information systems, management processes and data used to improve efficiencies and patient care.

### **Requirements of Minor**

BUS 313 - Health Care Systems & Policy Credit Hours: 3

BUS 317 - Health Care Management Credit Hours: 3

MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3

MIS 275 - Intro to Relational Databases Credit Hours: 4

MIS 345 - Health Care Info Systms Mgment Credit Hours: 3

MIS 357 - Info & Comm Systs in Hlth Care Credit Hours: 3

**Note:** Not all courses are offered every year or on every campus. Additional prerequisites may be required; see catalog descriptions and recent course schedules for details.

# Health Informatics, BS

Health Informatics is a rapidly developing scientific field that utilizes computer technology to improve the quality and safety of patient care. This program incorporates the sub disciplines of clinical and computational informatics; emphasizing the integration of computer science and the impact of clinical outcomes.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

MATH 111 - College Algebra Credit Hours: 4  
MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

### Winter

BIO 200 - Medical Terminology Credit Hours: 2  
ECO 201 - Principles of Microeconomics Credit Hours: 3  
MIS 102 - Spreadsheet Software Lab Credit Hours: 1  
MIS 145 - Intro to PC Hardware/Software Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

### Spring

BUS 317 - Health Care Management Credit Hours: 3  
ECO 202 - Principles of Macroeconomics Credit Hours: 3  
MIS 251 - Networking I Credit Hours: 4  
MIS 275 - Intro to Relational Databases Credit Hours: 4

**Total: 14 Credit Hours**

### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4  
MATH 361 - Statistical Methods I Credit Hours: 4  
MIS 118 - Intro to Programming in C# Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

BUS 223 - Marketing I Credit Hours: 3  
or  
BUS 337 - Prin of Health Care Marketing Credit Hours: 3  
MATH 362 - Statistical Methods II Credit Hours: 4  
MIS 218 - Intermediate Programming in C# Credit Hours: 4  
MIS 357 - Info & Comm Sys in Hlth Care Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4  
BIO 103 - Intro to Human Anat & Phys Credit Hours: 4  
MGT 335 - Project Management Credit Hours: 3  
SOC 225 - Medical Sociology Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 17 Credit Hours**

### Junior Year Fall

ACC 325 - Finance Credit Hours: 4

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
BUS 356 - Business Presentations Credit Hours: 4  
MIS 311 - Intro to Systems Analysis Credit Hours: 3  
General Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Winter

MIS 312 - Systems Analysis I Credit Hours: 4  
MIS 334 - Business Analytics Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4  
General Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

BUS 316 - Total Quality Health Care Credit Hours: 3  
MIS 322 - Systems Analysis II Credit Hours: 4  
MIS 344 - Business Intelligence Credit Hours: 3  
MIS 442 - Adv Database App Programming Credit Hours: 4  
MIS 495 - Senior Project Selection Credit Hours: 1

**Total: 15 Credit Hours**

### Senior Year Fall

BUS 457 - Business Research Methods II Credit Hours: 3  
MIS 345 - Health Care Info Sysms Mgmt Credit Hours: 3  
MIS 445 - Legal/Eth/Soc Iss in HC Tech Credit Hours: 3  
MIS 496 - Senior Project Management Credit Hours: 3  
Elective Credit Hours: 3

**Total: 15 Credit Hours**

### Winter

ANTH 452 - Globalization Credit Hours: 3  
MIS 497 - Senior Project II Credit Hours: 3  
PHIL 305 - Medical Ethics Credit Hours: 3  
or  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
or  
PHIL 342 - Business Ethics Credit Hours: 3  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

### Spring

BUS 478 - Strategic Management Credit Hours: 3  
MIS 446 - Data Mining Credit Hours: 3  
MIS 498 - Senior Project III Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3  
WRI 410 - Proposal & Grant Writing Credit Hours: 3

**Total: 15 Credit Hours**

**Total for a B.S. in Health Informatics: 182 Credit Hours**

## **Information Technology Minor**

The Information Technology (IT) Minor recognizes the achievement of 27 credits in technical courses. Some of the courses may be included in the student's requirements for a bachelor's degree from Oregon Tech. The IT minor may prove valuable to management or technical students who want to demonstrate that they have additional skills in management information systems and information technology areas; enhancing employability and improving graduate school possibilities. The minor is open to all majors except Information Technology, Cybersecurity, and Health Informatics.

### **Requirements of Minor:**

MIS 118 - Intro to Programming in C# Credit Hours: 4  
MIS 145 - Intro to PC Hardware/Software Credit Hours: 4  
MIS 275 - Intro to Relational Databases Credit Hours: 4  
MIS 311 - Intro to Systems Analysis Credit Hours: 3  
MIS 312 - Systems Analysis I Credit Hours: 4

### **Elective Courses:**

Choose two electives (8 credits) from the following list:

MIS 218 - Intermediate Programming in C# Credit Hours: 4  
MIS 251 - Networking I Credit Hours: 4  
MIS 273 - Systems Administration I Credit Hours: 4  
MIS 334 - Business Analytics Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4



# Information Technology, BS

Information Technology powers modern business. This field is interdisciplinary, with applications to all aspects of the economy. Students solve real-world business problems and gain critical skills and hands-on experience in networking, server administration, programming, databases, information security, and systems analysis. Graduating students are prepared to bridge the technology and management disciplines in their organizations.

## Curriculum

Required courses and recommended terms during which they should be taken:

### Freshman Year Fall

MATH 111 - College Algebra Credit Hours: 4  
SPE 111 - Public Speaking Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Laboratory Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

ECO 201 - Principles of Microeconomics Credit Hours: 3  
MIS 102 - Spreadsheet Software Lab Credit Hours: 1  
MIS 145 - Intro to PC Hardware/Software Credit Hours: 4  
PHIL 205 - Introduction to Logic Credit Hours: 3  
Humanities Elective Credit Hours: 3

**Total: 14 Credit Hours**

### Spring

BUS 215 - Principles of Management Credit Hours: 3  
ECO 202 - Principles of Macroeconomics Credit Hours: 3  
MIS 251 - Networking I Credit Hours: 4  
MIS 275 - Intro to Relational Databases Credit Hours: 4

**Total: 14 Credit Hours**

### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4  
MIS 118 - Intro to Programming in C# Credit Hours: 4  
MIS 273 - Systems Administration I Credit Hours: 4  
WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 16 Credit Hours**

### Winter

BUS 223 - Marketing I Credit Hours: 3  
CYB 201 - Cybersecurity Fundamentals Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4  
MIS 218 - Intermediate Programming in C# Credit Hours: 4  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
or  
PHIL 342 - Business Ethics Credit Hours: 3

**Total: 17 Credit Hours**

### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4  
MATH 362 - Statistical Methods II Credit Hours: 4  
MGT 335 - Project Management Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3  
Elective Credit Hours: 3

**Total: 17 Credit Hours**

### Junior Year Fall

ACC 325 - Finance Credit Hours: 4  
MIS 311 - Intro to Systems Analysis Credit Hours: 3  
Focused Sequence Elective Credit Hours: 4<sup>a</sup>  
Focused Sequence Elective Credit Hours: 4<sup>a</sup>

**Total: 15 Credit Hours**

### Winter

MIS 312 - Systems Analysis I Credit Hours: 4  
MIS 334 - Business Analytics Credit Hours: 4  
MIS 341 - Relational Database Design I Credit Hours: 4  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
or  
WRI 350 - Documentation Develop Credit Hours: 3

**Total: 15 Credit Hours**

### Spring

BUS 226 - Business Law Credit Hours: 3  
MIS 322 - Systems Analysis II Credit Hours: 4  
MIS 495 - Senior Project Selection Credit Hours: 1  
Elective Credit Hours: 3  
Focused Sequence Elective Credit Hours: 4<sup>a</sup>

**Total: 15 Credit Hours**

### Senior Year Fall

CYB 411 - Managing Risk in Information Systems Credit Hours: 3  
MGT 321 - Operations Management I Credit Hours: 3  
MIS 496 - Senior Project Management Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3  
Focused Sequence Elective Credit Hours: 4<sup>a</sup>

**Total: 16 Credit Hours**

### Winter

BUS 349 - Human Resource Management I Credit Hours: 3  
BUS 356 - Business Presentations Credit Hours: 4  
MIS 497 - Senior Project II Credit Hours: 3  
Focused Sequence Elective Credit Hours: 4<sup>a</sup>

**Total: 14 Credit Hours**

### Spring

ANTH 452 - Globalization Credit Hours: 3  
or  
HIST 452 - Globalization & Pac NW Credit Hours: 3  
BUS 478 - Strategic Management Credit Hours: 3  
MIS 498 - Senior Project III Credit Hours: 3  
Focused Sequence Elective Credit Hours: 4<sup>a</sup>

**Total: 13 Credit Hours**

**Total for a B.S. in Information Technology: 182 Credit Hours**

<sup>a</sup> Students will select a 24-unit track listed as their focus elective sequence and will complete a senior project related to the track chosen.

## **Focused Electives**

### **Business Application Programming**

MIS 280 - Web Development Fundamentals Credit Hours: 4  
MIS 285 - Python Programming Credit Hours: 4  
MIS 442 - Adv Database App Programming Credit Hours: 4  
Programming Elective Credit Hours: 4  
Programming Elective Credit Hours: 4  
Programming Elective Credit Hours: 4

### **Data Administration and Architecture**

MIS 280 - Web Development Fundamentals Credit Hours: 4  
MIS 344 - Business Intelligence Credit Hours: 3  
MIS 365 - Cloud Computing Credit Hours: 4  
MIS 441 - Big Data Credit Hours: 4  
MIS 442 - Adv Database App Programming Credit Hours: 4  
MIS 446 - Data Mining Credit Hours: 3  
Elective Credit Hours: 1  
Elective Credit Hours: 1

### **Data Infrastructure and Networking**

CYB 351 - Network Security Credit Hours: 4  
MIS 240 - Intro to Linux OS Credit Hours: 4  
MIS 285 - Python Programming Credit Hours: 4  
MIS 351 - Enterprise Networking Credit Hours: 4  
MIS 365 - Cloud Computing Credit Hours: 4  
MIS 441 - Big Data Credit Hours: 4

### **Health Informatics (Includes HI Minor)**

BUS 313 - Health Care Systems & Policy Credit Hours: 3  
MIS 255 - Health Informatics Cpts & Prct Credit Hours: 3  
MIS 344 - Business Intelligence Credit Hours: 3  
MIS 345 - Health Care Info Systms Mgmt Credit Hours: 3  
MIS 357 - Info & Comm Systs in Hlth Care Credit Hours: 3  
MIS 446 - Data Mining Credit Hours: 3  
STAT 414 - Stat Methods in Epidemiology Credit Hours: 4  
Elective Credit Hours: 1  
Elective Credit Hours: 1

## **Innovation & Entrepreneurship Minor**

The minor in Innovation & Entrepreneurship (I&E) is designed to equip students with the skills needed to work in or with innovative organizations, presenting innovation and entrepreneurship as an iterative process that originates with ideation and integrates business evaluation of concepts intended to either solve a problem or bring about desired change. Focus is on the entrepreneurial mindset.

The I&E minor may be completed by students from any major and is especially recommended for students interested in innovation- and invention-based career paths and/or competing in Catalyze Klamath. The minor will give students the opportunity to design a program of study that is relevant to their major program and their future career goals.

### **Requirements of Minor**

The minor requires 24 credit hours, including three (3) required courses (9 credits). The remaining courses may be chosen, in consultation with their advisor, from the list below.

#### **Required Courses Credit Hours: 9**

BUS 335 - Entrepreneurship II Credit Hours: 3

BUS 314 - Entrepreneurship I Credit Hours: 3

ENGR 445 - Engineering Project Management Credit Hours: 3

or

MGT 335 - Project Management Credit Hours: 3

or

PWR 355 - Project Management for Writers Credit Hours: 3

#### **Elective Courses**

ART 315 - Design Thinking Credit Hours: 3

BUS 318 - Marketing II Credit Hours: 3

BUS 319 - Integrated Marketing Comm. Credit Hours: 3

BUS 435 - Marketing III Credit Hours: 3

BUS 441 - Leadership I Credit Hours: 3

COM 215 - Creativity in Comm Credit Hours: 3

COM 309 - Communication Tech in Use Credit Hours: 3

COM 347 - Negotiation & Conflict Resol'n Credit Hours: 3

COM 446 - Communication & Leadership Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

PWR 330 - User Research Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

WRI 350 - Documentation Develop Credit Hours: 3

**Note:** Additional prerequisites may be required. Students are encouraged to work with their advisor to identify those courses most relevant to their course of study.

## **International Business Minor**

The Minor in International Business recognizes the achievement of 22 credits in international courses. The Minor in International Business may prove valuable to a technical student who ventures into management or consulting in his or her career field; enhancing employability and improving graduate school possibilities. This minor is open to all majors and is especially recommended for students with an interest in Business and/or global affairs.

### **Requirements of Minor:**

A passing grade in all courses and a cumulative GPA of 2.0 or better is required to be awarded the minor. Students are encouraged to consult with a Management Department advisor to schedule courses.

BUS 308 - Prin of International Business Credit Hours: 3

BUS 387 - International Human Res Mgmt Credit Hours: 3

or

PSCI 326 - World Politics in Transition Credit Hours: 3

or

PSCI 497 - US Foreign Policy Credit Hours: 3

BUS 434 - Global Marketing Credit Hours: 3

COM 205 - Intercultural Comm Credit Hours: 3

ECO 367 - Int'l Economics & Finance Mgt Credit Hours: 4

MIS 311 - Intro to Systems Analysis Credit Hours: 3

PSCI 250 - Intro to World Politics Credit Hours: 3

### **Suggested Social Science Electives**

GEOG 106 - Cultural Geography I Credit Hours: 3

HIST 103 - Hist-Western Civil Credit Hours: 3

PSCI 326 - World Politics in Transition Credit Hours: 3

PSCI 497 - US Foreign Policy Credit Hours: 3

### **Suggested Open Electives**

COM 320 - Advanced Intercultural Comm Credit Hours: 3

Any foreign language sequence Credit Hours: 4

### **Suggested Humanities Electives**

Any second year foreign language sequence Credit Hours: 4

### **Strongly Recommended: Study Abroad Program**

1 semester/2 terms Credit Hours: 4

## Operations Management, BS

Operations Managers coordinate equipment, materials, human capital and information across businesses to profitably meet or exceed customer expectations. Students in Operations Management successfully blend the art of management with applied science through creativity, people skills, rational analysis and application of technology.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

BUS 215 - Principles of Management Credit Hours: 3  
PSY 201 - Psychology Credit Hours: 3  
WRI 121 - English Composition Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 13 Credit Hours**

#### Winter

MATH 111 - College Algebra Credit Hours: 4  
MIS 102 - Spreadsheet Software Lab Credit Hours: 1  
SPE 111 - Public Speaking Credit Hours: 4  
Elective Credit Hours: 3

**Total: 12 Credit Hours**

#### Spring

BUS 223 - Marketing I Credit Hours: 3  
ECO 201 - Principles of Microeconomics Credit Hours: 3  
MIS 206 - Intro to Mgmt Info Sys Credit Hours: 3  
WRI 227 - Technical Report Writing Credit Hours: 4  
Humanities Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Sophomore Year Fall

ACC 201 - Prin of Accounting I Credit Hours: 4  
MATH 361 - Statistical Methods I Credit Hours: 4  
MIS 113 - Intro to Database Systems Credit Hours: 3  
Elective Credit Hours: 3  
Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Winter

BUS 226 - Business Law Credit Hours: 3  
ECO 202 - Principles of Macroeconomics Credit Hours: 3  
MATH 371 - Finite Math/Calc I Credit Hours: 4  
Elective Credit Hours: 3  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4  
BUS 356 - Business Presentations Credit Hours: 4  
BUS 456 - Business Research Methods Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 14 Credit Hours**

#### Junior Year Fall

ACC 325 - Finance Credit Hours: 4

BUS 457 - Business Research Methods II Credit Hours: 3  
MGT 321 - Operations Management I Credit Hours: 3  
MGT 461 - Lean/Six Sigma Management I Credit Hours: 3  
Elective Credit Hours: 3

**Total: 16 Credit Hours**

#### Winter

MGT 322 - Operations Management II Credit Hours: 3  
MGT 462 - Lean/Six Sigma Management II Credit Hours: 3  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
BUS 349 - Human Resource Management I Credit Hours: 3  
Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

MGT 323 - Operations Management III Credit Hours: 3  
MGT 335 - Project Management Credit Hours: 3  
MGT 463 - Lean/Six Sigma Management III Credit Hours: 3  
MIS 375 - Decision Support Systems Credit Hours: 3  
Elective Credit Hours: 3

**Total: 15 Credit Hours**

#### Senior Year Fall

BUS 441 - Leadership I Credit Hours: 3  
BUS 467 - Service Management Credit Hours: 3  
BUS 495 - Senior Project Proposal Credit Hours: 3  
MGT 421 - Quality Management Credit Hours: 3  
Laboratory Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

ANTH 452 - Globalization Credit Hours: 3  
or  
PSCI 326 - World Politics in Transition Credit Hours: 3  
BUS 496 - Senior Project Credit Hours: 3  
MGT 422 - Materials Management Credit Hours: 3  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
PSY 347 - Organizational Behavior Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

BUS 478 - Strategic Management Credit Hours: 3  
BUS 497 - Senior Project Credit Hours: 3  
MGT 423 - Logistics Management Credit Hours: 3  
Elective Credit Hours: 3  
Elective Credit Hours: 3

**Total: 15 Credit Hours**

**Total for a B.S. in Operations Management: 180 Credit Hours**

## Technology and Management, BAS

The Bachelor of Applied Science (BAS) in Technology and Management provides a path to a bachelor's degree for those students who have completed a technical Associate of Applied Science (AAS) or Associate of Science (AS) degree from an accredited institution recognized by the Council for Higher Education (CHEA) and are seeking career advancement into management or in their technical career fields. The BAS builds on a core of 60 credits of career and technical education (CTE) courses taken as part of the AAS or AS degree, adding 65 credits of business, management, and information technology courses and 55 credits of broad-based general education courses to enable the BAS graduate to advance in the workplace or continue on to graduate school. The management core includes a three-term capstone senior project to enable the student to demonstrate successful integration of technical and managerial coursework.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Prior Learning

Up to 60 Career Technical Elective credits

PHIL 342 - Business Ethics Credit Hours: 3 (upper-division) <sup>a</sup>

**Total: 14 Credit Hours**

#### Sophomore Year Winter

ACC 201 - Prin of Accounting I Credit Hours: 4

BUS 215 - Principles of Management Credit Hours: 3

or

BUS 304 - Engineering Management Credit Hours: 3

or

BUS 317 - Health Care Management Credit Hours: 3

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

BUS 356 - Business Presentations Credit Hours: 4

MGT 335 - Project Management Credit Hours: 3

MIS 206 - Intro to Mgmt Info Sys Credit Hours: 3

Laboratory Science Elective Credit Hours: 4

**Total: 14 Credit Hours**

#### Senior Year Fall

BUS 223 - Marketing I Credit Hours: 3

BUS 441 - Leadership I Credit Hours: 3

BUS 467 - Service Management Credit Hours: 3

BUS 495 - Senior Project Proposal Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

ACC 203 - Prin of Managerial Acct Credit Hours: 4

ECO 201 - Principles of Microeconomics Credit Hours: 3

MATH 361 - Statistical Methods I Credit Hours: 4

SPE 111 - Public Speaking Credit Hours: 4

**Total: 15 Credit Hours**

#### Winter

ANTH 452 - Globalization Credit Hours: 3

or

HIST 452 - Globalization & Pac NW Credit Hours: 3

BUS 496 - Senior Project Credit Hours: 3

PSY 347 - Organizational Behavior Credit Hours: 3

Humanities Elective Credit Hours: 3

Math/Science Elective Credit Hours: 4

**Total: 16 Credit Hours**

#### Junior Year Fall

BUS 226 - Business Law Credit Hours: 3

BUS 457 - Business Research Methods II Credit Hours: 3

MGT 321 - Operations Management I Credit Hours: 3

MGT 461 - Lean/Six Sigma Management I Credit Hours: 3

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 16 Credit Hours**

#### Winter

ACC 325 - Finance Credit Hours: 4

BUS 349 - Human Resource Management I Credit Hours: 3

ECO 202 - Principles of Macroeconomics Credit Hours: 3

MIS 102 - Spreadsheet Software Lab Credit Hours: 1

PHIL 331 - Ethics in the Professions Credit Hours: 3

or

#### Spring

BUS 478 - Strategic Management Credit Hours: 3

BUS 497 - Senior Project Credit Hours: 3

MIS 113 - Intro to Database Systems Credit Hours: 3

or

MIS 275 - Intro to Relational Databases Credit Hours: 4

WRI 327 - Advanced Tech Writing Credit Hours: 3

Humanities Elective Credit Hours: 3

**Total: 15/16 Credit Hours**

**Note:** The BAS degree specifies 60 upper-division credits. Students transferring in lower-division course equivalents do not receive upper-division credit and may be required to take upper-division electives to meet the minimum 60 credits of upper division credits required for the BAS degree.

**Total for a B.A.S. in Technology and Management: 180/181 Credit Hours**

# Manufacturing and Mechanical Engineering and Technology Department

Tim Pasang, *Department Chair*

*Professors:* D. Culler, N. Mead, R. Shih, W. Sun, T. Pasang

*Associate Professors:* W. Abrous, I. Demeshko-Prosnik, Y. Gao, D. Lee, R. Paxton, M. Saber, S. Sloan, C. Stover

*Assistant Professors:* K. Gangwar

## Degrees Offered

- Master of Science in Manufacturing Engineering Technology
- Bachelor of Science in Manufacturing Engineering Technology
- Bachelor of Science in Mechanical Engineering
- Bachelor of Science in Mechanical Engineering Technology

## Manufacturing Engineering Technology

### Degrees Offered

- Master of Science in Manufacturing Engineering Technology
- Bachelor of Science in Manufacturing Engineering Technology

### Program Mission Statement

The Manufacturing Engineering Technology Program at Oregon Institute of Technology is an applied engineering technology program. Its mission is to provide graduates with the skills and knowledge for successful careers in Manufacturing Engineering Technology.

### Program Learning Outcomes

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

### Career Opportunities

Manufacturing Engineering graduates will find a wide range of opportunities for employment in manufacturing design, research and development, testing, educational institutions, consulting and business. Manufacturing Engineering Technology also prepares students for further study in graduate school. In today's engineering environment, manufacturing engineers are often called upon to perform a wide range of tasks, from designing and purchasing manufacturing equipment to improving and troubleshooting the manufacturing process. Manufacturing engineers are involved in the design and continuous improvement of products, manufacturing equipment and production tooling. The Manufacturing Engineering curriculum provides education in a variety of areas including manufacturing process, robotics and automation, industrial controls, manufacturing tool design, computer aided design and manufacturing, engineering materials, manufacturing planning and quality control. Technical Electives allow the student flexibility in developing technical breadth or focus in their areas of interest.

### Bachelor Program Objectives

The objective of the Manufacturing Engineering Technology undergraduate program is to offer the student a quality education that provides the greatest possible opportunity for rewarding and successful careers. This includes practical training and technical education in engineering, manufacturing processes, and manufacturing equipment as well as supplemental coursework in communications, mathematics, science, social science, and business.

### Master Program Objectives

The objective of the graduate program in Manufacturing Engineering Technology is to offer students an advanced level of education that will help them to be successful in their professional career. This includes the theoretical and practical training in manufacturing systems, design for manufacturability, development of lean enterprise, quality engineering, computer-aided manufacturing, project management and information systems. The master's degree is also available online to students meeting the admission requirements for the program. There are no residency requirements for this degree. The same degree requirements apply to the online program.

## Student Preparation

Students planning to enter the Manufacturing Engineering Technology Program are strongly encouraged to take mathematics and science training in high school. In addition, courses such as drafting, CAD, computer skills, and industrial arts will prove beneficial.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## Cooperative Education Program

Students in the Bachelor of Science degree program have an opportunity to work in industry for a specified time and receive college credit. They are encouraged to meet with the Manufacturing Engineering Technology Undergraduate Program Director. MFG students at both the Klamath Falls and Portland-Metro campuses have the opportunity to participate in the state-wide MECOP internship program. For information, see the following Web site: <https://mecopinc.org>.

## Accreditation

The Bachelor of Science in Manufacturing Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## Mechanical Engineering

### Degree Offered

- Bachelor of Science in Mechanical Engineering

### Program Mission Statement

The Mechanical Engineering Program at Oregon Institute of Technology is an applied engineering program. Its mission is to provide graduates the skills and knowledge for successful careers in mechanical engineering.

### Program Learning Outcomes

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### Career Opportunities

Mechanical Engineering is the broadest branch of engineering providing graduates the ability to pursue many varied career paths. It encompasses a wide variety of specialties including alternative energy, mechanical design, thermal/fluids/heat transfer, and mechatronics to name a few. Graduates will find a wide range of opportunities for employment in design, research and development, testing, manufacturing, government agencies, educational institutions, consulting and business. The Mechanical Engineering degree also prepares the student for further study in graduate school.

### Objectives of the Program

The Mechanical Engineering Program at Oregon Institute of Technology provides an excellent theoretical and applied or hands on engineering education. The program provides graduates with a foundation in fundamentals, applications, design, project management, communications, and professional and ethical responsibility.

The program offers coursework in all of the above areas beginning with mathematics, science, machining, welding, and computer aided design topics in the freshman year. Engineering science and physics courses are typically taken by the student in the sophomore year. Junior and senior curriculum is devoted to analysis, design, and testing aspects of mechanical engineering. Technical electives are available for students to pursue their particular fields of interest.



Throughout the four-year curriculum, emphasis is placed on oral and written communication skills, teamwork and cooperation, and hands on laboratory and project work. Graduates are well-rounded engineers and readily accepted into industry or graduate programs.

## **Student Preparation**

Students planning to enter the Mechanical Engineering curriculum should undertake Mathematics/science training in high school. Such courses as algebra, trigonometry, calculus, physics, chemistry, drafting, CAD, writing, speech, and shop classes will prove beneficial.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## **Cooperative Field Experience**

There is an opportunity for students in the Bachelor of Science degree program to work in industry for a specified time and receive college credit. Those interested in such an opportunity are encouraged to work out the details with the Mechanical Engineering Program Director. Mechanical Engineering students at the Klamath Falls campus have the opportunity to participate in the state-wide MECOP internship program. For information, see the following Web site: <https://mecopinc.org>.

## **Accreditation**

The Bachelor of Science in Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education.

## **Mechanical Engineering Technology**

### **Degree Offered**

- Bachelor of Science in Mechanical Engineering Technology

### **Program Mission Statement**

The Mechanical Engineering Technology Program at Oregon Institute of Technology is an applied engineering technology program. Its mission is to provide graduates with the skills and knowledge for successful careers in mechanical engineering and manufacturing engineering.

### **Program Learning Outcomes**

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
3. an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
4. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
5. an ability to function effectively as a member as well as a leader on technical teams.

### **Career Opportunities**

Mechanical Engineering Technology graduates find a wide range of opportunities for employment in design, research and development, testing, manufacturing, government agencies, educational institutions, consulting and business. The largest number of graduates are employed by manufacturing firms. There, the graduates may develop new products, improve existing products, modify existing products for easier manufacture, or develop equipment for use in the production process. The work done by Mechanical Engineering Technologists varies widely. Interfacing computers and machines is a rapidly growing area of employment. This involvement with robotics and automation is having an impact on most mechanical systems. New materials such as high strength ceramics and polymers, fiber reinforced plastics, and new bonding agents are growing in importance and their applications will offer many interesting and fulfilling careers. Energy systems become increasingly important as energy costs rise. Aerospace firms employ many Oregon Tech graduates in design, testing, and manufacturing. Careers in such traditional areas as power plants, heating and cooling systems, gas and steam turbines, and automotive systems are within the domain for the Mechanical Engineering Technologist.

### **Objectives of the Program**

The objective of the Mechanical Engineering Technology Program is to ensure that graduates of this curriculum acquire competency in those theoretical, applied engineering and practical subjects necessary to become successful in their careers. The program strives to maintain a reputation for academic standards that will assure graduates a welcome by prospective employers.

## **Student Preparation**

Students planning to enter the Mechanical Engineering Technology curriculum should undertake mathematics-science training in high school. Such courses as algebra, geometry, trigonometry, physics, chemistry, drafting, CAD, English, writing, speech, and shop classes will prove beneficial.

**Note:** The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at <http://www.oit.edu/portland-metro/college-costs/bring-your-own-device>.

## **Cooperative Field Experience**

There is an opportunity for students in the Bachelor of Science degree program to work in industry for a specified time and receive college credit. Those interested in such an opportunity are encouraged to work out the details with the Mechanical Engineering Technology program director. MET students at both the Klamath Falls and the Portland-Metro campuses have the opportunity to participate in the state-wide MECOP internship program. For information, see the following Web site: <https://mecopinc.org>.

## **Accreditation**

The Bachelor of Science in Mechanical Engineering Technology program is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>. ABET is a specialized accrediting board recognized by the Council for Higher Education and/ or the Secretary of the U.S. Department of Education.

# Manufacturing Engineering Technology, BS

## Degree Requirements

The Bachelor of Science in Manufacturing Engineering Technology requires completing 192 credit hours, as prescribed in the following curriculum outline. Several of these courses are titled manufacturing elective, and allow the student some flexibility to pursue specific career objectives within the manufacturing engineering field. Upper-division manufacturing engineering technology courses not specifically required for graduation, as well as selected upper-division mechanical engineering technology courses and other approved courses, may be used as manufacturing electives. Students should contact their advisor for specific details as to which courses qualify as manufacturing electives.

### Engineering Science Elective

In order to satisfy the engineering science elective, the student must complete one of the following courses:

ENGR 212 - Engineering Mech: Dynamics Credit Hours: 3

ENGR 355 - Thermodynamics Credit Hours: 3

MECH 318 - Fluid Mechanics Credit Hours: 4

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

ENGR 111 - MMET Orientation Credit Hours: 2

MATH 111 - College Algebra Credit Hours: 4

WRI 121 - English Composition Credit Hours: 4

Humanities/Social Science Elective Credit Hours: 3<sup>a</sup>

Humanities/Social Science Elective Credit Hours: 3<sup>a</sup>

Introduction to General Chemistry<sup>b</sup>

Introduction to General Chemistry Laboratory<sup>b</sup>

**Total: 16 Credit Hours**

#### Winter

CHE 201 - General Chemistry I Credit Hours: 3

CHE 204 - General Chemistry I Lab Credit Hours: 1

MATH 112 - Trigonometry Credit Hours: 4

MET 241 - CAD for Mechanical Design I Credit Hours: 2

MFG 120 - Intro Machining Proc Credit Hours: 4

**Total: 14 Credit Hours**

#### Spring

MATH 251 - Differential Calculus Credit Hours: 4

MET 242 - CAD for Mechanical Design II Credit Hours: 2

MFG 103 - Intro Welding Proc Credit Hours: 3

SPE 111 - Public Speaking Credit Hours: 4

Humanities/Social Science Elective Credit Hours: 3<sup>a</sup>

**Total: 16 Credit Hours**

#### Sophomore Year Fall

MATH 252 - Integral Calculus Credit Hours: 4

MECH 260 - Engineering Materials I Credit Hours: 3

MFG 314 - Geom Dimension/Tolerance Credit Hours: 3

PHY 221 - General Physics w/Calculus Credit Hours: 4

Humanities/Social Science Elective Credit Hours: 3<sup>a</sup>

**Total: 17 Credit Hours**

#### Winter

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4<sup>c</sup>

MATH 361 - Statistical Methods I Credit Hours: 4

MFG 112 - Intro to Mfg Processes Credit Hours: 3

PHY 222 - General Physics w/Calculus Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

ENGR 213 - Engr Mech: Strength of Mat Credit Hours: 4<sup>c</sup>

ENGR 236 - Fund of Elec Circuits Credit Hours: 3

ENGR 266 - Engineering Computation Credit Hours: 3

MATH 362 - Statistical Methods II Credit Hours: 4

WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 18 Credit Hours**

#### Junior Year Fall

ENGR 326 - Electric Power Systems Credit Hours: 3

MECH 315 - Machine Design I Credit Hours: 3

MECH 360 - Engineering Materials II Credit Hours: 3

MET 375 - Solid Modeling Credit Hours: 3

MFG 313 - Mfg Analysis & Planning Credit Hours: 3

MFG 341 - Numerical Control Prog Credit Hours: 3

**Total: 18 Credit Hours**

#### Winter

MECH 316 - Machine Design II Credit Hours: 3

MECH 363 - Engineering Instrumentation Credit Hours: 3

MFG 333 - Stat Methods Qual/Improv Credit Hours: 3

MFG 342 - Computer Aided Machining Credit Hours: 3

MFG 343 - Manufacturing Tool Dsgn Credit Hours: 3

**Total: 15 Credit Hours**

#### Spring

MFG 331 - Industrial Controls Credit Hours: 3

MFG 344 - Dsgn of Mfg Tooling Credit Hours: 3

SPE 321 - Small Group/Team Comm Credit Hours: 3

Engineering Science Elective Credit Hours: 3<sup>d</sup>

Project Management Requirement Credit Hours: 3<sup>e</sup>

**Total: 15 Credit Hours**

#### Senior Year Fall

ANTH 452 - Globalization Credit Hours: 3

ENGR 491 - MMET Senior Projects I Credit Hours: 3

MFG 453 - Automation & Robotics Credit Hours: 3

MFG 454 - Thermal Manufacturing Process Credit Hours: 3

WRI 327 - Advanced Tech Writing Credit Hours: 3

MFG Elective Credit Hours: 3 <sup>f</sup>

**Total: 18 Credit Hours**

**Winter**

ENGR 492 - MMET Senior Projects II Credit Hours: 3

MGT 345 - Engineering Economy Credit Hours: 3

Humanities Elective Credit Hours: 3

MFG Elective Credit Hours: 3 <sup>f</sup>

MFG Elective Credit Hours: 3 <sup>f</sup>

**Total: 15 Credit Hours**

**Spring**

ENGR 415 - Occupational Safety Credit Hours: 3

ENGR 493 - MMET Senior Projects III Credit Hours: 3

MECH 426 - Fluid Power Systems Credit Hours: 3

MFG 447 - Lean Manufacturing Credit Hours: 3

Humanities/Social Science Elective Credit Hours: 3 <sup>a</sup>

**Total: 15 Credit Hours**

**Total for a B.S. in Manufacturing Engineering Technology: 192 Credit Hours**

<sup>a</sup> Select 9 credits of Humanities electives and 9 credits of Social Science electives. ANTH 452 fulfills the remaining credits needed to satisfy the 12 credits of Social Science courses for the Baccalaureate general education requirements

<sup>b</sup> CHE 101 and CHE 104 should be taken if needed to adequately prepare for CHE 201 and CHE 204. Any credits earned from these courses (CHE101/104) do not apply to the degree program. Consult with an academic advisor for further guidance

<sup>c</sup> MECH 221, MECH 222, MECH 223 may be alternatively taken (as an entire sequence) to satisfy the ENGR 211 and ENGR 213 requirements

<sup>d</sup> Select **one** course from the following list: ENGR 212, ENGR 355, or MECH 318

<sup>e</sup> Select either ENGR 445 or MGT 335

<sup>f</sup> Consult with an academic advisor or program director regarding available and appropriate MFG elective courses. Certain ENGR, MECH, and MET upper-division courses not already required for the program are also acceptable

# Manufacturing Engineering Technology, MS

## Degree Requirements

The Master of Science in Manufacturing Engineering Technology requires completing 45 credit hours of graduate work, with at least 30 credit hours of graduate coursework from the following four Curriculum Content Areas (CCAs):

1. Engineering Science and Design Technology
2. Manufacturing Software and Computer Integration
3. Advanced Manufacturing Materials and Processes Technology
4. Business, Financial and Management Processes

In addition to the 30 CCA credit hours, students must complete 12 credits toward thesis or 9 credits toward an approved project and three credits in graduate seminars. Students must take at least one course in each of the four CCAs and three courses in at least one CCA. All graduate courses are three credits each. See Master's student advisor to complete an academic plan.

## Manufacturing Engineering Technology/Mechanical Engineering Technology, BS

### Concurrent Degree

The Mechanical and Manufacturing Engineering Technology Department provides the opportunity for the interested student to earn concurrent degrees in Manufacturing Engineering Technology (MFG) and Mechanical Engineering Technology (MET) or Mechanical Engineering (MECH). Students who earn both degrees are highly sought after and have been very successful in industry. The concurrent degree program usually requires the student to complete an additional year of study beyond the Bachelor's Degree in Mechanical Engineering or Mechanical Engineering Technology.

#### Fall

MFG 313 - Mfg Analysis & Planning Credit Hours: 3

MFG 341 - Numerical Control Prog Credit Hours: 3

MFG 453 - Automation & Robotics Credit Hours: 3

BUS/MGT Restricted Elective Credit Hours 3 <sup>a</sup>

Manufacturing Elective Credit Hours: 3 <sup>b</sup>

**Total: 15 Credit Hours**

#### Winter

MFG 112 - Intro to Mfg Processes Credit Hours: 3 <sup>c</sup>

MFG 333 - Stat Methods Qual/Improv Credit Hours: 3

MFG 342 - Computer Aided Machining Credit Hours: 3

<sup>a</sup> Restricted Elective from the following courses: BUS 226, BUS 304, BUS 335, MGT 321, MGT 461 or MGT 462

<sup>b</sup> These courses must be different than those used to satisfy the BS degree in MET or MECH. In all cases the student must have at least 36 credits of additional coursework beyond the MET or MECH degree to qualify for the concurrent degree in MFG

<sup>c</sup> This course is already required for the BSMET degree

MFG 343 - Manufacturing Tool Dsgn Credit Hours: 3

MATH 362 - Statistical Methods II Credit Hours: 4

**Total: 16 Credit Hours**

#### Spring

ENGR 415 - Occupational Safety Credit Hours: 3

MFG 331 - Industrial Controls Credit Hours: 3 <sup>c</sup>

MFG 344 - Dsgn of Mfg Tooling Credit Hours: 3

MFG 447 - Lean Manufacturing Credit Hours: 3

Manufacturing Elective Credit Hours: 3 <sup>b</sup>

**Total: 15 Credit Hours**

## Manufacturing Engineering Technology/Mechanical Engineering, BS

### Concurrent Degree

The Mechanical and Manufacturing Engineering Technology Department provides the opportunity for the interested student to earn concurrent degrees in Manufacturing Engineering Technology (MFG) and Mechanical Engineering Technology (MET) or Mechanical Engineering (MECH). Students who earn both degrees are highly sought after and have been very successful in industry. The concurrent degree program usually requires the student to complete an additional year of study beyond the Bachelor's Degree in Mechanical Engineering or Mechanical Engineering Technology.

#### Fall

MFG 313 - Mfg Analysis & Planning Credit Hours: 3

MFG 341 - Numerical Control Prog Credit Hours: 3

MFG 453 - Automation & Robotics Credit Hours: 3

BUS/MGT Restricted Elective Credit Hours 3 <sup>a</sup>

Manufacturing Elective Credit Hours: 3 <sup>b</sup>

**Total: 15 Credit Hours**

#### Winter

MFG 112 - Intro to Mfg Processes Credit Hours: 3 <sup>c</sup>

MFG 333 - Stat Methods Qual/Improv Credit Hours: 3

MFG 342 - Computer Aided Machining Credit Hours: 3

MFG 343 - Manufacturing Tool Dsgn Credit Hours: 3

MATH 362 - Statistical Methods II Credit Hours: 4

**Total: 16 Credit Hours**

#### Spring

ENGR 415 - Occupational Safety Credit Hours: 3

MFG 344 - Dsgn of Mfg Tooling Credit Hours: 3

MFG 447 - Lean Manufacturing Credit Hours: 3

MFG 331 - Industrial Controls Credit Hours: 3

Manufacturing Elective Credit Hours: 3 <sup>b</sup>

**Total: 15 Credit Hours**

<sup>a</sup> Restricted Elective from the following courses: BUS 226, BUS 304, BUS 335, MGT 321, MGT 461 or MGT 462

<sup>b</sup> These courses must be different than those used to satisfy the BS degree in MET or MECH. In all cases the student must have at least 36 credits of additional coursework beyond the MET or MECH degree to qualify for the concurrent degree in MFG

<sup>c</sup> This course is already required for the BSMET degree

# Mechanical Engineering Technology, BS

## Degree Requirements

In the curriculum listings appear several courses titled "MET Elective." MET electives allow the student to select and pursue specific career objectives within the mechanical engineering technology field. MET electives are upper-division MET courses, not specifically required for graduation.

Students from other institutions should refer to the sections of this catalog titled "Transfer Students" and "Admission to Baccalaureate Programs." The Bachelor of Science in Mechanical Engineering Technology requires 191 credit hours as prescribed in the following curriculum outline.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

CHE 201 - General Chemistry I Credit Hours: 3  
CHE 204 - General Chemistry I Lab Credit Hours: 1  
ENGR 111 - MMET Orientation Credit Hours: 2  
MATH 111 - College Algebra Credit Hours: 4  
WRI 121 - English Composition Credit Hours: 4  
Psychology Elective Credit Hours: 3 <sup>a</sup>

**Total: 17 Credit Hours**

#### Winter

MATH 112 - Trigonometry Credit Hours: 4  
MFG 120 - Intro Machining Proc Credit Hours: 4  
Humanities Elective Credit Hours: 3  
Social Science Elective Credit Hours: 3

**Total: 14 Credit Hours**

#### Spring

MATH 251 - Differential Calculus Credit Hours: 4  
MFG 103 - Intro Welding Proc Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Economics Elective Credit Hours: 3  
Humanities Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Sophomore Year Fall

MATH 252 - Integral Calculus Credit Hours: 4  
MECH 260 - Engineering Materials I Credit Hours: 3  
MET 241 - CAD for Mechanical Design I Credit Hours: 2  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4  
or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 17 Credit Hours**

#### Winter

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4 <sup>b</sup>  
MATH 254 - Vector Calculus I Credit Hours: 4  
MET 242 - CAD for Mechanical Design II Credit Hours: 2  
MFG 112 - Intro to Mfg Processes Credit Hours: 3  
PHY 222 - General Physics w/Calculus Credit Hours: 4

**Total: 17 Credit Hours**

#### Spring

ENGR 213 - Engr Mech: Strength of Mat Credit Hours: 4 <sup>b</sup>  
ENGR 266 - Engineering Computation Credit Hours: 3  
MATH 361 - Statistical Methods I Credit Hours: 4

PHY 223 - General Physics w/Calculus Credit Hours: 4

**Total: 15 Credit Hours**

#### Junior Year Fall

ENGR 236 - Fund of Elec Circuits Credit Hours: 3  
ENGR 355 - Thermodynamics Credit Hours: 3  
MECH 315 - Machine Design I Credit Hours: 3  
MECH 360 - Engineering Materials II Credit Hours: 3  
MET 375 - Solid Modeling Credit Hours: 3

**Total: 15 Credit Hours**

#### Winter

ENGR 212 - Engineering Mech: Dynamics Credit Hours: 3  
MECH 318 - Fluid Mechanics Credit Hours: 4  
MECH 316 - Machine Design II Credit Hours: 3  
MECH 363 - Engineering Instrumentation Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 16 Credit Hours**

#### Spring

MATH 321 - Appl Diff Equation I Credit Hours: 4  
MECH 313 - Thermodynamics II Credit Hours: 3  
MECH 351 - Finite Element Analysis Credit Hours: 3  
MFG 314 - Geom Dimension/Tolerance Credit Hours: 3  
Project Management Requirement Credit Hours: 3 <sup>c</sup>

**Total: 16 Credit Hours**

#### Senior Year Fall

**ENGR 326 - Electric Power Systems Credit Hours: 3**  
**ENGR 491 - MMET Senior Projects I Credit Hours: 3**  
**MECH 323 - Heat Transfer I Credit Hours: 3**  
**MGT 345 - Engineering Economy Credit Hours: 3**  
**MET Elective Credit Hours: 3 <sup>d</sup>**

**Total: 15 Credit Hours**

#### Winter

ENGR 492 - MMET Senior Projects II Credit Hours: 3  
MECH 437 - Heat Transfer II Credit Hours: 2  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
MET Elective Credit Hours: 3 <sup>d</sup>  
MET Elective Credit Hours: 3 <sup>d</sup>  
Social Science Elective Credit Hours: 3

**Total: 17 Credit Hours**

#### Spring

ENGR 493 - MMET Senior Projects III Credit Hours: 3

MECH 426 - Fluid Power Systems Credit Hours: 3

MFG 331 - Industrial Controls Credit Hours: 3

Humanities Elective Credit Hours: 3

MET Elective Credit Hours: 3 <sup>d</sup>

**Total: 15 Credit Hours**

**Total for a B.S. in Mechanical Engineering Technology: 191 Credit Hours**

<sup>a</sup> PSY 201 is highly recommended

<sup>b</sup> MECH 221, MECH 222, and MECH 223 may be alternatively taken (as an entire sequence) to satisfy the ENGR 211 and ENGR 213 requirements

<sup>c</sup> Select either ENGR 445 or MGT 335

<sup>d</sup> Consult with an academic advisor or program director regarding available and appropriate MET elective courses. Certain ENGR, MECH and MFG upper-division courses not already required for the program **are also** acceptable



# Mechanical Engineering, BS

## Degree Requirements

In the curriculum listings appear several courses titled "MECH Elective." MECH electives allow the student to select and pursue specific career objectives within the mechanical engineering field. MECH electives are upper-division MECH courses, not specifically required for graduation.

Students from other institutions should refer to the sections of this catalog titled "Transfer Students" and "Admission to Baccalaureate Programs."

The Bachelor of Science in Mechanical Engineering requires 192 credit hours as prescribed in the following curriculum outline.

### Curriculum

Required courses and recommended terms during which they should be taken:

#### Freshman Year Fall

CHE 201 - General Chemistry I Credit Hours: 3  
CHE 204 - General Chemistry I Lab Credit Hours: 1  
ENGR 111 - MMET Orientation Credit Hours: 2  
WRI 121 - English Composition Credit Hours: 4  
Humanities/Social Science Elective Credit Hours: 3 <sup>a</sup>  
College Algebra (if suggested by advisor) <sup>b</sup>

**Total: 13 Credit Hours**

#### Winter

CHE 202 - General Chemistry II Credit Hours: 3  
CHE 205 - General Chemistry II Lab Credit Hours: 1  
MFG 103 - Intro Welding Proc Credit Hours: 3  
SPE 111 - Public Speaking Credit Hours: 4  
Humanities/Social Science Elective Credit Hours: 3 <sup>a</sup>  
Trigonometry (if suggested by advisor) <sup>b</sup>

**Total: 14 Credit Hours**

#### Spring

MATH 251 - Differential Calculus Credit Hours: 4  
MFG 120 - Intro Machining Proc Credit Hours: 4  
MET 241 - CAD for Mechanical Design I Credit Hours: 2  
Economics Elective Credit Hours: 3 <sup>a</sup>

**Total: 13 Credit Hours**

#### Sophomore Year Fall

MATH 252 - Integral Calculus Credit Hours: 4  
MECH 260 - Engineering Materials I Credit Hours: 3  
MET 242 - CAD for Mechanical Design II Credit Hours: 2  
PHY 221 - General Physics w/Calculus Credit Hours: 4  
WRI 122 - Argumentative Writing Credit Hours: 4

or

WRI 227 - Technical Report Writing Credit Hours: 4

**Total: 17 Credit Hours**

#### Winter

ENGR 211 - Engineering Mechanics: Statics Credit Hours: 4 <sup>f</sup>  
MATH 254 - Vector Calculus I Credit Hours: 4  
MFG 314 - Geom Dimension/Tolerance Credit Hours: 3  
PHY 222 - General Physics w/Calculus Credit Hours: 4

**Total: 15 Credit Hours**

#### Spring

ENGR 213 - Engr Mech: Strength of Mat Credit Hours: 4 <sup>f</sup> ENGR  
236 - Fund of Elec Circuits Credit Hours: 3

ENGR 266 - Engineering Computation Credit Hours: 3  
MATH 321 - Appl Diff Equation I Credit Hours: 4  
PHY 223 - General Physics w/Calculus Credit Hours: 4  
**Total: 18 Credit Hours**

#### Junior Year Fall

MATH 341 - Linear Algebra I Credit Hours: 4  
MECH 318 - Fluid Mechanics Credit Hours: 4  
MECH 363 - Engineering Instrumentation Credit Hours: 3  
MET 375 - Solid Modeling Credit Hours: 3  
Statistics Requirement Credit Hours: 4 <sup>e</sup>

**Total: 18 Credit Hours**

#### Winter

ENGR 212 - Engineering Mech: Dynamics Credit Hours: 3  
ENGR 326 - Electric Power Systems Credit Hours: 3  
ENGR 355 - Thermodynamics Credit Hours: 3  
MECH 315 - Machine Design I Credit Hours: 3  
MECH 360 - Engineering Materials II Credit Hours: 3  
SPE 321 - Small Group/Team Comm Credit Hours: 3

**Total: 18 Credit Hours**

#### Spring

HUM 125 - Intro Tech, Soc, Value Credit Hours: 3  
MATH 451 - Numerical Methods I Credit Hours: 4  
MECH 313 - Thermodynamics II Credit Hours: 3  
MECH 316 - Machine Design II Credit Hours: 3  
MECH Elective Credit Hours: 3 <sup>d</sup>

**Total: 16 Credit Hours**

#### Senior Year Fall

ENGR 491 - MMET Senior Projects I Credit Hours: 3  
MECH 323 - Heat Transfer I Credit Hours: 3  
MECH 351 - Finite Element Analysis Credit Hours: 3  
WRI 327 - Advanced Tech Writing Credit Hours: 3  
Fluid Mechanics II Requirement Credit Hours: 3 <sup>e</sup>  
MECH Elective Credit Hours: 3 <sup>d</sup>

**Total: 18 Credit Hours**

#### Winter

ENGR 492 - MMET Senior Projects II Credit Hours: 3  
MECH 437 - Heat Transfer II Credit Hours: 2  
MECH 480 - Mechanical Vibrations Credit Hours: 3  
PHIL 331 - Ethics in the Professions Credit Hours: 3  
Humanities/Social Science Elective Credit Hours: 3 <sup>a</sup>

MECH Elective Credit Hours: 3 <sup>d</sup>

**Total: 17 Credit Hours**

**Spring**

ENGR 493 - MMET Senior Projects III Credit Hours: **3**

MECH 436 - Classical Control Systems Credit Hours: 3

MGT 345 - Engineering Economy Credit Hours: 3

Humanities /Social Science Elective Credit Hours: 3 <sup>a</sup>

MECH Elective Credit Hours: 3 <sup>d</sup>

**Total: 15 Credit Hours**

**Total for a B.S. in Mechanical Engineering: 192 Credit Hours**

<sup>a</sup> Along with HUM 125, PHIL 331, and an Economics course, another 3 credits of Humanities courses and 9 credits of Social Science courses.

Furthermore, activity or performance-based Humanities courses are not accepted

<sup>b</sup> MATH 111 and MATH 112 should be taken if needed to adequately prepare for MATH 251. Any credits earned from these courses **do not** apply to the degree program. Consult with an academic advisor for further guidance

<sup>c</sup> Select either MATH 361 or MATH 465

<sup>d</sup> Consult with an academic advisor or program director regarding available and appropriate MECH elective courses. MFG and MET electives **are not** acceptable.

<sup>e</sup> Select either MECH 417 or MECH 418, depending upon which course is currently offered

<sup>f</sup> MECH 221, MECH 222, MECH 223 may be alternatively taken (as an entire sequence) to satisfy the ENGR 211 and ENGR 213 requirements

# Graduate Programs

## Admissions and Academic Policies

Graduate degree programs at Oregon Institute of Technology provide students with opportunities for advanced study in various disciplines. Graduates will develop the competence required for leadership roles in professional fields. Graduate education at Oregon Tech maintains an applied focus. Our mission is to integrate theory and practice.

### Admission

The Office of Admissions, in conjunction with the appropriate academic department, maintains all pertinent information regarding the admission of graduate students.

### Admission Requirements

To be considered for admission to a graduate program, an applicant must have a baccalaureate degree from a regionally accredited college or university, as well as a scholastic record that evidences the ability to perform satisfactory graduate work. Specifically, a student shall:

- have completed a four-year college course of study and hold an acceptable baccalaureate degree from an institution accredited by a regional accrediting association
- be in good academic standing at the last college or university attended
- have attained a grade point average of at least 3.0 on a 4.0 scale for the last 90 term (60 semester) units attempted
- have attained a grade point average of at least 3.0 on a 4.0 scale for the last 45 term hours in the major
- satisfactorily meet the professional, personal, scholastic, and other standards for graduate study
- pass qualifying examinations required by specific programs

Unusual circumstances may warrant exceptions to these criteria.

### Level of Course Work

All course work applied toward the master's degree must be earned in courses designed for graduate students; these courses are generally numbered 500 and above. Oregon Tech undergraduate seniors may enroll in 500 level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the department chair. Nine credits are applicable to a graduate degree. Undergraduate seniors may enroll in graduate-level courses for undergraduate credit subject to each department's policy. Oregon Tech offers some courses which are dual listed at the 400- and 500-level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply only to a graduate degree. Students enrolled in a dual-listed 500-level course will be required to complete additional work for graduate credit. Students may audit graduate courses subject to the policy described in the General Catalog. Audited courses cannot be used to meet degree requirements.

### Application as a Degree-Seeking U.S. Resident Student

Degree-seeking students must submit the following items to the Office of Admissions before the deadlines specified in the Application Deadlines section:

- an official admissions application, along with a \$50 non-refundable application fee. The application fee is waived for applicants who are currently attending Oregon Tech or who graduated from Oregon Tech within the previous two years
- official transcripts from each post-secondary educational institution attended

Individual programs may have additional requirements. Applicants must submit all required items before admission to the graduate program will be considered. Submitting the items, however, does not ensure admission. Applicants will receive official notification of admission after a review of the application by the Office of Admissions and the graduate program department.

### Application as an International Degree-Seeking Graduate Student

Oregon Tech must assess the academic preparation of international students. For this purpose, international students, including those who hold U.S. visas as student exchange visitors or other non-immigrant classifications, should apply early. Official transcripts must be on file at least eight weeks before registration for the first term and, if not written in English, must be accompanied by a certified English translation.

All international applicants from countries in which English is not the native language must take the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System exam (IELTS). A minimum score of 520 paper based TOEFL, 68 internet-based TOEFL or 6 IELTS is required for consideration. This requirement may be waived for some students whose primary language is English. Since the results of this test constitute part of the material reviewed for admission to graduate studies at Oregon Tech, students should arrange to have their test scores sent directly from the testing agency to the Office of Admissions well before the application deadline.

The following is an application checklist for degree-seeking international students:

- submit the graduate application for admission with the \$50 (U.S.) application fee
- submit the international graduate student supplement to the graduate application form (as well as the Statement of Financial Responsibility form), available from the Admissions Office
- provide evidence of ability to meet educational expenses at Oregon Tech. The Statement of Financial Responsibility form must be completed and submitted with documentation such as official bank statements and tax returns
- official academic transcripts of all university course work sent to Oregon Tech
- for university course work done outside the United States, transcripts must be reviewed by an evaluation service. There are several such services that are acceptable. A "course-by-course evaluation" or a "detail report" is necessary
- proof of proficiency in the English language. Oregon Tech requires that international graduate students submit official test scores on the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System exam (IELTS). A minimum score of 520 paper-based TOEFL, 68 Internet-based TOEFL, or 6 IELTS is required for consideration. This requirement may be waived for some students whose primary language is English
- students currently in the United States should submit a photocopy of the I-20 form and passport

Individual programs may have additional requirements.

## **Application Deadlines**

Oregon Tech encourages all prospective students to submit graduate application materials six to nine months in advance of the planned enrollment date. This recommendation is especially important for international students in order to allow sufficient time for visa processing. However, applications will be accepted any time before the deadlines listed below. The recommended entrance time is fall term.

- Fall Term: April 1
- Winter Term: July 1
- Spring Term: October 1

## **Residency Classification**

See the residency section of this catalog.

## **Tuition and Fees**

See the tuition and fees section of this catalog.

## **Graduate Assistantships**

Oregon Institute of Technology offers graduate assistantships, awarded on a competitive basis, to qualified graduate students based on department needs. Compensation varies with the type of service, the amount of time required for performing the service, and the academic qualifications and experience of the appointee. An applicant for a graduate assistantship must be admitted to a graduate program. Graduate departments usually award appointments and assistantships by Summer term, effective at the beginning of the next academic year. A graduate assistant application form is available from the appropriate department.

## **Types of Assistantships**

Graduate assistantships (GAs) at Oregon Tech are either research assistantships (RAs) or teaching assistantships (TAs). Research assistantships are awarded by the faculty member administering the research grant and involve providing assistance in fulfilling the goals and objectives of the grant. Depending upon the grant, research assistantships may include additional support for summer term. If you are interested in a research assistantship, contact the faculty members responsible for the grant.

Teaching assistantships are awarded by the department and involve classroom and laboratory instruction. If you are interested in a TA, contact the individual department to determine availability.

## **Assistantship Offer**

Assistantship notices of appointment are awarded on a term-by-term basis and renewal is dependent upon competent performance of assistantship duties, adequate academic progress, departmental needs, and the availability of funds. Assistantships may include a tuition waiver and/or a monthly stipend based upon a percentage of a full-time equivalent (FTE) salary.

## **Assistantship Course Load**

Graduate assistants are expected to maintain full-time enrollment (nine credits). Graduate assistants not enrolled in nine credits of formal courses must supplement the course load with thesis or project credits to maintain full-time enrollment status.

## Satisfactory Progress

Graduate assistants must make satisfactory progress toward a graduate degree to retain a graduate assistantship. Satisfactory progress includes:

- maintaining a 3.0 or higher grade point average
- maintaining full-time student enrollment

Failure to maintain satisfactory academic progress will result in loss of an assistantship.

## Academic Policies

The Graduate Council determines graduate academic policies at Oregon Tech. Other academic policies and procedures are described and/or defined in the general policies of Oregon Tech.

## Student Rights and Responsibilities

Oregon Tech encourages students to perform at a high academic level, and students are responsible for knowing degree requirements and enrolling in courses that will enable them to complete the master's program. Oregon Tech expects students to conduct themselves in a manner compatible with the university's function as an institution of higher learning. Students should acquaint themselves with regulations for the standard of work required to continue in the graduate school. For additional information, students should consult their graduate advisor.

## Academic Integrity

Oregon Tech's goal is to foster an atmosphere that produces educated, literate graduates. Academic misconduct, such as cheating and plagiarism, will not be tolerated. Cheating includes, but is not limited to, the following:

- use of any unauthorized assistance in taking quizzes, tests or examinations
- dependence upon the aid of sources specifically prohibited by instructors in writing papers, preparing reports, solving problems or carrying out other assignments
- the acquisition, without permission, of tests or other academic materials belonging to a faculty member of the school

Plagiarism includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without acknowledging the source. Plagiarism occurs when a student either copies the work of another person and attempts to receive credit for that work or acquires and uses prepared material from someone who is selling academic materials. These examples are intended to provide general guidelines and are in no way comprehensive in describing academic dishonesty.

Faculty may assign specific penalties for cases of academic misconduct, including a failing grade for a test or assignment, a reduced grade for a test or assignment, or a failing grade in the course. Responding to academic dishonesty is the responsibility of the course instructor. If a student commits plagiarism or other academic dishonesty during the graduate project, the advisor, in consultation with the dean, determines the appropriate response.

All graduate students should acquaint themselves with the definitions and implications of academic misconduct as explained in Oregon Tech's student conduct code. Repercussions for a student guilty of academic conduct violations range from a warning to expulsion. Students may contest a charge of academic misconduct by following the grievance procedure outlined in the OIT catalog and the student handbook, available on the Oregon Tech Web site.

## Student Records

The Registrar's Office maintains a permanent file for each graduate student. Faculty advisors will maintain a file of advising records, grade information and other correspondence pertaining to each graduate student's academic progress. For more information on student records, contact the Registrar's Office.

## Enrollment Status

Full and part-time credit loads for graduate students are defined as follows:

- Full-time: 9 or more credits
- 3/4 time: 7 - 8 credits
- Half-time: 5 - 6 credits

Oregon Tech undergraduate seniors may enroll in 500-level graduate courses for graduate credit with the approval of the student's undergraduate advisor and the graduate program director.

Students who are not yet admitted to Oregon Tech may take up to one third of the graduate program credits as a non-admit student and apply them toward the graduate degree upon formal admission to the graduate program.

Oregon Tech offers some courses which are dual-listed at the 400- and 500-level. The 400-level courses apply only to an undergraduate degree, while 500-level courses apply to both undergraduate and graduate degrees. Students enrolled in a dual-listed 500-level course will be required to complete additional work to obtain graduate credit.

## **Continuous Enrollment for All Graduate Students**

All graduate degree-seeking students must be continuously enrolled. Continuous enrollment is defined as completing, with grades assigned, a minimum of 1 hour of graduate credit every quarter.

## **Academic Prerequisite Deficiencies**

Students who have prerequisite deficiencies for graduate studies may be required to take additional course work prior to completing their graduate studies, as determined by the graduate program director. If there are deficiencies, the director will recommend substitute courses, and these are entered on the Graduate Program Form. When students pass these courses with a B or better, they become fully qualified graduate students. Prior to completion of the listed courses, the graduate student is considered "provisionally admitted."

## **Academic Performance Standards**

Students must maintain a cumulative GPA of 3.0 or better in all graduate work specific to the program of study to remain in good academic standing. Grades below C do not meet requirements for a graduate degree.

Graduate students earning a cumulative GPA of less than 3.0 will be placed on probation and, if no improvement is made, will be suspended from the graduate program. Conditions established for probation and suspension are listed below:

**Academic Probation:** Students having 9 or more attempted credit hours will be placed on academic probation for each term that their cumulative GPA falls below 3.0.

**Academic Suspension:** A student on probation must maintain a term GPA of 3.0 or higher to avoid academic suspension. A student will be suspended if the student's term GPA falls under 3.0 while on probation. Suspended students lose their institutional financial aid, including graduate research and teaching assistantships. A student may appeal academic suspension by following the process outlined in the Oregon Tech catalog. A successful appeal results in probation status.

## **Transfer Credits**

Students may petition to transfer up to one third of the program graduate term hours earned at other accredited institutions and apply those credits toward an Oregon Tech graduate degree. However, each course must be consistent with the program of study planned by the student and the graduate advisor. Only grades of A and B are acceptable as transfer credit into the graduate program.

## **Grading Policy**

Oregon Tech uses a 4.0 grading scale to evaluate student performance. Upon completion of a course or upon termination of attendance in the course, a student's performance will be graded by the instructor and reported to the Registrar's Office.

## **Requirements**

Graduate degree academic requirements are specified by the program. The student, in conference with the graduate faculty advisor, will prepare a program of study for the graduate degree as a guide for planning an academic schedule.

## **Application for Graduation**

To apply for graduation, the student must submit a petition for graduation to the Registrar's Office two terms in advance of the anticipated final term of work. The petition is a record of the approved program of study. To receive favorable action, candidates must meet the following requirements:

- show that course requirements for the master's degree will be satisfied before or during the final term
- maintain an overall grade point average of at least 3.0
- provide evidence of passing any qualifying or comprehensive examinations, including defense of the master's project or thesis
- obtain approval of both the student's academic advisor and department chair, or by the program director or other faculty member in the event that the student's academic advisor is the department chair

# Right of Appeal

## Philosophy of Policy Application

The graduate student academic grievance procedure provides a mechanism for exchanging information between student and instructor in cases of grade dispute and a safeguard against unfair grading practices. The intent is to provide an informal forum for discussing and resolving differences of opinion.

## Academic Disputes Appealable by Policy

Student claims that final course grade resulted from:

- unfair or prejudicial treatment by instructor
- unusual or irregular procedures that impacted an individual student's grade in a disproportionate manner
- dismissal from a professional program or externship because of failure to meet prerequisite or sequential course requirements

Note: The student should initiate appeals of final grades or professional academic standing within three weeks after distribution of final course grades or dismissal notice. The appropriate academic dean will not consider appeals after that time limit unless the student was incommunicado with the campus or unable to obtain grades after distribution because of academic assignment, or unusual events associated with grading procedure or completion of assignments made it impossible for the student to receive or appeal the grade in a timely manner.

## Academic and Related Disputes Not Appealable by Policy

- Grades assigned to tests, quizzes, homework, papers, projects, or other components of a course
- Final grades based on failure to meet published (via syllabus) standards for the course that involves no unusual or prejudicial treatment
- Disciplinary or other student conduct matters not specifically covered above
- Challenges to the instructor's grading system or components thereof, as long as the system was made available to students at the beginning of the academic term

## Procedure

- Student reads policy to determine if grievance is appealable
- Student makes appointment to discuss dispute with course instructor. Since reconciliation of the dispute at this level is in the best interests of all parties, instructors and students are urged to engage in an honest and open-minded effort to resolve the problem
- Failing to resolve the dispute with the instructor, the student makes an appointment with the program director and department chair. The student and the instructor document the dispute in writing and bring this to the meeting. Department chair and program director should confer with instructor before consultation with the student. Department chair decides dispute based on available information.
- If the student disagrees with the decision, s/he may request an appointment with the appropriate dean. The appropriate dean will not see students unless they have followed the preceding steps. If the course instructor is the department chair, the second level of appeal is the appropriate academic dean. The appropriate dean contacts the department chair and program director, and, when appropriate, the course instructor, to obtain information about the dispute. After consultation with the department and the student, the appropriate academic dean offers the student the choice of a summary decision or the opportunity for a hearing with the Graduate Council.

## Summary Decision by Academic Dean

If the appropriate academic dean summarily decides the dispute, the grievance is terminated and the department chair, program director, instructor, and the student are notified in writing. If a grade change results, the Registrar's Office is also notified in writing.

## Graduate Council Hearing

If the student elects to have the dispute referred to the Graduate Council,

- The student must prepare a written request, summarizing the reasons for a hearing and the requested intervention (e.g., change of grade, reinstatement), with supporting documentation attached. The request is presented to the academic dean within three academic days after discussion with the dean.
- The council schedules a hearing at the earliest time mutually available, normally within five academic days after the academic dean receives the request.
- The department chair and program director receive a copy of the student request and supporting documentation.
- The Graduate Council chair convenes the hearing and considers the presentations of student and instructor. Either may call witnesses to offer supporting information. The student has the right to have an advisor or attorney. The advisor may be at the student's side, and the student may consult with the advisor, but the advisor may not address or question the council.
- The council formulates and sends a recommendation, supported by a rationale, to the academic dean. It may include a majority and minority report, if appropriate.

- After careful consideration of the council's findings, the academic dean renders a final decision and notifies the council, department chair, program director, instructor and student. If the outcome is a grade change, the academic dean notifies the Registrar's Office.

**Time Limits**

Graduate students are allowed five years to complete all the requirements for a master's degree. Under extenuating circumstances, students may request an extension. The extension must be approved by the Program Director, the Department Chair, and the Associate Provost.



## Course Descriptions

Course descriptions in this section are reasonable summaries only and are neither completely inclusive nor completely exclusive of total course content for any given course.

Courses listed herein may or may not be offered each term.

Courses are listed alphabetically according to prefix.

## Numbering Code

Courses are grouped into a three-digit number series which indicates the normal teaching levels. Some variations may occur.

**1-99** Preparatory and Developmental Courses. Courses numbered below 100 are not applicable toward a degree even though units are assigned, grades are awarded and tuition is assessed.

Lower-Division Courses (freshman and sophomore)

**100-199** First-Year Courses

**200-299** Second-Year Courses

Upper-Division Courses (junior and senior)

**300-399** Third-Year Courses

**400-499** Fourth-Year Courses

Graduate Courses

**500-599** Graduate Courses

## Other Codes

*Each Term:*

Some courses in this section have a code following the course title. This code designates when the course will be offered. F indicates Fall, W indicates Winter, S indicates Spring, Su indicates Summer.

For more information, see Baccalaureate General Education Requirements

**Courses with the following notation fulfill the appropriate general education requirements:**

**C - Communication H - Humanities HP - Humanities Performance SS - Social Science**

## Special Terms

**As Required:** This term designates a course or series of courses which will be offered only as enrollment, student interest, or individual department needs demand and as staffing allows. A course so designated may be offered if special student needs, situations of extreme hardship, or other unusual circumstances deem it in the best interest of both the student(s) and the institution to do so.

**Hours to be Arranged Each Term:** Normally students negotiate individually with faculty members and/or departments and arrange to have courses so designated offered for the term most suitable to their unique situation.

**Corequisite:** A course that must be taken simultaneously with another course. Corequisites are noted at the end of each course description.

**Prerequisite:** A course that must be passed satisfactorily before another course may be taken. Prerequisites are noted at the end of each course description. Courses transferred in to Oregon Tech with a C- or better meet the prerequisite requirement of obtaining a C or better.

**Quarter Credit:** A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than:

- One hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or
- At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution, including laboratory work, internships, practicals, studio work, and other academic work leading to the award of credit hours.

A numerical credit value assigned to certain number of lecture or laboratory hours. A lecture class meeting for three 50-minute periods a week would be assigned three units of credit. Students have traditionally been expected to spend an additional six hours of outside class work per week for each

three units of lecture class credit. Generally, a lab class requires three hours per week for one unit of credit, or a total of nine in-lab hours with no additional outside class work expected for three units of lab class credit.

**Reading and Conference:** A course taken on an independent study basis with the supervision of an instructor, usually consisting of weekly conferences, assigned readings, research papers, etc.

**Seminar:** A class taught by a group discussion process rather than by means of formal lecture. Student research and reporting are usually expected.

**Sequence:** A series of classes in the same subject area that, taken as a whole, comprise a full year's work. Generally, course sequences are numbered consecutively, and often (though not always) should be taken in the numerical order listed (i.e., CHE 201 should be taken before CHE 202, etc.).

# Applied Behavior Analysis

## ABA 501 - ABA Colloquium

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Weekly seminar focused on current topics, research in ABA. May be repeated for credit.

## ABA 507 – Seminar

Lecture Hours: 7

Lab Hours: 0

Credit Hours: 7

(Hours to be arranged each term.)

## ABA 511 - Foundations of ABA I

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic principles, characteristics, and concepts of Applied Behavior Analysis (ABA). Includes history of ABA, terminology, and applications.

## ABA 512 - Foundations of ABA II

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Foundational knowledge for practice of Applied Behavior Analysis (ABA): basic principles, characteristics and concepts of ABA.

Prerequisite: ABA 511 with grade "B" or better

## ABA 515 - Basic Behavior Analysis

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Experimental analysis of behavior, human and non-human research, basic principles of operant and respondent conditioning.

## ABA 516 - ABA and Human Development

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Typical and atypical development across the lifespan, emphasis on behavioral theories, principles, and applications.

Prerequisite: ABA 512 with grade "B" or better

## ABA 521 - Ethics & Professional Issues I

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Introduction to ethical and professional issues in Applied Behavioral Analysis (ABA). Compliance Code and professional identity, certification and licensure, confidentiality and privacy.

## ABA 522 - Ethics & Professional Issues II

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines ethical and professional issues in Applied Behavior Analysis (ABA) focus on Compliance Code and application to ethical and professional conduct, ethical decision making, and professional practices.

Prerequisite: ABA 521 with a grade "B" or higher

## ABA 524 - Observations and Measurements

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Theory and practice related to the BACB Task List items related to observation and measurement including: methods for conducting valid and reliable direct observation techniques including data collection, data display, and data interpretation; methods for calculating inter-observer agreement.

Corequisite: ABA 525

## ABA 525 - Research Methods in ABA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Methods for conducting valid and reliable behavioral measurement and experimental evaluations of behavioral interventions, including data collection, data display, and data interpretation and designing and evaluating behavioral research designs.

Corequisite: ABA 524

## ABA 526 - Behavioral Assessment I

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Behavioral assessment including descriptive assessments and functional analysis; methods of assessment, data

collection and interpretation; assessment based selection of intervention; ethical and practical issues.

Prerequisite: ABA 524 with grade "B" or better

## ABA 527 - Radical Behaviorism

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Concepts, principles, history, and philosophy of behaviorism; behavioral theory and understanding behavior.

Prerequisites: ABA 512 with grade "B" or better

## ABA 531 - Behavioral Change I: Decreasing Challenging Behavior

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Behavioral analytic interventions used to decrease behavior. Fundamental elements of, and ethical and practical considerations related to behavior change, behavioral interventions, behavior change systems, and specific behavior change procedures.

Prerequisite: ABA 512 with grade "B" or better

## ABA 532 - Behavioral Change II: Increasing and Maintaining Behavior

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Behavior analytic interventions used to increase and maintain behavior. Fundamental elements of, and ethical and practical considerations related to behavior change, behavioral interventions, behavior change systems, and specific behavior change procedures.

Prerequisite: ABA 531 with grade "B" or better

## ABA 535 - Special Topics in ABA

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of systems, interventions, current issues, and/or advances in Applied Behavior Analysis; includes focus on strategies for managing program implementation and supervision of behavioral change agents. Topics vary.

Prerequisites: ABA 525 and ABA 531

**ABA 536 - Behavior, Physiology, and Pharmacology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Interrelationship of physiological and behavioral processes, includes psychotropic medications, drug effects and interactions.

Prerequisite: ABA 515 with grade "B" or better

**ABA 546 - Behavioral Assessment II**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Assessment and measurement techniques related to skill deficits in children and adolescents with developmental or intellectual disability. Includes VB-MAPP, ABLLS, PEAK, EFL, AFLS, Vineland, social skills assessments, and others.

Prerequisite: ABA 526 with grade "B" or better

**ABA 547 - Supervision and Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Methods of behavior analytic personnel supervision and management including but not limited to ethical and professional responsibilities, establishing performance standards and goals, feedback, behavior skills training, problem solving, and evaluation of the effectiveness of supervision. Additionally, this course will serve to fulfill the curriculum requirement for the BACB Supervisor 8-Hour Training based on the Supervisor Training Curriculum (2.0).

Prerequisite: ABA 521 with grade "B" or better

**ABA 565 - Organizational Behavior Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Application of the theory, principles, and methods of behavior analysis in businesses, industries, human service organizations, and governments.

Prerequisites: ABA 522, ABA 525, and ABA 532 all with grade "B" or better

**ABA 566 - ABA and Education**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applications of behavior analysis in education; instructional design and classroom behavior management applications in education, special education, and college instruction.

Prerequisites: ABA 525 and ABA 532, both with grade "B" or better

**ABA 567 - ABA and Health**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Application of the theory, principles, and methods of behavior analysis to areas of behavioral medicine, individual health, and public health.

Prerequisites: ABA 522 and ABA 536, both with grade "B" or better

**ABA 575 - Community Behavior Analysis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applications of behavior analysis in the community; historical developments, conceptual issues, and practical issues are examined; applications to socially significant issues.

Prerequisites: ABA 525 and ABA 532, both with grade "B" or better

**ABA 576 - Clinical Behavior Analysis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Clinical applications of behavior analysis; focus on methods, theory, and evidence-based practices.

Prerequisites: ABA 522, ABA 525, and ABA 532, all with grade "B" or better

**ABA 577 - ABA and Special Populations**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applications of behavior analysis across diverse populations including intellectual and developmental disabilities, autism, and brain injury; ethical, legal, and practical considerations.

Prerequisites: ABA 521, ABA 525, and ABA 532, all with grade "B" or better

**ABA 598 - Supervised Practicum**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Supervised experience in Applied Behavior Analysis. Designed to meet Intensive Practicum experience standards and supervisory requirements of the Behavior Analysts Certification Board (BACB®). Students will have the opportunity to develop proficiency in behavior analytic consultation and service delivery. May be repeated for credit.

**ABA 599 – Thesis**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Supervised research experience for the thesis leading to the master's degree in Applied Behavior Analysis. May be repeated for credit.

Prerequisites: ABA 521, ABA 525, and ABA 531, all with grade "B" or better

**Academic Success****ACAD 101 - Student Success Sem**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 2

A course to facilitate the success of first year students at OIT. Emphasis on faculty-student and student-student interactions. Includes academic resources, campus services, the learning process, communication skills, health and wellness issues. May also include academic skills and career planning.

**ACAD 105 - Achieving Academic Success**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Course identifies attitudes, behaviors, and specific strategies that will lead to academic success at the college level. Topics may include study habits, time management, strategies for memorization and test-taking, and goal-setting.

**ACAD 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ACAD 115 - Career Exploration**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Effective academic and career decision-making is facilitated by thorough self-assessment, exploration of the world of work, and identification of appropriate academic majors. Course includes activities such as personality type testing, research, visits to academic departments, and information interviews with professionals in various occupations.

**ACAD 120 - Stress Management**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 2

Identifies signs and symptoms of stress as well as the ways in which they impact student academic success. Effective ways of dealing with stress, including relaxation techniques, will be identified, discussed and practiced.

**ACAD 135 - Reading Tutor**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

For 'America Reads' tutors. Provides information about how children learn to read and write, strategies for teaching children, and working in an elementary school.

**ACAD 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ACAD 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ACAD 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**Accounting****ACC 101 - Intro to Accounting**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The principles of elementary accounting systems for small businesses.

**ACC 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ACC 115 - Basic Income Tax Prep**

Lecture Hours: 2

Lab Hours: 4

Credit Hours: 3

Federal and state laws, ethics, and regulations applicable to individual income tax returns. Prepares tax preparers for the qualifying examination and meets the personal needs of individuals preparing their own returns.

**ACC 124 - Business Math/Machines**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Business math such as decimals, percents, markups, proration, and interest. Emphasis on operational techniques of electronic calculators for problem solving.

**ACC 201 - Prin of Accounting I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduction to terminology, content, and form of financial statements for sole proprietorships. Recording of data for use in preparing profit-and-loss statements and balance sheets.

Prerequisite: MATH 100 or equivalent

**ACC 202 - Prin of Accounting II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A continuation of ACC 201 with emphasis on corporate accounting.

Prerequisite: ACC 201 with grade "C" or better

**ACC 203 - Prin of Managerial Acct**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Theory and procedure in gathering cost data and their use in analyzing and controlling operation costs: job-order and process-cost systems. Technique of standard costs, analysis of variance,

managerial reports, and specialized cost programs including activity based costing systems.

Prerequisite: ACC 201 with grade "C" or better

**ACC 205 - Computerized Accounting**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Spreadsheet software used to solve accounting problems, model-building techniques. Integrated accounting software introduced.

Prerequisite: ACC 201

**ACC 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ACC 245 - Payroll Accounting**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Covers federal and state laws pertaining to wages, payroll taxes, payroll tax forms, and journal and general ledger transactions. Emphasis is placed on computing wages; calculating social security, income, and unemployment taxes; preparing appropriate payroll tax forms; and journalizing/posting transactions.

Prerequisite: ACC 101 or ACC 201

**ACC 295 - Individual Studies**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ACC 298 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ACC 299 - Laboratory Practice**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

**ACC 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ACC 320 - Cost Accounting I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Cost accumulation systems including job order costing, process costing and activity-based costing will be explored. Techniques to control and evaluate operations including variance analysis based on flexible budgets and standard costs.

Prerequisite: ACC 203 with grade "C" or better

**ACC 321 - Cost Accounting II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Continuation of Cost Accounting I.

Strategic planning and financial budgeting.

Cost measurement, planning, control and performance evaluation and behavioral issues. The role or responsibility

accounting for revenue, cost, contribution and profit centers will be investigated.

Prerequisite: ACC 320 with grade "C" or better

**ACC 325 – Finance**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Emphasis on working capital management, long-term finance, and capital structure.

Prerequisites: ACC 203, and MATH 105 or MATH 111

**ACC 331 - Interm Accounting I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Financial accounting concepts, theory, and practices involving current asset accounts; practical application of theory to accounting problems.

Prerequisite: ACC 202 with grade "C" or better

**ACC 332 - Interm Accounting II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Accounting concepts, theory, and practices involving ownership equities,

interpretation, analysis of financial statements, and correction of errors; practical application of theory to accounting problems.

Prerequisite: ACC 331 with grade "C" or better

**ACC 333 - Interm Accounting III**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Accounting concepts, theory, and practices involving plant assets, intangible assets and liabilities; practical application of theory to accounting problems.

Prerequisite: ACC 332 with grade "C" or better

**ACC 405 - Accounting Info Sys**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Analysis of accounting cycles and the associated controls with emphasis on problem solving and critical thinking.

Includes computerized accounting system implementation.

Prerequisites: ACC 332 and MIS 275

**ACC 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ACC 411 - Income Tax Procedures**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Federal and state income tax laws and regulations applicable to individuals and their businesses including computerized tax return preparation.

Prerequisite: ACC 333 with grade "C" or better

**ACC 412 - Corporate Taxation**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Federal tax law applicable to corporations, partnerships, and estates. Emphasis on tax research procedures, and locating and evaluating various sources of tax law.

Prerequisite: ACC 411 with grade "C" or better

**ACC 421 - Income Tax Procedures Lb**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

Lab accompanying class content in ACC 411.

**ACC 431 - Advanced Accounting I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Comprehensive study of problems in partnership accounting, fund accounting, branch accounting, and governmental accounting.

Prerequisite: ACC 333 with grade "C" or better

**ACC 432 - Advanced Accounting II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Analysis of problems facing small, medium, and large companies, with emphasis upon an integrated and concurrent decision making methodology applying economics, finance, accounting and tax theory.

Prerequisite: ACC 431 with grade "C" or better

**ACC 435 – Auditing**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduction to auditing concepts and practices. Topics include professional standards, audit planning and procedures, ethical considerations, internal controls, professional responsibilities, the acquisition and evaluation of audit evidence, and report writing.

Prerequisites: ACC 333 and ACC 405, both with grade "C" or better

**ACC 465 - Case Studies in Accounting**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The use of accounting cases to develop problem solving/critical thinking skills.

Application of the case methodology to all areas of accounting.

Prerequisites: ACC 431, ACC 435, and ACC 496, all with grade "C" or better

### **ACC 496 - Senior Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Development and implementation of an accounting related project for the benefit of an external entity and the student. Projects will include a proposal, analysis, design, and implementation. An oral presentation and project documentation will be required at the completion of each course.

Prerequisites: ACC 320 and ACC 405, or instructor consent

### **ACC 497 - Senior Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Development and implementation of an accounting related project for the benefit of an external entity and the student. Projects will include a proposal, analysis, design and implementation. An oral presentation and project documentation will be required at the completion of each course.

Prerequisites: ACC 320 and ACC 405, or instructor consent

## **Allied Health Education**

### **AHED 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **AHED 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **AHED 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **AHED 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **AHED 450 - Instructional Methods**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students develop instructional content and an instructional plan for teaching topics for adult learners. Teaching methods, learning styles, student and instructor evaluation, and use of media will be discussed.

Prerequisite: DH 380, or admission to the RCP or BDH degree completion program

### **AHED 451 - Instructional Experience**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Students create and structure their own instructional experience, participate in a clinical or laboratory setting as a supervising instructor, present a didactic unit using visual aids.

Prerequisite: AHED 450

### **AHED 452 - Instructional Practicum**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

Student and Faculty advisor design an individualized teaching experience. A learning contract is written and implemented.

Prerequisite: AHED 451 or AHED 460

### **AHED 460 - Fund of Distance Education**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students learn the fundamentals of online teaching and learning. Lesson plan developed in AHED 450 will be finalized as an online module. Synchronous vs. asynchronous learning, instructional design and course management as it relates to online instruction will be discussed.

Prerequisite: AHED 450

## **Allied Health**

### **ALH 505 - Intro to IT for Hlth Care Pros**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Students will get an introduction to information technology (IT) as it applies to healthcare and in learning IT tools for success in online education.

Prerequisite: Admission to the MSAH program

### **ALH 506 - Program Administration**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The roles, responsibilities and functions of administrators in healthcare and educational environments.

### **ALH 508 - Medical Ed. Theories & Methods**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Instructional methods for allied health educators. Emphasis on lesson plan design to meet learning style needs of adult learners. Learning objectives, active teaching strategies, traditional and non-traditional assessment, and evaluation are addressed for teaching in an on-campus or online environment.

### **ALH 509 - Masters Capstone Project**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

The capstone project is designed as a culminating clinical experience and provides an alternative to the thesis option. The student must present a formal capstone project plan prior to beginning the project to his/her graduate committee. Upon completion of the experience, the student will provide a written evaluation of the project. The student will also preform an oral presentation and oral defense to his/her committee.

Prerequisite: Admission to the MSAH program

### **ALH 510 - The Science of Evidence-Based Medicine**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Modern health practices often claim that they are "evidence based", but sometimes the quality of the evidence isn't as good as one would hope. This course looks at a variety of medical and health issues and evaluates the reliability of the evidence. Topics include menopausal hormone replacement therapy, screening for breast, prostate, thyroid and colon cancer, and nutritional/dietary recommendations.

Prerequisite: Admission to the MSAH program

### **ALH 515 - Scientific Writing & Healthcare**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A large focus of this class is in reading and interpreting scholarly literature related to healthcare leadership. In addition, students will be learning to write using instructor led professional and scientific methods.

Prerequisite: Admission to the MSAH program

### **ALH 525 - Effective Healthcare Leadership**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The students will explore best practices in team leadership including team theories and safety concerns as they apply to healthcare. Real life case examples will be taught and the students will be able to practice their team leadership skills to learn how to effectively lead healthcare teams.

Prerequisite: Admission to the MSAH program

### **ALH 535 - Assmt. Plan. Imp. and Eval.**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focus is teaching students to assess needs, plan effectively, implement changes and evaluate their own success in a healthcare setting. Prerequisite: Admission to the MSAH program

Prerequisite: Admission to the MSAH program

### **ALH 545 - Pertinent Ethical & Legal Cons**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Common real-life healthcare ethical cases will be presented and discussed in this class with a focus on the role of a healthcare leader in handling difficult ethical situations. Healthcare legalities will be introduced to help with liability and malpractice, etc.

Prerequisite: Admission to the MSAH program

### **ALH 555 - Leadership Theory for Healthcare Leaders**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A wide range of scholarly leadership theories will be discussed, ranging from military leadership models to Gardiner's Servant Leadership Model. Students will self-assess to evaluate their own leadership and communication styles along with their own power and influence styles. These research based leadership theories will be applied to healthcare leadership and best practices.

Prerequisite: Admission to the MSAH program

### **ALH 565 - Population Health Issues for Allied Health Professionals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Population health issues and needs will be discussed in all aspects particularly as it applied to healthcare leadership.

Prerequisite: Admission to the MSAH program

### **ALH 575 - Methods of Research for Allied Health Professionals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The various types of healthcare research will be discussed including qualitative, quantitative, and mixed methods. Students will design their own research project that will include data collection and analysis, with particular attention given to the planning process of the research and choosing appropriate methodology.

Prerequisite: Admission to the MS MAH program

Prerequisite: Admission to the MSAH program

### **ALH 585 - Financial Considerations & Policy Strategies**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students will be introduced to best practices in healthcare finances including health care policies and funding sources. The emphasis will be to teach students how to incorporate successful financial models into their own healthcare organizations. Discussions will take place to include the best practices in using

political models and strategies related to demand and supply within healthcare settings. Prerequisite: Admission to MS MAH program

Prerequisite: Admission to the MSAH program

### **ALH 595 - Curriculum Design for AHP**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Creating the best healthcare curriculum that ensures the best practices and student outcome will be emphasized. How to manage healthcare curriculum with consideration to needs assessment and program specific accreditation standards will be discussed.

Prerequisite: Admission to the MSAH program

### **ALH 599 - Master's Thesis Presentation**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

The topic of thesis must be approved by the Program Director. The student and Program Director will help form a committee of three faculty members to serve in an advisory role. The thesis topic will be selected by the candidate with the advice and approval of the Program Director. The student must prepare a written document describing the research problem, purpose, data collection, data analysis, research methods, interpretation methods and any other concerns related to the research. After the thesis topic has been researched and written, the student will perform an oral presentation and oral defense to his/her committee.

Prerequisite: Admission to the MSAH program

## **Anthropology**

### **ANTH 101 - Intro to Physical Anthropology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to physical anthropology, emphasizing man's place in the animal kingdom, evolution of man, fossil hominid forms, Paleolithic cultures, and principles of genetics. Satisfies either a science elective or a social science elective.



**ANTH 102 - Intro to Archaeology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Survey of the science of archaeology. Covers the biological and social evolution of the human species with emphasis on the growth of human populations and social complexity. Relates site-specific evidence to theories of social change. Discusses field and laboratory methods of archaeology.

**ANTH 103 - Intro to Cultural Anthropology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Culture, language, subsistence patterns, group formation, kinship, economic systems, political organizations, religion, and cultural change.

**ANTH 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ANTH 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ANTH 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ANTH 335 - The Built Environment**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An examination of the American built environment from historical to modern times and the role it plays in shaping American Society. The topics include city planning, architecture, transportation technologies, dam and bridge building, and urban sprawl.

**ANTH 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ANTH 452 – Globalization**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Addresses what globalization is and how it developed and spread. Benefits and harms of globalization in the areas of work, culture, warfare, national sovereignty, health, and food. Countervailing pressures from social movements will be examined. Prerequisite: WRI 122

**Art****ART 107 – Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**ART 205 - Introduction to Watercolors**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introductory studio course in beginning watercolor painting. Students will learn a variety of watercolor techniques as well as elements of design and aesthetics.

**ART 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ART 210 - Beginning Sculpture**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introductory studio course in beginning sculpture, emphasizing basic materials and techniques.

**ART 215 - Design Arts and Aesthetics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students learn how to think like designers through critical analysis of design principles, enabling them to differentiate between good and bad design as well as how to influence perception, increase appeal, and problem solve when designing.

**ART 220 - Basic Drawing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Designed for the student who has an interest in exploring the field of pictorial representation but has had, for a variety of reasons, little opportunity to do so.

**ART 226 - Digital Photography**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Studio course in digital photography, studying and producing photographs. Focus on digital exposures, color, location, Photoshop techniques and issues in photography. Students must have the use of a digital SLR camera or a digital camera with manual settings.

**ART 280 - Introductory Painting**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Offers an opportunity to study rendering in color by exposure to a study of color and color mixing, tones, and values with an introduction to acrylics, watercolors, and oils.

**ART 282 - Intro to Acrylic Painting**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introductory studio course with emphasis on basic materials and techniques in acrylic painting.

**ART 307 – Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**ART 315 - Design Thinking**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students learn how to collaborate and tackle complex problems through creative design strategies, and develop an ability to define the problem, increase empathy, ideate and pitch their idea. Prerequisite: Junior standing

**ART 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

# Biology

## **BIO 101 - Intro to Cell Biology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to cell biology, genetics, basic chemistry of living organisms, and the scientific method.

## **BIO 102 - Diversity of Life**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Evolution and phylogenetics among all major groups of living organisms, including bacteria, protists, fungi, plants and animals.

## **BIO 103 - Intro to Human Anat & Phys**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Basic human anatomy and physiology, including a survey of all major bodily systems. (Cannot be used for graduation credit by students who have taken BIO 231, BIO 232, and BIO 233).

## **BIO 105 – Microbiology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Classification, morphology, reproduction, transmission, and control of micro-organisms causing disease in man. Laboratory practice in culturing methods, microscopic observation, and physical and chemical control.

## **BIO 107 – Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

## **BIO 109 - Intro to Medical Sciences**

Lecture Hours: 1

Lab Hours: 2

Credit Hours: 2

Survey of medical and health-related occupations, including biomedical sciences. Discussion of health care structure, private and public entities, the research community, and trends in health education and practice.

## **BIO 135 - Prep for Human A&P**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Study techniques for a science course are explored using examples of Human Anatomy and Physiology.

Corequisite: BIO 231

## **BIO 200 - Medical Terminology**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Basic structure of medical words including prefixes, suffixes, roots and combining forms. Correct spelling, pronunciation, and meaning of terms are stressed.

## **BIO 205 – Nutrition**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A study of the relationships of food and nutrition to health. An overview of the basic nutrition principles including the nutrients and how they function in the body, nutrient requirements, diet planning, and energy balance. Current topics and controversies are examined.

## **BIO 207 – Seminar**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

## **BIO 209 - Current Research Tpc Med Sci I**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Introduces students to topics in medicine focusing on global health issues, infectious and chronic diseases. Projects in medical literature research, understanding scientific paper format, preparing technical presentations and public speaking.

Prerequisite: Biology or Health Sciences major, or instructor consent

## **BIO 211 - Principles of Biology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Principles of modern biology emphasizing form and function of multicellular plants, major invertebrate phyla, and general vertebrate morphology and physiology.

## **BIO 212 - Principles of Biology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Principles of modern biology emphasizing evolution, ecology, population genetics, and behavior of organisms.

## **BIO 213 - Principles of Biology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Principles of modern biology emphasizing the biochemical basis for life processes, cell structure, and function. Molecular genetics, cell reproduction, metabolism, and form and function of microorganisms.

## **BIO 216 - Intro to Veterinary Medicine**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Covers many aspects of animal health care and their impact society. Discussions cover husbandry, anatomy, preventive medicine, common diseases and behavioral problems of dogs, cats, horses and exotics. Some hands-on work with dogs, horses, and wildlife is included.

## **BIO 220 - Cardiovascular Physiology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Application of principles of fluid dynamics to the human vascular system. Detailed considerations of cardiac function and its regulation, analysis of flow in arterial, venous and capillary systems, and integration of cardiovascular regulation. Prerequisite: BIO 233

## **BIO 226 - Intro to Wildlife Rehab**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of wildlife rehabilitation including state and federal laws, medical terminology, basic anatomy, natural history and diet, form and function, and euthanasia. Field captures, basic restraint, first aid, minimum housing requirements, and zoonotic diseases are also included.

## **BIO 227 - Intro to Forensic Science**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An entry level course exploring the

methodologies and procedures utilized by crime scene investigators and forensic laboratories. Emphasis on crime scene investigation, recognition, documentation, and collecting of physical evidence. Laboratory exercises provide hands-on opportunities supplementing lecture topics.

### **BIO 231 - Human Anatomy/Physiology I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to the systematic studies of human anatomy and physiology.

Introduction to cytology and histology followed by the integumentary, skeletal, muscular and endocrine systems and the physiology of excitable tissues. The laboratory sessions emphasize human anatomy using models and human cadavers.

### **BIO 232 - Human Anatomy/Physiology II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A continuation of the systematic study of human anatomy and physiology. The nervous, cardiovascular and immune systems are studied. The laboratory sessions emphasize human anatomy using models and human cadavers. Dissections and physiological experiments are conducted.

Prerequisite: BIO 231 with grade "C" or better

### **BIO 233 - Human Anatomy/Physiology III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Conclusion of the sequence in human anatomy and physiology. Digestive, respiratory, renal and reproductive systems are examined. Metabolism, human genetics and development are also studied. Laboratory sessions emphasize physiological experiments and human anatomy using models and human cadavers.

Prerequisite: BIO 232 with grade "C" or better

### **BIO 235 - Human Genetics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Genetic concepts using human examples, including the molecular and cellular basis of inheritance, patterns of inheritance, basic pedigree analysis, mutation, single-gene and polygenic diseases, and an introduction to genetic biotechnology.

Prerequisite: BIO 233

### **BIO 247 - Forensic Anthropology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The morphological characteristics unique to the human skeleton that are used in establishing population demographics will be discussed and demonstrated. The laboratories are designed as hands-on experience applying the methodologies as presented in the lecture session.

### **BIO 307 – Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

### **BIO 313 – Botany**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Introduction to classification and identification of vascular plants, emphasizing major plant families in California and Oregon; field and herbarium techniques. Weekend field trips required.

Prerequisites: BIO 211 and BIO 212

### **BIO 326 – Parasitology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Parasitic infections of humans and animals (especially by protozoa and helminths). The course will cover parasite taxonomy, life cycles, epidemiology, clinical features, laboratory diagnosis, treatment and prevention. Students will practice various diagnostic techniques in the laboratory.

Prerequisite: BIO 105 or BIO 213 or BIO 233, or instructor consent

### **BIO 331 - Human Anatomy/Physiology I**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 5

An in-depth systematic study of human anatomy and physiology of the integumentary, skeletal, and muscular systems. Laboratories include histology, examination of human bones, cadaver dissection, computer-aided physiology studies and other hands-on activities.

Prerequisites: BIO 213 and CHE 223, both with grade "C" or better

Pre- or Corequisite: BIO 200 or instructor consent

### **BIO 332 - Human Anatomy/Physiology II**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 5

An in-depth systematic study of human anatomy and physiology of nervous, endocrine and cardiovascular systems. Laboratories will include histology, cadaver dissection, computer-aided physiology studies, and other hands-on activities.

Prerequisite: BIO 331 with grade "C" or better, or instructor consent

### **BIO 333 - Human Anatomy/Physiology III**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 5

An in-depth systematic study of human anatomy and physiology of the lymphatic, respiratory, digestive, urinary and reproductive systems and an overview of embryology. Laboratories will include histology, cadaver dissection, computer-aided physiology studies, and other hands-on activities.

Prerequisite: BIO 332 with grade "C" or better, or instructor consent

### **BIO 335 - Cross-Sectional Anatomy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Cross-sectional anatomy correlated with computer tomography, ultrasonography, and magnetic resonance imaging.

Prerequisite: BIO 233

**BIO 336 - Essentials of Pathophysiology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of dynamic aspects of disease process with emphasis on abnormal physiology. Detailed discussion of cellular alterations, normal immunology, neoplasia, inflammation, and alterations of the respiratory and skeletal systems, and Diabetes Mellitus.

Prerequisites: BIO 200 and BIO 233

**BIO 337 - Aquatic Ecology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Lotic and lentic ecosystems, hydrologic principles, processes and patterns of development, abiotic-biotic interactions, aquatic organisms and trophic structures, nutrient cycles and eutrophication, effects of disturbance, bioassessment techniques, management and restoration case studies.

Prerequisite: BIO 212

**BIO 341 - Medical Genetics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of heredity, chromosome mechanisms and molecular genetics applied to disease processes in humans. Review of case histories of selected inherited disorders. Discussion of genetic intervention therapies.

Prerequisite: BIO 213 or BIO 233 or instructor consent

**BIO 342 - Cell Biology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Organelle organization, protein sorting, cell signaling, cytoskeletal functions, cell division mechanics, and cell interactions in development and aging.

Prerequisite: BIO 211 and BIO 212 and BIO 213, or instructor consent

**BIO 345 - Medical Microbiology**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Mechanisms of pathogenicity and virulence relating to disease-causing viruses, bacteria, fungi, and other microorganisms. Host-parasite relationships and immunology, microbial

physiology and genetics. Laboratory procedures and identification of selected bacteria and parasites.

Prerequisite: BIO 213 or BIO 233 or instructor consent

**BIO 346 - Pathophysiology I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the dynamic aspects of the disease process with emphasis on abnormal physiology. Detailed discussion of cellular alterations, normal and abnormal immunology, neoplasia, inflammation, arteriosclerosis, hypertension, cardiac and vascular diseases.

Prerequisites: BIO 200, and BIO 233 or BIO 333 with grade "C" or better, or instructor consent

**BIO 347 - Pathophysiology II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the dynamic aspects of the disease process with emphasis on abnormal physiology. Detailed discussion of alterations of respiratory function, liver and digestive system, neurologic, urinary, musculoskeletal disorders, and Diabetes Mellitus.

Prerequisite: BIO 346 with grade "C" or better, or instructor consent

**BIO 352 - Developmental Biology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

This course will explore the developmental processes of selected invertebrate and vertebrate groups. The event of gametogenesis, fertilization, gastrulation, neurulation, and post-embryonic development will be discussed. The role of differential gene expression in developmental pathways will be covered.

Prerequisite: BIO 211 and BIO 212 and BIO 213, or instructor consent

**BIO 354 - Environmental Health**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A multidisciplinary exploration of Environmental Health across scales from local to global including the history of public health and infrastructure and

linkages between air and water quality, environmental psychology, environmental justice, epidemiology, toxicology, food production, waste, genetics, and climate change.

Prerequisite: BIO 211 or BIO 212 or instructor consent

**BIO 357 - Intro to Neuroscience**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This is an introductory course covering the organization and function of the human nervous system to build a foundation of general knowledge in a neurobiology of such topics as sensory/motor systems, the brain and behaviours, the biological basis of brain development, and learning of memory.

Prerequisite: PSY 339 (PSY 339 is not needed if taken BIO 232 or BIO 332)

Pre- or Corequisite: BIO 232 or BIO 332

**BIO 366 – Zoology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Organismal and integrative approach to the study of animal functional morphology, ecological physiology, behavior and interactions, development and evolution.

Prerequisites: BIO 211 and BIO 212

**BIO 367 - Plant Ecology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Overview of plant ecology including physiology, populations, communities, and ecosystems. Some topics covered are unique to plants, such as photosynthesis, and other topics, not necessarily unique to plants, emphasize the distinctive ways that plants deal with their environments.

Weekend field trip required.

Prerequisites: BIO 211 and BIO 212

**BIO 375 - Cross Sectional Anatomy II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Continuation of cross section anatomy not including in BIO 335. This course covers MR images of the joints of the wrist, elbow, shoulder, ankle, knee, hip, thorax, spine and arterial system form the arch of the aorta to the Circle of Willis, as

demonstrated by MRA.  
Prerequisite: BIO 233

### **BIO 377 - Wildlife Ecology**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4  
Fundamental concepts and applied methods in the study of wildlife populations. Focus on study design, habitat, and animal movements. Develop skills in wildlife data analysis, animal capture, marking and remote tracking.  
Prerequisites: BIO 211 and BIO 212

### **BIO 386 – Ornithology**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4  
Introduction to avian evolution, biology, ecology, and behavior with lab emphasis on the avian field studies and identification of birds Oregon and the Klamath region and skills and concepts for careers in wildlife and natural resources.  
Prerequisites: BIO 211 or BIO 212 or instructor consent

### **BIO 407 – Seminar**

Lecture Hours: 15  
Lab Hours: 15  
Credit Hours: 15  
(Hours to be arranged each term.)

### **BIO 409 - Crnt Rsch Tpcs in Med Sci II**

Lecture Hours: 2  
Lab Hours: 0  
Credit Hours: 2  
A continuation of BIO 209 covering topics in medicine focusing on global health issues, infectious and chronic diseases. Projects in medical literature research, understanding scientific paper format, preparing technical papers and presentations, and public speaking.  
Prerequisite: BIO 209 or instructor consent

### **BIO 426 - Evolutionary Biology**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Principles of evolutionary science, including speciation, biogeography, biodiversity, population genetics, natural selection and coevolution.  
Prerequisite: BIO 211 and BIO 212 and BIO 213, or instructor consent

### **BIO 434 - Data Analysis Methods**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4  
Fundamental principles of data analysis from field projects, data archives, and other sources. Analysis of variance, hypothesis testing, random processes. Regression and times series analysis. Discussion and practice of data visualization and presentation techniques.

### **BIO 435 - Exercise Physiology**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Physiological response to single bouts of exercise and longer term training, considering resistance and aerobic exercise effects on metabolism, skeletal muscle, the cardiovascular system, and the respiratory system. Additional applications of exercise and training in performance and human health.  
Prerequisite: BIO 233 or BIO 333 or instructor consent

### **BIO 436 – Immunology**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4  
Cellular and humoral immunology including innate immunity, acquired immunity, antibodies, anatomy of immune response, production of effectors, adversarial strategies during infection, immunodeficiency, and transplantation.  
Prerequisite: BIO 213 or BIO 233 or instructor consent

### **BIO 446 - Conservation Biology**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Study of global patterns and threats to biodiversity. In-depth focus on ecosystem services, habitat fragmentation, design of conservation reserves, conservation funding and politics, and understanding and communicating of climate change.  
Prerequisites: BIO 211 and BIO 212

### **BIO 461 - Human Cadaver Dissection**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Study of human anatomy utilizing cadaver dissection. Attention will be given to three-dimensional relationships of

structures, appreciation of textural differences, and development of palpation skills. Recognition of pathologic abnormalities and individual variations will be investigated.  
Prerequisites: BIO 233 or BIO 333, and instructor consent

### **BIO 462 - Human Cadaver Dissection**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Study of human anatomy utilizing cadaver dissection. Attention will be given to three-dimensional relationships of structures, appreciation of textural differences, and development of palpation skills. Recognition of pathologic abnormalities and individual variations will be investigated.  
Prerequisites: BIO 233 or BIO 333, and instructor consent

### **BIO 495 - Research Project in Biology**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: Varies (1-4)  
Supports student-initiated research projects in biological sciences. Topic and scope must be reviewed and accepted by a faculty advisor. May be repeated for up to nine total credits.  
Prerequisite: Instructor consent

## **Business**

### **BUS 101 - Introduction to Business**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
An introductory course covering the basic aspects of business, marketing, management, production, accounting, and finance. Exploration of the various forms of business ownership. Examination of the role of business in the economy, and society. Discussion of cultural, ethical and current events, and trends affecting business. Exposure to the multiple career fields in the areas of business.

### **BUS 107 – Seminar**

Lecture Hours: 15  
Lab Hours: 15  
Credit Hours: 15  
(Hours to be arranged each term.)

**BUS 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**BUS 215 - Principles of Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the history of management. Emphasis on the management functions of planning, organizing, directing and controlling; existing and emerging management theories, social responsibilities and business ethics.

(Cannot be taken for graduation credit by students who have taken BUS 304 or BUS 317.)

**BUS 223 - Marketing I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles that drive the integration of the marketing mix (product, price, place, promotion) to meet the needs and wants of consumer and business markets. Function of market research and the study of market opportunities to grow and sustain organizations.

**BUS 226 - Business Law**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The fundamentals of business law: the structure of federal and state courts and agencies, their decision processes; the legal structure of modern business organizations including closely and publicly held corporations, partnerships, limited partnerships, nonprofit corporations, sole proprietorships and limited liability companies; contract law; Uniform Commercial Code; tort law and its implications for business; administration law; and criminal law as it applies to business and industry.

**BUS 256 - Business Communications**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Emphasis on effective content, structure, tone and visual format for both internal and external communication. Students will compose various commonly occurring business documents achieving

effectiveness in design, organization, content, and style, applying current graphic design and visual-design principles.

Prerequisites: BUS 215 or BUS 223

**BUS 304 - Engineering Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The engineering management process. The unique aspects of managing 'knowledge workers.' The manager's role in planning, organizing, leading and controlling. Managing design and new products development, materials, and inventory. Organizational styles, structures, and policies. Human resource management for individuals and groups. (Cannot be taken for graduation credit by students who have taken BUS 215 or BUS 317.)

Prerequisite: Junior standing or instructor consent

**BUS 307 – Seminar**

Lecture Hours: 16

Lab Hours: 0

Credit Hours: 16

(Hours to be arranged each term.)

**BUS 308 - Prin of International Business**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to international business fundamentals in the areas of cultural, ethical, legal and economic environments, international financial tools and instruments, international trade theory, manufacturing strategies, international supply chain management, country selection, exchange rate mechanics and international human resource management.

Prerequisite: WRI 121

**BUS 313 - Health Care Systems & Policy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course will explore the U.S. Health System focusing on its historical development, current configuration and possibly future direction. Included will be the study of health system development, key influencers, accessibility, financiers, employers, government and insurers. Particular attention will be paid to the

future direction of healthcare and what parts of the system are likely to change.

Prerequisite: WRI 227

**BUS 314 - Entrepreneurship I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Start-up concepts and models.

Identification and assessment of the critical factors that lead to a successful start-up. Focus on small business idea generation and the analysis of market opportunities in B2C and B2B markets. Conduct a market and financial feasibility study.

**BUS 316 - Total Quality Health Care**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The health care quality management process, contemporary issues and trends involved with quality control, organization structures, policies, human factors and teamwork.

Prerequisite: Junior standing

**BUS 317 - Health Care Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The health care manager's role in planning, organizing, leading, and controlling. Special emphasis on the unique and complex issues involved in health care management. Organizational structures. Strategic and operational planning. Health care finance and budgeting. The future of management. (Cannot be taken for graduation credit by students who have taken BUS 215 or BUS 304.)

Prerequisite: WRI 121

**BUS 318 - Marketing II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced study markets with a focus on the motivation and behavioral characteristics of consumers. Study and apply analytics, technology and data-driven decision making in the formation of a customer-centered marketing and marketing communication strategy.

Prerequisites: BUS 223 and PSY 201

**BUS 319 - Integrated Marketing Comm.**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Integrated marketing communication promotion mixes and strategies, tactics and media to influence buyer behavior and brand equity with various markets.

Application of marketing communication tools through the development of a promotional campaign with goals, core themes, designs, budgets and specifications.

Prerequisite: BUS 223 or BUS 337

**BUS 325 - Finance Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic issues and methodology of financial management. Emphasis placed on working capital management, sources of short-term and long-term funds, and optimal capitalization of the firm.

Prerequisites: BUS 215 and ACC 203

**BUS 326 - Sales/Sales Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamentals of selling products and services and sales management in various markets, buying behavior and processes, adaptive selling skills, establishing and selling the value proposition, role playing and sales simulations, after sale considerations and review of customer relationship management systems.

Prerequisites: ACC 201 and BUS 223

**BUS 328 - Health Care****Accounting/Finance**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

General principles and application of managerial accounting in health care organizations. Theory and procedure in gathering cost data and their use in analyzing and controlling operation costs: job-order and process-cost systems.

Revenue cycle, sources and system analysis of variance, cost effectiveness and managerial reporting are examined.

Prerequisite: ACC 201

**BUS 331 - Personal Finance**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the basic principles of personal financial planning and budgeting. Includes banking services, consumer credit, asset purchases, insurance, and the fundamentals of investments and retirement planning.

**BUS 335 - Entrepreneurship II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Complete a full marketing, financial and operational business plan for a new business venture. Students will learn and apply fundamental strategic decisions for small business entrepreneurs in all facets of starting, operating and growing a business.

**BUS 337 - Prin of Health Care Marketing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamentals of health care marketing covering strategy, planning process, assessment, marketing actions, branding and evaluation.

**BUS 345 - Fraud Examination**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of fraud and fraud investigative techniques. Topics include nature of fraud, types of fraud, fraud prevention, detection and investigation methods, and legal follow-up procedures.

**BUS 349 - Human Resource Management I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles, theories and applications of HR management in the areas of strategy, workforce planning, employment law, job analysis, recruitment, selection, training, performance management and international HRM.

Prerequisite: BUS 215 or BUS 304 or BUS 317 or instructor consent

**BUS 356 - Business Presentations**

Lecture Hours: 3

Lab Hours: 4

Credit Hours: 4

Design, preparation and delivery of effective business presentations. Emphasis on integration of skills in speech and digital communication software to deliver effective, informative and persuasive presentations in any business or organization.

Prerequisites: SPE 111

**BUS 387 - International Human Res Mgmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In-depth review of human resource selection, training for international assignments, managing the expatriate manager, compensation packages, repatriation training, women and dual-career couples, conflicting interests of parent company and host country and managing joint ventures.

Prerequisite: BUS 308

**BUS 390 - Applied Management Internship**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

This course provides credit for an approved internship related to the student's program. Students work in a supervised setting where they receive training to develop career related skills while applying college learned theory.

Prerequisite: Instructor consent

**BUS 397 - Human Resource Management II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles, theories, and applications of HR management in the areas of compensation, benefits, safety, labor relations, employee rights and engagement.

Prerequisite: BUS 349

**BUS 399 - Marketing Special Topics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Concentrated areas of marketing will be taught on a rotating basis: business to business, hospitality and travel, entertainment and sports, high tech, direct marketing and public relations.

Prerequisite: BUS 223

**BUS 405 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**BUS 407 – Seminar**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**BUS 414 - Marketing Research**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the research function as it applies to marketing. Research methodology, design, surveys, data collection, interpretation and recommendations.

Prerequisites: MATH 361 and WRI 227

**BUS 415 - Environmental Regulation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Legislation and enforcement activities involving natural and industrial environments. Conservation laws, land use and planning, responsibilities of regulatory agencies, review of current legislative actions and judicial decisions.

Prerequisite: BIO 112 or BUS 226

**BUS 416 - Environmental Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Review of contemporary management issues and business practices related to land use management and planning, ecological planning, environmental quality engineering and control, and natural resource economics.

Prerequisites: BUS 415, and ECO 201 or BIO 112

**BUS 420 - Applied Management Internship**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

This course provides credit for an approved internship related to the student's program. Students work in a supervised setting where they receive training to develop career related skills while applying college learned theory. This course can substitute for BUS 496.

Prerequisite: Instructor consent

**BUS 434 - Global Marketing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Comprehensive study of global business issues that develop strategic visions for market entry in emerging and developed countries, analyzing financial and pricing considerations, evaluating strategies of export versus local manufacturing, developing a marketing program that demonstrates implementation of global business principles.

Prerequisites: BUS 223 and BUS 308

**BUS 435 - Marketing III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Management marketing strategies within a marketing centric business or organization, including the development of new products and services in response to market demands. Development of collaborative strategies in distribution, pricing and product/service mixes for new products, services and line extensions.

Prerequisite: BUS 318

**BUS 441 - Leadership I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Role of managers and leaders within an organization. Recognizing styles, competencies and traits of a leader and strategic application within a working environment through case analysis and discussion, introduction and development of personal leadership skills.

Prerequisite: BUS 215 or BUS 304 or BUS 317

**BUS 442 - Leadership II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Leadership in developing and communicating vision/mission and values setting ethical standards. Leading and developing multi-levels of managers. Mentoring high potential managers and transformational leaders. Leadership during conflict, change and diversity. The role of the leader in organizational development.

Prerequisite: BUS 441

**BUS 447 - Controversial Issues in Mgmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of the many controversial issues in management such as social responsibility, whistle blowing, outsourcing, drug testing, Affirmative Action and so on. Students will study opposing views and arguments from a variety of viewpoints. Discussion and debate develops critical thinking skills.

Prerequisites: BUS 215, BUS 304 or BUS 317, PSY 347, WRI 122, and Junior standing

**BUS 456 - Business Research Methods**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Research design, exploration, and proposals. Hypotheses formulation and testing. Data sources, collection and analysis. Survey design, sampling and census techniques. Library and on-line information retrieval sources. Effective search strategies.

Prerequisites: MATH 243 or MATH 361, and BUS 215 or BUS 304 or BUS 317

**BUS 457 - Business Research Methods II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Emphasizes quantitative elements of research methods including presenting and describing information, drawing conclusions about populations using sample information; and improving business processes.

Prerequisites: BUS 215 or BUS 304 or BUS 317, and MATH 243 or MATH 361



**BUS 467 - Service Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The nature of service and service encounters, strategy, and competitiveness.

Design of service systems. Facilities location, design, and layout. Service quality and continuous improvement.

Prerequisite: BUS 215 or BUS 304 or BUS 317

**BUS 473 - Marketing Plan Development**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Development of an in-depth marketing plan for a local community business. All aspects of the plan will be covered in detail.

Prerequisites: BUS 223 and BUS 319

**BUS 478 - Strategic Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Comprehensive study and analysis of businesses and/or case studies. Evaluation of strategic and operational decision making. Performance analysis in areas of finance, marketing and social performance.

Prerequisites: ACC 203, WRI 227, and Senior standing

**BUS 495 - Senior Project Proposal**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of senior internship and/or project process and requirements.

Definitions of a suitable senior internship or project topic and preparation of a formal proposal. Topics dealing with client contact, task definition, privacy and confidentiality, initial research, presentation of results.

Pre- or Corequisites: BUS 456 or BUS 457, and MGT 335

**BUS 496 - Senior Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students finalize project plan and complete data gathering and analysis portion of a project for a client or an independent research project. Topics include completing research, data gathering and analysis. Interim project report is written.

Prerequisite: BUS 495 with grade "C" or better

**BUS 497 - Senior Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students complete project started in BUS 496 including preparing a detailed project report and delivering a final PowerPoint presentation. Periodic progress reports required. Instructor functions as a consultant.

Prerequisite: BUS 496 with grade of "C" or better

Pre- or Corequisite: BUS 356

**BUS 507 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**BUS 525 - Marketing Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Topics include concepts related to the marketing management function of segmentation, brand equity, customer value analysis, integrated marketing, internal marketing and various organizational roles in moving a firms' products or services to end-users profitability and with value to the customers.

## Civil Engineering

**CE 107 - Seminar**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

**CE 203 - Engineering Graphics**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Graphical communication in civil engineering using computer-aided drafting and design software. Includes development of drawings related to civil engineering projects such as roads, subdivisions and buildings, development of scaled plots and reading of engineering drawings.

**CE 205 - Computational Methods**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Solve applied problems involving formulas, functions, summation and iteration using Excel and VBA. Use built-in functions and graphing capabilities.

Prerequisite: MATH 112 with grade "C" or better

**CE 207 - Seminar**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

**CE 208 - Princ of Professional Practice**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Civil engineering professional practice topics including project acquisition, development, management and delivery. Business in civil engineering including ethics, economics, leadership, communication and legal matters, current and emerging trends in practice.

**CE 212 - Civil Engineering Materials**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Study of the engineering properties of soil as well as portland cement and asphaltic concretes. Field and laboratory testing methods for classifying soil. Mix design of concretes.

Prerequisites: ENGR 102 and MATH 111, both with grade "C" or better

**CE 299 - Independent Studies**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**CE 307 - Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**CE 308 - Princ of Professional Practice**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Civil engineering professional practice topics including project acquisition, development, management and delivery. Business in civil engineering including ethics, economics, leadership, communication and legal matters. Current and emerging trends in practice.

Prerequisites: ENGR 102 and MATH

111, both with grade "C" or better

**CE 311 - Intro to Geotechnical Engr**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Soil permeability, seepage, filters, effective stress, consolidation, settlement, shear strength, slope stability, stresses in soils, and stresses under loaded areas.

Includes laboratory testing.

Corequisite: CE 212 with grade "C" or better

**CE 312 - Earth Pressures &****Foundations**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis and design of shallow footings, deep foundations include piles, caissons and earth retaining structures design. Use of computer applications for design of these structures.

Prerequisite: CE 311 with grade "C" or better

**CE 331 - Structural Analysis**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Structural loads according to ASCE 7. Analysis of statically determinate trusses and frames. Shear and moment diagrams, deflections, and influence lines for statically determinate structures. Analysis of statically indeterminate structures by force and displacement methods. Software applications emphasized in labs.

Prerequisite: ENGR 213 with grade "C" or better

**CE 341 - Elementary Structural Design**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Fundamentals of structural element design:

emphasis on structural steel, reinforced concrete, and timber beams and short columns as well as reinforced masonry lintels and walls due to gravity loads. Labs include construction, material and destructive testing, and software applications.

Prerequisite: CE 331 with grade "C" or better

**CE 351 - Intro to Transportation Engr**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to the design, planning, operation, management and maintenance of transportation systems with a focus on the highway and railway modes. Principles of planning multi-modal transportation systems, layout of roadways, traffic flow modeling and capacity analyses.

Prerequisites: ENGR 211 and GME 161, both with grade "C" or better

**CE 354 - Traffic Engineering**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Principles of traffic engineering and operation, traffic engineering studies, signalized intersection design, traffic analysis software.

Prerequisite: CE 351 with grade "C" or better

**CE 371 - Closed Conduit Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Population and factors influencing water supply demands, fire flows, peaking factors and storage requirements. Flows in pressure pipe systems, pipe networks analysis and design techniques. Estimation of wastewater flows including I/I considerations. Gravity-fed collection system design, construction and maintenance.

Prerequisite: ENGR 318 with grade "C" or better

**CE 374 – Hydrology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Study of the hydrologic cycle, measurement of rainfall, runoff and streamflow. Curve fitting, hydrographic analysis, statistical analyses of extreme

flows, flood routing and storage capacity. Runoff modeling and design of hydrologic structures and systems.

Prerequisite: CE 371 with grade "C" or better

Corequisite: MATH 361

**CE 401 - Civil Engineering Project I**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 2

First term of a two-term sequence integrating civil engineering design, group dynamics and technical communications. Students receive two credit hours in civil engineering (CE 401) and three credit hours in communication for general education (COM 401).

Prerequisites: WRI 227 or WRI 122

**CE 402 - Civil Engineering Project II**

Lecture Hours: 5

Lab Hours: 6

Credit Hours: 4

Second term of a two-term sequence integrating civil engineering design, group dynamics and technical communications. Students receive four credit hours in civil engineering (CE 402) and three credit hours in communication for general education (COM 402).

Prerequisites: CE 401 and COM 401, both with grade "C" or better

Corequisite: SPE 321

**CE 403 - FE Exam Preparation**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lectures and problem work sessions to help civil engineering students successfully pass the fundamentals of engineering (FE) exam. Topics covered include mathematics, ethics, economics, statics, dynamics, solid mechanics, materials, fluid mechanics, hydraulics, hydrologic systems, structures, geotechnical, transportation, environmental, construction, and surveying.

Corequisite: CE 402

**CE 405 - Sustainability & Infrastruct**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Integrating sustainability concepts and key social, economic and environmental issues and processes relevant to civil engineering. Sustainable design practices in each civil engineering sub-discipline will be studied and existing and proposed infrastructure projects will be evaluated.

Corequisite: CE 401

**CE 407 – Seminar**

Lecture Hours: 12

Lab Hours: 12

Credit Hours: 12

(Hours to be arranged each term.)

**CE 408 – Workshop**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 0

(Hours to be arranged each term.)

**CE 411 - Engineering Geology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A study of the interaction of geology, including structure, geologic processes (current and historic), lithology and mineralogy with civil engineering structures.

Prerequisites: CE 311 and GEOL 201, both with grade "C" or better

**CE 413 - Advanced Soils**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Advanced laboratory and in situ techniques for characterizing soils for use in civil engineering applications.

Prerequisites: CE 311 and GEOL 201, both with grade "C" or better

**CE 421 - Seepage & Earth Structures**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Covers material related to analyzing steady state and transient seepage conditions, erosion and piping, and the stability of earth slopes and embankments.

Prerequisites: CE 311, CE 312, and GEOL 201, all with grade "C" or better

**CE 422 - Adv Shear Strength of Soils**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course is designed to give students an advanced understanding of the shear strength of soils including drained and undrained strength of fine and coarse grained soils.

Prerequisites: CE 311 and GEOL 201, both with grade of "C" or better

**CE 423 - Deep Foundations**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course covers the design of deep foundation systems including driven piles and drilled shafts. These systems are designed for axial and lateral loading.

Prerequisites: CE 311, CE 312, and GEOL 201, all with grade "C" or better

**CE 432 - Struc Loading & Lat. Forces**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Gravity loads (dead, live, roof live, and snow) and lateral loads (wind and seismic) according to ASCE 7 and Oregon Structural Specialty Cod. Introduction and design of basic lateral force resisting systems and gravity elements with software applications as appropriate.

Prerequisite: CE 341 with grade "C" or better

**CE 433 - Structural Matrix Analysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Static analysis of determinate and indeterminate structures using the direct stiffness method with heavy emphasis on computer models and solutions. Students will design and develop their own structural analysis program.

Prerequisite: CE 331 with grade "C" or better

**CE 439 - Highway Bridge Rating**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to bridge types, bridge design philosophies and bridge rating procedures. Load rating of short-span highway bridges using AASHTO provisions and ODOT procedures. Software applications.

Prerequisite: CE 341 with grade "C" or better

**CE 442 - Adv Reinforced Concrete Design**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Design, analysis, and detailing of reinforced concrete elements, including: T-beams, doubly-reinforced beams, continuous beams, shear walls, slender columns, slabs, footings, and moment frames. Seismic resistance and the development, anchorage, and splicing of steel reinforcement are introduced.

Prerequisite: CE 341

**CE 444 - Intermediate Steel Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Design of structural steel tension members, frameworks, composite beams, and bolted and welded connections. Application of the AISC Steel Construction Manual structural stability provisions and software applications.

Prerequisite: CE 341 with grade "C" or better

**CE 447 - Masonry Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis and design of masonry beams, walls and columns using computer solutions with emphasis on lateral design considerations.

Prerequisites: CE 341 with grade "C" or better, and gravity elements with software applications as appropriate

**CE 448 - Timber Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis and design of simple (determinate) timber beams, columns, trusses and connections using dimensioned lumber, plywood and laminated members, with an emphasis on lateral force design.

Computer solutions introduced. Prerequisite: CE 341 with grade "C" or better

**CE 449 - Bridge Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Design and analysis of short and medium-span highway bridge superstructures including reinforced concrete, slab bridges, steel deck girder bridges, and prestressed concrete bridges. Software applications.  
Prerequisite: CE 341 with grade "C" or better

**CE 450 - Transportation Structures**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Design and analysis of common transportation structures including culverts, sign structures, light poles, and railings according to current AASHTO provisions and ODOT procedures. Software applications.  
Prerequisite: CE 341 with grade "C" or better

**CE 456 - Pavement Engineering**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Hot mixed asphalt materials testing and mixture design. Methods of manufacture, transport, and placement of rigid and flexible pavements. Structural design of rigid and flexible pavements. Pavement rehabilitation and management.  
Prerequisites: CE 212, CE 351, and ENGR 213, all with grade "C" or better

**CE 457 - Transportation & Land Dev.**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study of interactions between land development activity and the transportation network. Application of planning and engineering design techniques to manage the impacts of development upon the transportation system.  
Prerequisite: CE 354 with grade "C" or better

**CE 458 - Transportation Safety**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Safety concepts in highway engineering including highway design, operation, and maintenance, as well as human factors,

statistical analysis, traffic control and public policy. Design concepts of intersections, interchanges, signals, signs and pavement markings.

Prerequisite: CE 354 with grade "C" or better

**CE 468 - Travel Demand Modeling**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to travel demand analysis and forecasting. Models studied from a theoretical, applied and practical perspective. Students will become familiar with the traditional four-step travel forecasting process, including model development, application and interpretation of outputs.

Prerequisite: CE 351 with grade "C" or better

**CE 472 – Hydrometry**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Measurement of variables in the hydrologic cycle. Principles, methods, instruments, and equipment for obtaining surface and ground water quantity and quality data in nature to support design and water management efforts.

Prerequisite: CE 374 with grade "C" or better

**CE 473 – Groundwater**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Offers an introduction to the physical properties and principles of groundwater. Topics include groundwater and the hydrologic cycle, fundamental fluid flow laws, groundwater resource evaluation, and groundwater contamination.

Prerequisite: CE 311 with grade "C" or better

**CE 476 - Applied Hydraulic Design**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Flow analysis for constructed channels; principles of hydraulic design of culverts, bridge waterway openings, highway inlets, rundowns, and appurtenant water control structures. Computer modeling of bridge and culvert hydraulics. Design of appropriate Best Management Practices

(BMPs) for stormwater quality and erosion control. Design project.

Prerequisite: CE 374 with grade "C" or better

**CE 481 - Environmental Engineering I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to environmental engineering principles, fundamental concepts and supporting calculations. Physical, chemical and biological elements of the natural environment. Environmental impacts of anthropogenic activities. Control and pollution prevention technologies. Legal and regulatory framework governing environmental management.

Prerequisites: CHE 221 and ENGR 318, both with grade "C" or better

**CE 489 - Treatment Wetlands**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Treatment wetland features; biological, chemical, and physical properties. Planning, design, and performance assessment principles for municipal, agricultural and stormwater treatment wetlands. Considers vegetation and microbiology, aerobic and anaerobic biogeochemistry, hydraulics and treatment efficiencies. Local case studies.

Prerequisites: CHE 221 and ENGR 318, both with grade "C" or better

**CE 499 - Independent Studies**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**CE 501 - Civil Engr Graduate Seminar**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Civil Engineering graduate students will meet regularly with faculty members to share progress on their graduate project selection and report writing.  
Prerequisite: Advisor consent

**CE 507 – Seminar**

Lecture Hours: 9

Lab Hours: 9

Credit Hours: 9

(Hours to be arranged each term.)

**CE 511 - Seepage and Earth Structures**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Covers material related to analyzing steady state and transient seepage conditions, erosion and piping, and the stability of earth slopes and embankments.

Prerequisites: CE 311, CE 312, and GEOL 201, all with grade "C" or better

**CE 512 - Earthquake Engineering**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course describes basic earthquake engineering in terms of regional seismicity, predicted ground motions, probabilistic methods for seismic analysis, liquefaction and steady-state shear strength analysis.

Prerequisites: CE 311 and GEOL 201, both with grade "C" or better

**CE 513 - Deep Foundations**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course covers the design of deep foundation systems including driven piles and drilled shafts. These systems are designed for both axial and lateral loading.

Prerequisites: CE 311, CE 312, and GEOL 201, all with grade "C" or better

**CE 522 - Adv Shear Strengths of Soils**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course is designed to give students an advanced understanding of the shear strength of soils including drained and undrained strength of fine and coarse grained soils.

Prerequisites: CE 311 and GEOL 201, both with grade "C" or better

**CE 533 - Structural Matrix Analysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Static analysis of determinate and indeterminate structures using the direct stiffness method with heavy emphasis on computer models and solutions. Students will design and develop their own structural analysis program.

Prerequisite: CE 331 with grade "C" or better

**CE 534 - Advanced Solid Mechanics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Three-dimensional stress and strain, failure theories, elasticity and plasticity, curved beams, beams on elastic foundations, unsymmetric bending and shear centers.

Prerequisite: CE 442 or CE 444 with grade "C" or better

**CE 535 - Structural Dynamics**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Analysis of single degree of freedom structural systems to harmonic and general dynamic loading. Free vibrating and forced vibration of multiple degree of freedom systems, modal superposition, earthquake engineering, current IBC methods.

Prerequisite: CE 331 with grade "C" or better

**CE 539 - Highway Bridge Rating**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to bridge types, bridge design philosophies and bridge rating procedures. Load rating of short-span highway bridges using AASHTO provisions and ODOT procedures. Software applications.

Prerequisite: CE 341 with grade "C" or better

**CE 542 - Prestressed Concrete Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis, behavior, and design of prestressed concrete structures and elements including beams, composite beams, box-girders and flanged beams, continuous beams and indeterminate frames, slabs, and compression members. Precast member design and behavior also introduced.

Prerequisite: CE 442 with grade "C" or better

**CE 544 - Advanced Steel Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Torsion members, plate girders, and lateral force resisting systems. AISC Seismic Provisions for Structural Provisions for Structural Steel Buildings. Advanced

topics in structural stability and connection design.

Prerequisite: CE 444 with grade "C" or better

**CE 549 - Bridge Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Design and analysis and short and medium-span highway bridge superstructures including reinforced concrete slab bridges, steel deck girder bridges, and prestressed concrete girder bridges. Software applications.

Prerequisite: CE 341 with grade "C" or better

**CE 550 - Transportation Structures**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Design and analysis of common transportation structures including culverts, sign structures, light poles, and railings according to current AASHTO provisions and ODOT procedures. Software applications.

Prerequisite: CE 341 with grade "C" or better

**CE 551 - Geometric Design of Roadways**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course will provide students with an understanding of the principles and techniques of highway design. Topics include laying out potential routes, design of the alignment and intersections, evaluation of earthwork requirements, and safety considerations.

Prerequisite: CE 354 with grade "C" or better

**CE 554 - Advanced Traffic Engineering**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Traffic studies including volume, speed, travel time and delay. Freeway and rural highway facility design, signing and marking. Urban unsignalized and signalized intersection design. Arterial planning and design.

Prerequisite: CE 354 with grade "C" or better

**CE 556 - Advanced Pavement Design**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course covers advanced topics in the design and analysis of pavement materials and structures.

Prerequisite: CE 456 with grade "C" or better

**CE 558 - Transportation Safety**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Safety concepts in highway engineering including highway design, operation, and maintenance, as well as human factors statistical analysis, traffic control and public policy. Design concepts of intersections, interchanges, signals, and pavement markings.

Prerequisite: CE 354 with grade "C" or better

**CE 568 - Travel Demand Modeling**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to travel demand analysis and forecasting. Models studied from a theoretical, applied and practical perspective. Students will become familiar with the traditional four-step travel forecasting process, including model development, application and interpretation of outputs.

Prerequisite: CE 351 with grade "C" or better

**CE 571 - Open-Channel Hydraulics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Application of basic principles of hydraulics to open channel flow. Theory and analysis of critical, uniform, unsteady, and gradually and rapidly varied flow. Flow characteristics in natural and constructed channels. Computer modeling of open-channel flow systems. Floodplain delineation methods.

Prerequisite: CE 371 with grade "C" or better

**CE 572 – Hydrometry**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Measurement of variables in the

hydrologic cycle. Principles methods, instruments, and equipment for obtaining surface and ground water quantity and quality data in nature to support design and water management efforts.

Prerequisite: CE 374 with grade "C" or better

**CE 574 - Environmental River****Mechanics**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

River response to watershed modification and infrastructure, including introduction to fluvial geomorphology, sediment transport and stream restoration.

Management of waterways and floodplains.

Prerequisite: CE 374 with grade "C" or better

**CE 576 - Applied Hydraulic Design**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Flow analysis for constructed channels; principles of hydraulic design of culverts, bridge waterway openings, highway inlets, rundowns, and appurtenant water control structures. Computer modeling of bridge and culvert hydraulics. Design of appropriate Best Management Practices (BMPs) for stormwater quality and erosion control. Design project.

Prerequisite: CE 374 with grade "C" or better

**CE 586 - Water & Wastewater****Treatment**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Water and wastewater characteristics, chemistry, quality and supply. Engineering design and water demand projection. Theory of individual treatment processes, design guidelines for components for water/wastewater treatment.

Prerequisites: CE 371 and CHE 221, both with grade "C" or better

**CE 587 - Environmental Remediation****Tech**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Potential human activity effects on natural systems (air, soil, water). Physical,

chemical, and biological processes in contaminant fate and transport. Regulatory aspects of environmental assessment, monitoring, and prioritization.

Remediation/restoration technologies and strategies.

Prerequisite: CE 481 with grade "C" or better

**CE 590 - Civil Engineering Grad Project**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 9

Research and preparation pertaining to the master's project.

Prerequisite: Advisor consent

**CE 595 - Graduate Thesis**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: Varies (1-6)

Research and preparation pertaining to the master's thesis.

Prerequisite: Advisor consent

**Chemistry****CHE 101 - Intro to General Chemistry**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A brief presentation of introductory chemical concepts including atomic structure, the chemical equation, the behavior of gases, the chemistry of solution, and acid-base chemistry. For students with good knowledge of algebra.

Corequisite: CHE 104 (lab)

Pre- or Corequisite: MATH 100

**CHE 102 - Intro to Organic Chemistry**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A continuation of CHE 101 with emphasis on organic chemistry. The role of organic chemistry in life and industrial processes is discussed.

Prerequisite: CHE 101 with grade "C" or better or instructor consent

Corequisite: CHE 105 (lab)

**CHE 103 - Intro to Biochemistry**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A continuation of CHE 102 with emphasis on biochemistry. The organic chemistry of biochemicals including proteins, carbohydrates, and fats, as well as nucleic acids is discussed. Basic elements of metabolism are also explored.

Prerequisite: CHE 102 with grade "C" or better or instructor consent

Corequisite: CHE 106 (lab)

**CHE 104 - Intro to General Chemistry Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab accompanying class content in CHE 101.

Corequisite: CHE 101

**CHE 105 - Intro to Organic Chemistry Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab accompanying class content in CHE 102.

Corequisite: CHE 102

**CHE 106 - Elementary Chemistry Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab accompanying class content in CHE 103.

Corequisite: CHE 103

**CHE 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**CHE 201 - General Chemistry I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Atomic structure, chemical compounds, chemical equations and reaction stoichiometry, reactions in aqueous solutions (including acid/base, redox, and precipitation reactions) gas laws and kinetic-molecular theory, and thermochemistry. Emphasis on engineering applications.

Prerequisite: CHE 101 and CHE 104, or

high school chemistry or equivalent

Corequisite: CHE 204 (lab)

Pre- or Corequisite: MATH 111

**CHE 202 - General Chemistry II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Electronic structure of atoms, periodic trends, chemical bonding, molecular geometry, intermolecular forces, phase transitions, and properties of solutions. Emphasis on engineering applications.

Prerequisite: CHE 201 and CHE 204, or CHE 221

Corequisite: CHE 205 (lab)

**CHE 203 - General Chemistry III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Chemical kinetics and equilibrium, applications of aqueous equilibria (including acid-base reactions, buffers, solubility, and complexation reactions), thermodynamics, entropy and free energy, electrochemistry, and nuclear chemistry.

Prerequisite: CHE 202 and CHE 205, or CHE 222

Corequisite: CHE 206 (lab)

**CHE 204 - General Chemistry I Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab accompanying class content in CHE 201.

Corequisite: CHE 201

**CHE 205 - General Chemistry II Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab accompanying class content in CHE 202.

Corequisite: CHE 202

**CHE 206 - General Chemistry III Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab accompanying class content in CHE 203.

Corequisite: CHE 203

**CHE 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**CHE 210 - Clinical Pharmacology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The drug action of selected pharmaceutical. Emphasis is placed on drug interactions, routes of administration, and effects on body systems.

Prerequisites: BIO 231 and BIO 232

**CHE 221 - General Chemistry I**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Atomic structure, chemical compounds, chemical equations and reaction stoichiometry, reactions in aqueous solution (including acid/base, redox, and precipitation reactions), gas laws and kinetic-molecular theory, and thermochemistry. Includes lab component.

Prerequisite: CHE 101 and CHE 104, or high school chemistry or equivalent

Pre- or Corequisite: MATH 111

**CHE 222 - General Chemistry II**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Electronic structure of atoms, periodic trends, chemical bonding, molecular geometry, intermolecular forces, phase transitions, and properties of solutions. Includes lab component.

Prerequisite: CHE 201 and CHE 204, or CHE 221

**CHE 223 - General Chemistry III**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Chemical kinetics and equilibrium, applications of aqueous equilibria (including acid-base reactions, buffers, solubility, and complexation reactions), thermodynamics, entropy and free energy, electro chemistry, and nuclear chemistry. Includes lab component.

Prerequisite: CHE 202 and CHE 205, or CHE 222

**CHE 260 - Electrochemistry for RE Applic**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Development of electrochemistry concepts, including thermodynamics, reaction kinetics, charge transport and mass transport. Topics are presented in the context of fuel cells, electrolysis, electroplating and batteries. Also discussed, the chemistry of hydrogen; its properties, production, storage and transportation.

Prerequisite: CHE 202 and CHE 205, or CHE 222

**CHE 305 - Nanoscience & Nanotech**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Survey of chemical and physical phenomena as applied to nanoscale materials, including metal and semiconductor nanoparticles and carbon nanostructures. Discussion of major synthesis and characterization techniques. Biological and engineering applications of nanoscale materials.

Prerequisites: CHE 202 and CHE 205, or CHE 222, and PHY 222 or PHY 223

**CHE 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**CHE 315 - Environmental Analytical Chemistry**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis of chemicals in the environment, including appropriate techniques and instrumentation for each environmental compartment (i.e. water, soil, and air). Chemical reactions/transformations within each compartment including concerns about contaminants, and effects of pollutants. Relative statistics and analytical techniques presented.

Prerequisite: CHE 223 or instructor consent

**CHE 325 - Soil Science**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Nature, properties and distribution of soils and their relationship to the influence of vegetation, climate, landforms, and human activity. Understanding how soils form and how and why they vary horizontally across the landscape and vertically with depth. Emphasis upon North American patterns. Required field trips and labs.

**CHE 331 - Organic Chemistry I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The structures and reactions of carbon compounds with emphasis on thermodynamics, reaction pathways and spectroscopy.

Prerequisite: CHE 203 and CHE 206, or CHE 223

**CHE 332 - Organic Chemistry II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Organic stereochemistry with emphasis on biologically important molecules.

Prerequisite: CHE 331

**CHE 333 - Organic Chemistry III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Free radical chemistry, pharmaceutical chemistry and the mechanistic aspects of enzymatic catalysis.

Prerequisite: CHE 332

**CHE 335 - Bioorganic Chemistry**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An overview of common organic chemistry mechanisms that occur in mammalian metabolism with a focus on molecular structure and reactivity of biological molecules and metabolites.

Prerequisite: CHE 331

**CHE 341 - Instr Methods/Data Acqstn I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

As introduction to the theory and practical applications of computer/instrument interfacing and data acquisition techniques and software. Includes a survey of optical measurement techniques.

Prerequisite: CHE 235

Corequisite: CST 116 or MIS 115 or instructor consent

**CHE 342 - Instr Methods/Data Acqstn II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Principles and techniques of instrumental methods and data analysis. Methods appropriate for chemical analysis including spectroscopy, gas chromatography, potentiometric and flame photometric methods. Emphasis on sample preparation, instrumental response, sensitivity, and accuracy.

Prerequisite: CHE 341

**CHE 345 - Corrosion Chemistry**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A survey of the chemical kinetics and thermodynamics of corrosion, the various types of corrosion, inhibition of corrosion, and industrial applications.

Prerequisites: CHE 101 and CHE 104, CHE 201 and CHE 204, or CHE 221, and PHY 202 or instructor consent

**CHE 346 - Corrosion Chemistry Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Laboratory accompanying CHE 345. Providing practical experience with electrochemical equipment used to measure corrosion processes.

Corequisite: CHE 345

**CHE 350 - Clinical Pharmacology/NMT**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of pharmacokinetics, pharmacodynamics and survey of the major drug families developing familiarity with commonly prescribed drugs, their clinical application, mechanism of action and side effects. Emphasis is on drugs of importance to nuclear medicine and the common radiopharmaceuticals.

Prerequisite: BIO 233 or BIO 333 or instructor consent



**CHE 360 - Clinical Pharmacology/Hlth Prf**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of pharmacokinetics, pharmacodynamics and a survey of the major drug families developing familiarity with the most commonly prescribed drugs, their clinical application, mechanism of action and side effects.

Prerequisite: BIO 233 or BIO 333 or instructor consent

**CHE 407 – Seminar**

Lecture Hours: 8

Lab Hours: 8

Credit Hours: 8

(Hours to be arranged each term.)

**CHE 450 - Biochemistry I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Molecular and cellular biochemistry with emphasis on DNA structure, replication, the process and cellular regulation of RNA transcription, and analyzing and constructing DNA.

Prerequisites: BIO 213 and CHE 332

**CHE 451 - Biochemistry II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Molecular biochemistry with emphasis on protein conformation and function, mechanisms of enzyme action and control, and energy production via glycolysis.

Prerequisite: CHE 450

**CHE 452 - Biochemistry III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Molecular and cellular biochemistry with emphasis on cell membranes, lipid metabolism, aerobic energy metabolism, anabolism, and the role of biochemistry in cellular signaling processes.

Prerequisite: CHE 451

**CHE 465 - Fate/Transport of Pollutants**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Application of principals learned in CHE 315. Mass Balance and the use of chemical equilibrium and kinetics to calculate

pollutant transport in environmental compartments. Discussion and use of partitioning coefficients to determine fate of pollutants in water, soil, and air.

Prerequisite: CHE 315

**CHE 495 - Research Project in Chemistry**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: Varies (1-4)

Supports student-initiated research project in biological sciences. Topic and scope must be reviewed and accepted by a faculty advisor. May be repeated for up to nine total credits.

Prerequisite: Instructor consent

## Communication

**COM 104 - Introduction to Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces Communication Studies. Principles and applications developed in context of career exploration, interpersonal, group, organizational, and technical communication. Includes history and structure of communication field, career paths, research skills and role of technology. Required for COM majors.

**COM 105 - Intro to Communication Theory**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces basic theories and concepts in the Communication discipline. Acquaints students with major theories fundamental to communication research and to communication interactions including interpersonal, organizational, media and intercultural.

Prerequisite: COM 104

Pre- or Corequisite: WRI 122

**COM 106 - Introduction to Comm Research**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces research in the communication discipline. Students find and analyze quantitative, qualitative and critical research. Introduces communication research as a process composed of

methods, data-gathering, analysis, conclusions.

Prerequisite: COM 105

**COM 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**COM 109 - Intro to Communication Tech**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to the use of communication technology. Emphasis on the use of various communication technologies including social media, instant messaging, and visual communication technologies. Features projects using technology to effectively communicate to various audiences.

**COM 115 - Intro to Mass Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides an introduction to mass media. Focuses on understanding how media operate with emphasis on contemporary social, economic, political, cultural and ethical issues.

**COM 135 - Communication Software**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Techniques for coordinated use of office software, including word processing (style definitions, template creations, graphic use), data analysis (function use, custom functions, data importation), and presentation (master style definitions, visual effects, dynamic content creation) software, and cross-application functions.

**COM 205 - Intercultural Comm**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces basic theories and concepts of intercultural communication. Builds understanding and skills enabling students to analyze intercultural interactions and develop and practice effective communication strategies.

**COM 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**COM 215 - Creativity in Comm**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Define and learn how personal and group creativity can be enhanced. Study the lives of creative individuals in the arts, sciences, and industry. Individual and group exercises designed to enhance the creative process.

**COM 216 - Essen of Grammar & Punctuation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Involves learning basic and advanced grammar and punctuation to provide a firm foundation for any type of writing. Prerequisite: WRI 121 with grade "C" or better

**COM 225 - Interpers Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces interpersonal communication theory and practice. Students apply course concepts to analyze and practice dyadic communication to develop more effective work and personal relationships.

**COM 226 - Nonverbal Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Nonlinguistic aspects of human communication. Examines the relationships between nonverbal and verbal communication behavior and nonverbal communication skill. Topics include space, distance, environment, touch, gesture, facial expression and gaze as communication.

**COM 237 - Intro to Visual Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces theory and rhetoric through several perspectives: personal, historical, technical, ethical, cultural, and critical.

Emphasizes relationships between form/content, word/image, and societal role of visual communication.

Prerequisite: WRI 122

**COM 248 - Digital Media Production**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study of the technical aspects of digital media design and production. Hands-on experience in creating and editing digital media. Production of digital media for specific contexts.

**COM 255 - Communication Ethics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines typical communication situations involving ethics. Provides methodologies for critically evaluating ethical situations. Uses case approach with emphasis on application.

Prerequisite: WRI 122

**COM 256 - Public Relations**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces history and practice of public relations; emphasizes practical accomplishment of public relations campaigns. Topics: internal/external audiences, brochures, press releases, internal documents, pitches, issue management, and project design, execution. Service learning course.

Prerequisite: WRI 122

**COM 276 - Democracy and Media**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides introduction to ownership/structure of media, politics, objectives, and links to the corporate and national economy. Introduces project analysis through ownership, sourcing, flak, advertising, ideology filters.

Prerequisites: COM 115 and WRI 122

**COM 301 - Rhetorical Theory & Applicatn**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces rhetorical theories and applications to personal, business and

industrial settings. Focuses on evolution of rhetoric. Examines rhetorical effects on individual, group and mass communication.

Prerequisites: SPE 111 and WRI 227

**COM 305 - Contemporary Rhetorical Theory**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores contemporary rhetorical theory in its development over the 20th century.

Topics range from the need for a new rhetoric to critical rhetorical theories of power, race, and gender.

Prerequisites: SPE 111 and WRI 121

**COM 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**COM 309 - Communication Tech in Use**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Advanced use of communication technology. Emphasis on the use of communication technology to achieve specific communication goals. Features a large project using multiple communication technologies to reach specific audiences.

Prerequisites: COM 109, MIS 101, MIS 102, and MIS 103

**COM 320 - Advanced Intercultural Comm**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Builds on theories from COM 205. Focuses on analyzing intercultural interactions in specific work contexts, for example health care, education, social services, business and technology.

Prerequisite: COM 205

**COM 325 - Gender and Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces basic theories and concepts of culturally-derived gendered communication patterns and behaviors. Builds understanding and skills enabling students to analyze those patterns and behaviors in order to develop and practice effective communication strategies.

Prerequisite: COM 205

**COM 326 - Communication Research**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to research methods and design. Design of both quantitative and qualitative research. Emphasis on communication based methodologies: focus groups, directed interviews, and ethnomethodologies. Includes a research project and written and oral research reports.

Pre- or Corequisite: WRI 227

**COM 336 - Nonverbal Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Nonlinguistic aspects of human communication. Examines the relationships between nonverbal and verbal communication behavior and nonverbal communication skill. Topics include space, distance, environment, touch, gesture, facial expression and gaze as communication.

Prerequisites: COM 225 and SPE 111

**COM 345 - Organization Comm I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Studies communication in organizations, including message movement, exchange and interpretation, identification of variables, roles and patterns influencing communication in organizations.

**COM 346 - Health Communication**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Overview of interpersonal, social, and cultural issues in health communication, including family interaction, roles of patients and caregivers, communication in

health organizations and the role of media.

Prerequisites: WRI 122 with grade "C" or better, and COM 205 or equivalent

**COM 347 - Negotiation & Conflict Resol'n**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines theories and strategies for conduct of conflict and negotiation across contexts. Topics: destructive conflict cycles, confronting/managing conflict, social/psychological aspects, conflict analysis, causes, and promoting constructive conflict.

Prerequisite: SPE 321 or instructor consent

**COM 348 - Facilitation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides experience leading small groups through deliberative processes including participatory decision making and conflict resolution. Provides theoretical and practical understanding of facilitation focusing on building skills in group leadership.

Prerequisite: SPE 321

**COM 358 - Communication and the Law**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Issues involved in establishing legal parameters within which professional communicators work. Evolving interpretations of the first amendment, balancing conflicting first amendment claims, libel, limits of a free press, prior restraint, licensing and regulation.

Prerequisites: SPE 111 and WRI 227

**COM 365 - Electronic Comm & Society**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores the Internet as a mediator of human communication and its effect on society. Topics include: social media, informatics, entertainment/workplace contexts, and the convergence of technology as a global village.

Prerequisite: WRI 227

**COM 401 - Civil Engineering Project I**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 3

First term of two-term sequence integrating civil engineering design, group dynamics and technical communications. Students receive three credit hours in civil engineering design (CE 401) and three credit hours in communication for general education (COM 401). Students will be introduced to a major civil engineering project, prepare a professional engineering proposal and function effectively in engineering design teams. Formal written proposal and oral presentation of the proposal are required.

Prerequisite: Civil Engineering advisor consent

Corequisite: CE 401

**COM 402 - Civil Engineering Project II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Second term of a two-term sequence. Students receive three credit hours in civil engineering design (CE 402) and three credit hours in communication for general education (COM 402). Student teams will perform work as defined in the fall term proposal. Consultations with faculty, students, and clients ensure work progresses toward stated goals. Term culminates with final design recommendations presented in a written report and oral presentation. Plans, specifications, and a construction cost estimate will also be completed.

**COM 407 - Seminar**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**COM 415 - Dev Eff Multmdia Presntn**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Interdisciplinary course introducing students to the tools and skills associated with designing, developing, presenting, and disseminating state-of-the-art multimedia presentations. Hands-on experience with graphics, digital/audio video, animation, and text.

Pre or Corequisites: CST 102 or equivalent, or instructor consent; PWR 220

### **COM 420 – Externship**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

Students work in applied settings in their emphasis under the supervision of an on-site mentor. Regular contact with extern advisor. Written externship reports required.

Prerequisite: Senior standing

### **COM 421 - Senior Project I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Allows students to initiate research on a significant capstone project in the communication field. Focuses on development of a proposal and presentation.

Prerequisite: Senior standing

### **COM 422 - Senior Project II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Continues work of COM 421, focusing on project research methodologies.

Prerequisite: COM 421

### **COM 423 - Senior Project III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on completion of project, including final documentation and presentation.

Prerequisite: COM 422

### **COM 424 - Capstone Course**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Communication Studies majors complete a significant research project that bridges education with future profession or graduate school. Students collaboratively produce a project or portfolio reflecting strong critical thinking and application of communication theory and practice.

Project topics vary by instructor.

Prerequisites: WRI 227 and Senior standing

### **COM 425 – Mediation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Prepares students to mediate in public and

private settings. Covers conflict management strategies, processes and issues including gender and cultural awareness.

Prerequisite: COM 225 or instructor consent

### **COM 426 - Mediation Practicum**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 3

Mediation practice and observation with experienced mediators through the Klamath Mediation Center. Students will progress from observation, to co-mediation, and finally, mediation of real disputes. Builds on the theoretical insights and practice of COM 425.

Pre- or Corequisite: COM 425

### **COM 437 - Comm Training & Devpmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Prepares students to facilitate communication skills workshops and differentiate between organizational structure and communication training needs. Topics include: audience analysis, learning theory, curriculum design, presentation skills, classroom dynamics and assessment.

Prerequisite: SPE 321

### **COM 445 - Organiz'l Communication II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines organizational communication systems and the design of communication audit procedures. Synoptic reports of findings and recommendations.

Prerequisite: COM 345 or instructor consent

### **COM 446 - Communication & Leadership**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores the relationship between communication and leadership within organizations and the development and application of communication competencies associated with effective leadership.

Prerequisite: SPE 321 or instructor consent

## **Clinical Sleep Health**

### **CSH 201 - Human Development and Sleep Health**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Normal sleep architecture over the lifespan. Behavioral, physiological, and environmental patterns that contribute to healthy sleep.

### **CSH 220 - Sleep Disord & Co-Morbid**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Pathophysiology, epidemiology, and clinical presentation of abnormal sleep. Understanding and recognition of major comorbidities associated with sleep disorders.

### **CSH 225 - Imp of Neuro Disord on Slp**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Effect and management of chronic neurological disorders on sleep quality and therapy outcomes.

### **CSH 233 - Sleep Therapies & Compliance**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Non prescription sleep therapies, PAP, CBT, Light Therapy, Chronotherapy and other treatment modalities. Patient compliance issues, predictors of outcomes, and psychological theories.

### **CSH 236 - Pharmacology of Sleep**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Different classes of medication, dependency, addiction, long term effect on sleep, and prognosis for other sleep therapies.

### **CSH 242 - Evaluation & Measurement Tools**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Physiological, psychological, and psychomotor evaluation and measurement tools to assess severity of sleep disorders and patient response to therapy.

### **CSH 255 - Oral Appliances for Sleep Apnea**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Review all types of oral appliances and their appropriate applications and preparations for use with sleep apnea patients.

### **CSH 268 - Lrng, Hlth Lit, & Comm Edu**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Adult education theories, appropriate communication strategies for health literacy, development of programming for patients, families, allied health providers, and community groups.

### **CSH 276 - Capstone Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students develop, plan and implement a project for community sleep education. Instructor functions as a consultant.

Prerequisite: CSH 268

### **CSH 277 - Clinical Sleep Health Extern**

Lecture Hours: 0

Lab Hours: 40

Credit Hours: 13

Clinical skills essential for the practice of sleep case management. Patient assessment, creation of individualized care plan, long term compliance monitoring, and identification of changes in the status of other chronic diseases. Students must be employed in a clinical facility that treats sleep disordered patients. (400 contact hours).

Prerequisite: CSH 268

## **Computer Systems Engineering Technology**

### **CST 102 - Intro Computer Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 3

Concepts, terms, and trends related to the Computer Engineering Technology (hardware) and Software Engineering Technology (software) curriculums. Includes discussions on fundamental aspects of the computer field. Laboratory component will introduce students to

microcomputers, programming concepts and various computer/engineering related software.

Prerequisite: CSET major or instructor consent

### **CST 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **CST 116 - C++ Programming I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Computer concepts and problem solving methods using C++ programming language. Topics include: algorithms, simple data types, conditional and iterative structures, function definition, structured programming and documentation. Cannot be taken for graduation credit if student has completed MIS 116.

Pre- or Corequisite: MATH 111

### **CST 120 - Embedded C**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

C programming concepts for embedded platforms such as cross-compilation, storage classes, dynamic memory allocation, bitwise operations and masking. Embedded systems topics such as I/O ports, interrupts, timers and hardware interfacing will also be explored.

Prerequisites: CST 126 and CST 162

### **CST 126 - C++ Programming II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Solving complex problems using advanced features of the C++ language. Topics include function usage, pointer data type, dynamic memory allocation, string manipulation, and structure and union data types. Emphasis is on structured program design techniques. Cannot be taken for graduation credit if student has completed MIS 126.

Prerequisite: CST 116 with grade "C" or better

### **CST 130 - Computer Organization**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces computer elements, organization, and instruction sets. Computer arithmetic, ALU, Registers, Datapath, memory and Control unit functions. Course includes laboratory. Prerequisite: CST 162 with grade "C" or better

### **CST 131 - Computer Architecture**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Continuation of CST 130. Topics include: main memory, cache, virtual memory, memory management, secondary storage, networks, operating system functions, and pipelining.

Prerequisite: CST 130 with grade "C" or better

### **CST 133 - Digital Logic II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to sequential logic, latches, flip-flops, registers, counters, timers, finite state machines. Implementation in programmable logic devices using HDL. DC and AC parameters, timing analysis. Laboratory is integral to class.

Prerequisite: CST 162 or EE 131, both with grade "C" or better

### **CST 134 – Instrumentation**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lecture/laboratory course that provides students experience in measuring, calibrating, and testing digital and analog systems. Uses various test equipment for test and measurement of digital and analog components.

Pre- or Corequisite: CST 133

### **CST 136 - OOP with C++**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A study of object oriented programming with C++. Beginning and intermediate concepts are covered including classes, objects, member functions, overloading, inheritance, polymorphism, templates, and virtual functions. This course prepares students with a strong C background for upper division coursework using C++. Cannot be taken for graduation credit if student has completed MIS 136.

Prerequisite: CST 126 with grade "C" or better

### **CST 162 - Digital Logic I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to combinational logic. Includes introduction to number systems, Boolean algebra, logic gates, Muxes, Decoders, Adders, Subtracters. Logic design using a hardware description language. Laboratory integral to the class. Pre- or Corequisite: MATH 100

### **CST 204 - Intro to Microcontrollers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to microcontrollers (uC). Signals and data flow within simple systems. Introduction to instruction set, software development tools and I/O techniques, both programmed and interrupt-driven. Experiments using uC plus external circuits in applications. Prerequisites: CST 131 and CST 250, both with grade "C" or better, or instructor consent

### **CST 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **CST 211 - Data Structures**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Discussion of efficient methods of data representation such as stacks, queues, linked-lists, binary trees, B-trees. Emphasis is on data representation and algorithm analysis.

Prerequisite: CST 136 with grade "C" or better

### **CST 223 - Concepts of Programming Lang**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study of principles and fundamental concepts characterizing high-level programming languages, including history and survey of programming paradigms, syntax and semantic rules, data types, control flow and data abstraction.

Prerequisite: CST 126 with grade "C" or better

### **CST 229 - Introduction to Grammars**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The concepts involving alphabet words and languages will be discussed. Related topics in automata and regular expression will be explored. Emphasis is on context free grammars, parse tree and parsing techniques.

Prerequisites: CST 136, and CST 223 or CST 231

### **CST 231 - Digital Systems Design I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Concepts, terminology and techniques in design and implementation of digital system components. Synchronous sequential logic design with emphasis on state machines. System design process including synthesis using Verilog HDL and implementation in programmable logic devices. Lab integral to course.

Prerequisite: CST 133 with grade "C" or better

### **CST 236 - Engineering for Quality Software**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

This course teaches industry standard tools to enforce best practices to ensure quality software. Topics include project management, the Agile methodology, build management, and testing methodologies.

Prerequisite: CST 136 with grade "C" or better

### **CST 238 - GUI Programming**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to HCI and GUI design in a rapid application development environment. Prerequisite material in delegation, events, and multithreaded programming included. Topics include: forms, containers, components, controls, modal/modeless windows, fixed/dynamic layouts, SDI/MDI applications, application internationalization, and data binding.

Pre- or Corequisite: CST 211

### **CST 240 - Linux Programming**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Students will study the structure of the Linux Operating System, including: file structure, input/output processing, commands and utilities, shell configuration, communications and script programming languages. Students will write programs using processes, threads, and sockets.

Prerequisite: CST 126 with grade "C" or better

### **CST 250 - Computer Assembly Lang**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Concepts of assembly language programming applied to a modern computer; data and instruction formats, address generation; data definition, storage allocation and program control statements; sub-routine library; CPU instruction set; control records; and writing of sub-routines.

Prerequisites: CST 126 and CST 130 with grade "C" or better

### **CST 262 - Digital Design Using HDL**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced digital circuit design. HDL is used in designing sequential logic circuits such as registers, counters, and synchronous finite state machines. Basic digital circuit design and analysis with semiconductor devices is also covered. Laboratory is integral to the class.

Prerequisites: CST 162 with grade "C" or better, or EET 101 and EET 102

### **CST 276 - Software Design Pattern**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Design patterns establish a common terminology allowing developers to use a common vocabulary and share a common viewpoint of the problem. Design patterns provide a common point of reference during the analysis and design phase of a project.

Prerequisite: CST 136 with grade "C" or better

**CST 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**CST 315 - Embedded Sensor Inter & I/O**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to data acquisition systems, sampling theory, ADC, DAC, signal conditioning, filters, amplifiers, noise, transducers and sensors, including bio-sensors, sensor interfacing, smart sensors, and busses. Lab integral to course.

Prerequisites: CST 204 and EE 221

**CST 316 - JR Team-Based Proj Dev I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

In this three-term sequence, students will work in teams to gather requirements, model, analyze, develop and integrate an n-tiered architecture software product. Students will learn about project management, software development lifecycle tools and processes, and quality assurance processes.

Prerequisite: CST 211 with grade "C" or better

Pre- or Corequisites: CST 324 with grade "C" or better, and at least two of CST 236, CST 238, CST 276, all with grade "C" or better

**CST 320 - Compiler Methods**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Basic concepts of compiler design and operation. Topics include lexical and syntactical analysis, parsing, translation, data flow analysis and code generation, and implementation of a small compiler.

Prerequisite: CST 211 with grade "C" or better, and CST 229

**CST 321 - Intro to Microprocessors**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 5

Hardware and assembly level software needed to interface a microprocessor to I/O ports, memory and interrupt sources. Topics include bus controller design, timing analysis, programmed I/O and

interrupts. Extensive lab provides experience with system design, test and debugging using the 80386DX microprocessor.

Prerequisites: CST 204 and CST 231, with grade "C" or better, or instructor consent

**CST 324 - Database Systems and Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An overview of Data Base Management Systems including requirements analysis methodology for data base design, conceptual DB design methodology including formulation of entity-relationship models, review of query language characteristics, and a comparison of commonly available DBMS.

Prerequisite: CST 211 with grade "C" or better

**CST 326 - JR Team-Based Proj Dev II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

In this three term sequence, students will work in teams to gather requirements, model, analyze, develop and integrate an n-tiered architecture software product. Students will learn about project management, software development lifecycle tools and processes, and quality assurance processes.

Prerequisite: CST 316

**CST 328 - Graph, Gmes, & Sim Programmng**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to games and simulations programming using a high end game development engine. Graphics topics include: geometric transformations, physics simulation, collision detection/handling, and ray tracing/casting. Artificial intelligence topics: game theory, probability, steering behaviors, flocking behaviors, path-finding, and behavior trees.

Prerequisite: CST 238 or instructor consent

**CST 331 - Microproc Periph Interfacing**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 5

Expansion of processor based systems

through off chip parallel bus interfacing. Adding off chip I/O ports, memory and parallel I/O devices. I/O port expansion through serial interface. In depth interface timing analysis. Extensive lab provides continued experience with system design, test and debugging techniques.

Prerequisites: CST 231 with grade "C" or better, and CST 321 or CST 337

**CST 334 - Project Proposal**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Description of senior project; time management techniques; task assignment; development of in-depth senior project proposal and preparation of formal senior project. Includes use of PC-based planning.

Pre- or Corequisite: CST 336 or CST 373

**CST 335 - I/O Device Interfacing Tech**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Application of opto-couplers, peripheral drivers, A-D converters, and operational amplifiers to microprocessor/microcontroller based applications. Survey of transducer theory and available devices. An embedded system is used as a development platform in laboratory experiments.

Prerequisites: CST 204 and EE 223, or EET 237 and EET 238, or instructor consent

**CST 336 - JR Team-Based Proj Dev III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

In this three-term sequence, students will work in teams to gather requirements, model, analyze, develop and integrate an n-tiered architecture software product. Students will learn about project management, software development lifecycle tools and processes, and quality assurance processes.

Prerequisite: CST 326

**CST 337 - Embedded System Architecture**

Lecture Hours: 3

Lab Hours: 6

Credit Hours: 5

Configuration, programming, testing, debugging of embedded systems. Serial

interfaces including RS232, I2C and SPI. I/O methods including programmed I/O, interrupts and DMS. Interfacing issues related to timing and protocol. Impact of processor architecture and I/O methods on system performance.  
Prerequisite: CST 204 with grade "C" or better

#### **CST 340 - Advanced UNIX**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Advanced facets of the UNIX operating system will be explored. Topics include: interprocess communication, programming, system administration. Students will use OIT computers operating under UNIX.

Prerequisite: CST 240

#### **CST 344 - Intern Computer Arch**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Register level design of a computer system, including the processor and memory structures. Cache and virtual memory. Includes analysis of both CISC (Complex Instruction Set Computer) and RISC (Reduced Instruction Set Computer) architectures.

Prerequisite: CST 204

#### **CST 346 - .NET Programming in C#**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Essentials of programming using the C# language. It emphasizes C# programming structure, syntax, design, and implementation essentials, as well as a brief overview of the .NET framework. Creating Windows Forms and accessing ADO.NET are also examined.

Prerequisite: CST 211

#### **CST 347 - Real Time Embedded Op Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

OS Kernel Constructs and problem scaling, small scale environment specification, process, threads, fibers, synchronization primitives, small scale memory management, scheduling paradigms, real time scheduling, I/O and debugging. Lab integral to course.

Prerequisites: CST 211 and CST 240, both with grade "C" or better

#### **CST 350 - Intro to VLSI Design**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introduction to the various aspects of very large scale integration circuits.

Includes modern design techniques, using CAD/CAE software tools. Design using standard cell techniques, discussion of full custom design and VLSI testing concepts.

Demonstrations are included to supplement lectures. The course will include laboratory experience.

Prerequisites: CST 231, CST 232, and EE 321, or instructor consent

#### **CST 351 - Digital Systems Design II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Continuation of Digital Systems Design I. Focus on timing, test benches, testing, and security in programmable logic devices.

Laboratory includes analysis, design, synthesis, simulation and testing of complete digital systems.

Prerequisite: CST 231

#### **CST 352 - Operating Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Issues in Operating Systems design.

Topics include: processes, threads and fibers, privilege modes, preemptive multitasking, process state machine, scheduling paradigms, system calls/traps, shared resources and synchronization primitives, memory management schemes/virtual memory, deadlock detection, handling, and avoidance, I/O management.

Prerequisites: CST 211 and CST 240, both with grade "C" or better

#### **CST 356 - Web Design and Development**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Basic components of web development which include aspects of design as well as current development technologies.

Development technologies include, but are not limited to, HTML/XHTML, JavaScript, and CSS. Other technologies

discussed may include Java Applets, CGI programming, ASP.NET and PHP.

Prerequisite: CST 211

#### **CST 371 - Embedded Systems Development I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A three term sequence covering design, implementation, test and documentation techniques used for embedded computer systems. Each student is required to work on and complete a project as a member of a team. The entire sequence must be completed in three consecutive terms.

Prerequisite: CST 204

Corequisite: CST 315 or CST 335

#### **CST 372 - Embedded Systems Develop II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Second course in a three term sequence.

Design, implementation, test and documentation techniques used for embedded computer systems. Each student is required to work on and complete a project as a member of a team. The entire sequence must be completed in three consecutive terms.

Prerequisite: CST 371

#### **CST 373 - Embedded Systems Develop III**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Final course in a three term sequence.

Design, implementation, test and documentation techniques used for embedded computer systems. Each student is required to work on and complete a project as a member of a team. The entire sequence must be completed in three consecutive terms.

Prerequisite: CST 372

#### **CST 374 - Embedded Project Proposal**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Development of formal, in-depth embedded senior project proposal. Guidelines for an acceptable project; project and time management techniques; task assignment. Individual creativity will be encouraged by allowing the student to



select an appropriate embedded systems project.

Pre- or Corequisite: CST 373

#### **CST 405 - Directed Study**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced study under the guidance of faculty. Topics and learning objectives arranged between students and instructor. Students will meet with instructor weekly to discuss progress and provide evidence of their performance.

Prerequisites: Junior standing in CSET and instructor consent

#### **CST 407 – Seminar**

Lecture Hours: 18

Lab Hours: 18

Credit Hours: 18

(Hours to be arranged each term.)

#### **CST 412 - Senior Development Proj**

Lecture Hours: 2

Lab Hours: 5

Credit Hours: 3

A three-term sequence giving the student major responsibility for planning and carrying out a computer-oriented project. Individual creativity will be encouraged by allowing the student to select an appropriate project.

Prerequisites: CST 334, and CST 336 or CST 373

#### **CST 415 - Computer Networks**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Current issues in computer networks and distributed systems. Topics include network protocols, interface standards, and transmissions mode. Network layers detailing Internet Protocol Suite and correlations with 7 layer abstract communication model. Routing and WAN architectures.

Prerequisite: CST 240 with grade "C" or better

#### **CST 417 - Embedded Networking**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Network protocol in a small scale embedded environment, Physical characteristic specification, network interface, controller interface, TCP/IP,

application interface, packet routing, network architecture. Lab integral to course.

Pre- or Corequisite: CST 336 or CST 373 with grade "C" or better

#### **CST 418 - Data Comm & Networks**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides students with an introduction to data communications and computer networks. Students acquire knowledge of communications components and their use in implementing a network. Emphasis is on the practical aspects of network configuration, operations, and detection, isolation and correction of problems.

Prerequisites: CST 204, and EE 223 or EET 237

#### **CST 420 - Effective C++ & STL**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Emphasis is on techniques to apply the C++ language and library effectively toward the implementation of object oriented systems. Specific ways to improve design and program will be covered as well as purpose and use of the C++ Standard Library.

Prerequisite: CST 320 or instructor consent

#### **CST 422 - Sr Development Project**

Lecture Hours: 2

Lab Hours: 5

Credit Hours: 3

A three-term sequence giving the student major responsibility for planning and carrying out a computer-oriented project. Individual creativity will be encouraged by allowing the student to select an appropriate project.

Prerequisites: CST 334, and CST 336 or CST 373

#### **CST 426 - Intro to Artif Intell**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Concepts and techniques of AI with considerable use of the LISP interpreter. Includes discussion of 'search' methods, knowledge representation, natural language processing, models of cognition, vision, and 'The Blocks World.'

#### **CST 432 - Senior Development Proj**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

A three-term sequence giving the student major responsibility for planning and carrying out a computer-oriented project. Individual creativity will be encouraged by allowing the student to select an appropriate project.

Prerequisites: CST 334, and CST 336 or CST 373

#### **CST 435 – Microprogramming**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The concepts and methods involved in programming the computer's control unit. Coverage includes a review of computer organization, microprogram operations such as floating point arithmetic, translator/simulator development, and emulation techniques.

Prerequisite: Software Engineering Technology Senior standing or instructor consent

#### **CST 441 - Logic Synthesis with VHDL**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course will show students how to use the hardware description language, VHDL, with hierarchical design techniques to manage a complex design. In this process students will create a design using the VHDL modeling tools, simulate the design using advanced simulation techniques, synthesize and test the design. Laboratory integral with the course.

Prerequisite: CST 351 or instructor consent

#### **CST 442 - Adv Comp Architecture**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced concepts in computer architectures including pipelined, superpipelined, superscalar, and dynamically pipelined processor architectures. Parallel processors, multiprocessors, cache and cache coherency.

Prerequisite: CST 344 or instructor consent

**CST 445 - Adv Microproc & Applic**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

This class examines the architecture of the Motorola 680X0 microprocessor family. The course investigates advanced design techniques used in developing interfaces to the 680X0 microprocessor family, along with the use of coprocessors and special device controllers. Advanced design concepts in both software and hardware will be examined.

Prerequisite: CST 331 or instructor consent

**CST 451 - ASIC Design using FPGAs**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

FPGA senior project design specifications; presentation of the project in a design review to peers; application of formal hardware/software design techniques when designing with FPGAs; and verification of FPGAs.

Prerequisite: CST 441 or instructor consent

**CST 455 - System on a Chip Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

System level design representations, and modeling languages. Target architecture models. Intra-chip communication. Partitioning algorithms. Task time measurement. Back annotation of timing. Synthesis of SoC components.

Prerequisites: CST 231 and CST 373

**CST 456 - Embedded System Testing**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Testing of complete embedded systems including hardware and software. Topics include unit testing for both hardware and software, UVM testing framework for hardware and test driven design practices as they apply to both hardware and software.

Prerequisites: CST 136, CST 204, and CST 231

**CST 461 - Adv Topics VLSI Design**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Conclusion of a three-course sequence in very large scale integration design. This course focuses on testing methodology, especially boundary scan. In addition, an alternative synthesis tool is introduced. Current issues in VLSI design are discussed. Laboratory experiments form an essential part of the course.

Prerequisite: CST 441

**CST 464 - RISC-Based Micro Sys**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

RISC architecture and applications. Includes i960 micro processor features, instruction set, and i960 support software. Laboratory focus on applications.

Prerequisites: CST 331 and CST 344

**CST 465 - Web Development with ASP.NET**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Dynamic web site creation and development strategies using ASP.NET are discussed and practiced. Focus on the importance of databases in the creation of a dynamic web site is heavily emphasized. Pre- or Corequisite: CST 324 or instructor consent

**CST 466 - Embedded System Security**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamental theories and applications of cryptography relevant to computer and embedded system security.

Prerequisites: CST 126 and MATH 112

**CST 471 - Embedded Senior Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A three-term sequence giving the student major responsibility for planning, implementing and testing an embedded systems project.

Prerequisites: CST 373 and CST 374

**CST 472 - Embedded Senior Project**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

A three-term sequence giving the student major responsibility for planning, implementing and testing an embedded

systems project.

Prerequisites: CST 373 and CST 374

**CST 473 - Embedded Senior Project**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

A three-term sequence giving the student major responsibility for planning, implementing and testing an embedded systems project.

Prerequisites: CST 373 and CST 374

**CST 475 - Big-Data Analysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Data analysis using very large data sets. Topics include loading, extracting, and analyzing data. Technologies include distributed SQL and No-SQL databases, map-reduce, and other distributed data access and processing mechanisms.

Prerequisite: CST 324

**CST 490 - Co-op Field Practice**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: Varies

An approved work program related to the student's field of specialization for a continuous three-month or six-month period. The employer and the type, level, and difficulty of the particular job must be approved by the student's engineering technology department prior to the employment period. A written comprehensive report of each season's activity must be submitted during the following term of residence. This class cannot be repeated for credit.

Prerequisite: Instructor consent

## Cybersecurity

**CYB 201 - Cybersecurity Fundamentals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces fundamental concepts used in Cybersecurity. Topics covered include: threats, attacks, and vulnerabilities; confidentiality, integrity, and availability; common cybersecurity technologies and tools; security architecture and design principles; identity and access management; risk management; and cryptography.

### **CYB 301 - Hacker Tools and Techniques**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces how "hackers" operate and the techniques, tools and processes they use to gain unauthorized access to systems, and how to best protect and defend systems from these same types of attack. Students will learn how to conduct basic security testing or "ethical hacking" to identify potential weaknesses in an organization's network and computer systems. Students will also learn how to prepare a formal written report of their findings for management.

Prerequisites: CYB 201 and MIS 285 both with grade "C" or better, and WRI 227

### **CYB 302 - System Defenses and Incident Response**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces the CIS 20 Critical Controls and the fundamental concepts of operating system hardening and other defensive strategies to secure networks and information systems. Students will also learn how to investigate suspicious activity on computer systems to determine if it has been compromised, and how to respond to security incidents and data breaches.

Prerequisites: CYB 301 and MIS 351 both with grade "C" or better

### **CYB 303 - Security Operations and Analysis**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces the concept of a Security Operations Center (SOC) and the role of a Security Analyst. Students will learn about Security Information and Event Management (SIEM) systems, Intrusion Detection Systems (IDS), log management and analysis, packet capture analysis, vulnerability analysis and patch management. Students will complete a team project during the course where they must monitor and defend systems as a group.

Prerequisites: CYB 301 with grade "C" or better, and SPE 321

### **CYB 351 - Network Security**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Examines tools and techniques used for securing IP based networks, with a specific focus on Firewalls and VPNs. Topics include stateful inspection firewall basics, explicit proxy, deep-packet inspection, intrusion detection and prevention systems, network based anti-virus, email filtering, data loss prevention, application control, traffic shaping, packet capture and analysis, and SSL and IPSec VPNs.

Prerequisites: CYB 201 and MIS 351 both with grade "C" or better

### **CYB 411 - Managing Risk in Information Systems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focus on the risk assessment and analysis processes as they are applied to information systems. Details of how confidentiality, integrity and availability are maintained in an organization's complex information systems are explored. Topics include quantitative and qualitative risk analysis, risk mitigation/transference/acceptance, disaster recovery and business continuity planning, security program management, and security awareness training.

Prerequisites: BUS 215 or BUS 304 or BUS 317 and MIS 206 or MIS 311 or MIS 255 all with grade "C" or better

## **Dental Hygiene**

### **DH 100 - Introduction to Dental Hygiene**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Orientation to the theory and practice of all aspects of the dental hygiene profession. The history of dental hygiene, professional organization and career opportunities are discussed. Hands-on activities involving basic dental hygiene skills. Opportunities to experience normal oral anatomy.

### **DH 101 - Intro to Dental Hyg II**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Hands-on activities involving the procedures and skills learned in DH 100.

Students will practice basic dental hygiene skills. Opportunities to experience normal oral anatomy.

Prerequisite: DH 100

### **DH 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **DH 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **DH 221 - Clinical Prac & Seminar I**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Sequential courses designed to provide clinical skills essential for the practice of dental hygiene. Skill development of patient assessment, basic instrumentation and individualized preventive care emphasized.

Prerequisite: Admission to the Dental Hygiene program

### **DH 222 - Clinical Prac & Seminar II**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Sequential courses designed to provide clinical skills essential for the practice of dental hygiene. Skill development of patient assessment, basic instrumentation, and individualized preventive care emphasized.

Prerequisite: DH 221

### **DH 223 - Clinical Prac & Seminar III**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Sequential courses designed to provide clinical skills essential for the practice of dental hygiene. Skill development of patient assessment, basic instrumentation, and individualized preventive care emphasized.

Prerequisites: DH 222, and DH 252

**DH 225 - Head/Neck Anat, Histol, Embry**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Lecture and lab course that provides an in-depth study of head and neck anatomy, histology, and embryology for the dental professional. Emphasis on human development, anatomy in relation to facial and oral structures, and histology of hard and soft dental tissues.

**DH 240 - Prevention I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Beginning discussions about healthcare for the provider as a part of holistic healthcare, and foundations for preventing oral disease. Focus on strategies for improving oral health.

Prerequisite: Admission to the Dental Hygiene program

Corequisite: DH 221

**DH 241 - Prevention II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Second of a three-term series emphasizing prevention and management of caries and oral health education for individual patients and groups.

Prerequisite: DH 240

**DH 242 - Prevention III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Last of a three-term series emphasizing dental management and oral health education for a variety of age demographics including pregnancy, infants, children, and adolescence.

Prerequisite: DH 241

**DH 244 - General and Oral Pathology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to general pathology and common oral pathologies. Basic pathology, inflammation, immune system, and neoplasia. Etiology and recognition of benign and malignant oral and skin lesions. Descriptive terminology and differential diagnosis introduced.

**DH 252 - Oral Radiology I**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

The first of a two course series that includes didactic and pre-clinical instruction in the principles and techniques of dental radiography.

Prerequisites: DH 225 and DH 266

**DH 253 - Oral Radiology II**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

The second of a two course series that includes didactic instruction in the principles and techniques of dental radiography with emphasis on image interpretation.

Prerequisites: DH 244 and DH 252

**DH 254 - Introduction to Periodontology**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Introduction to periodontology with emphasis on etiology and pathogenesis of periodontal disease, disease classification, and assessment procedures.

Prerequisite: DH 244

**DH 266 - Dental Anatomy**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

In-depth study of crown and root morphology of primary and permanent dentitions, with tooth restoration considerations. The temporomandibular joint and occlusion will also be studied.

**DH 267 - Emergency Procedures**

Lecture Hours: 2

Lab Hours: 1

Credit Hours: 3

Prevention, preparation, and management of emergency situations common in the dental environment. Individual and team practice in carrying out emergency procedures.

Prerequisite: DH 244

**DH 275 - Dental Ethics**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Professional ethics and legal requirements of the dental profession.

**DH 299 - Laboratory Practice**

Lecture Hours: 0

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**DH 307 - Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**DH 321 - Clinical Prac & Sem IV**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Sequential courses designed for the continued development of dental hygiene skills necessary for entry into professional clinical practice. Ultrasonic, advanced instrumentation, and expanded dental hygiene functions are practiced, in addition to observations in dental practice settings.

Prerequisite: DH 223

**DH 322 - Clinical Prac & Sem V**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Sequential courses designed for the continued development of dental hygiene skills necessary for entry into professional clinical practice. Ultrasonic, advanced instrumentation, and expanded dental hygiene functions are practiced, in addition to observations in dental practice settings.

Prerequisite: DH 321

**DH 323 - Clinical Prac & Sem VI**

Lecture Hours: 1

Lab Hours: 12

Credit Hours: 5

Sequential courses designed for the continued development of dental hygiene skills necessary for entry into professional clinical practice. Ultrasonic, advanced instrumentation, and expanded dental hygiene functions are practiced, in addition to observations in dental practice settings.

Prerequisite: DH 322

**DH 340 - Emerging Oral Health Topics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course emphasizing dental management of common conditions found in a variety of populations, exploration of current topics in dentistry, and oral health related trends commonly encountered in professional practice.

Prerequisite: DH 242

**DH 341 - Vulnerable Populations**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course emphasizing oral health education and dental management of patients with medically compromised status. A variety of systemic conditions are discussed in depth in regards to the unique needs and prevention strategies for each individual.

**Prerequisite: DH 340****DH 344 - Adv General & Oral****Pathology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Further study of general and oral pathology. Developmental, hereditary, and congenital disorders. Endocrine, cardiovascular, hematopoietic, respiratory, gastrointestinal, neurologic, and skeletal disorders. Tooth abnormalities, radiographic lesions, and oral tissue enlargements. Systemic and oral complications of HIV and AIDS. Lesion description emphasized.

Prerequisite: DH 244

**DH 351 - Pain Management I**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

The first of a two course series. Lecture: study of pharmacology, solutions, dosages, vasoconstrictors, drug interactions, medical history evaluation and contradictions. Laboratory practice in techniques of local anesthesia include basic injection technique including block infiltration.

Prerequisites: CHE 360 and DH 267

**DH 352 - Pain Management II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

A continuation course of the pain management series. Coordinated lecture and laboratory practices in the recognition of dental anxiety; behavioral management; complications with anesthesia; nitrous oxide sedation techniques are practiced; advanced techniques in the administration of local anesthetics.

Prerequisite: DH 351

**DH 354 – Periodontology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Evidence-based approach for treatment of periodontal disease including nonsurgical and surgical treatment. Root anatomy relating to effective instrument adaptation. Treatment planning for patients with all types of classifications of periodontal disease.

Prerequisite: DH 254

**DH 363 - Dental Materials**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

General properties, composition and manipulation of common dental and restorative materials. Expanded functions including denture relines and amalgam polishing are practiced.

**DH 370 - International Extnrshp I**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Sequential courses preparing for and providing dental hygiene care at an international site using portable dental equipment. Cultural issues, teamwork, financing, needs assessment, goal setting, and delivery of program.

Prerequisites: DH 321 and DH 381

**DH 371 - International Extnrshp II**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Sequential courses preparing for and providing dental hygiene care at an international site using portable dental equipment. Cultural issues, teamwork, financing, needs assessment, goal setting and delivery of program.

Prerequisite: DH 370

**DH 372 - International Extnrshp III**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Sequential courses preparing for and providing dental hygiene care at an international site using portable dental equipment. Cultural issues, teamwork, financing, needs assessment, goal setting and delivery of program.

Prerequisite: DH 371

**DH 380 - Comm Dentl Hlth I**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

First in a four course sequence using a service learning approach. Students work in teams, identify target groups and conduct a needs assessment. Introduction to public health agencies and their functions; and to the role of the dental hygienist in public health.

Prerequisite: DH 241

Corequisite: DH 242

**DH 381 - Comm Dentl Hlth II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Service learning and systematic approach to developing oral health programs continues. Teams complete a program based on the needs assessment. Community health education and health literacy are emphasized. Grant writing for program funding is practiced.

Prerequisite: DH 380

**DH 382 - Comm Dentl Hlth III**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Service learning and systematic approach for implementing community oral health programs continues. Teams implement programs they designed. Health education occurs in the community. A broad view of public health including advocacy, epidemiology, research; controversy of water fluoridation.

Prerequisite: DH 381

**DH 383 - Comm Dentl Hlth IV**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Service learning and systematic approach for community oral health programs is continued. Teams complete implementation and evaluate of programs. Teams share results of programs and recommendations for future in public relations and written documentation in a portfolio and year-end report.

Prerequisite: DH 382

**DH 399 - Lab Practice**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

**DH 401 - Overview Advanced Dental Hyg**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the online degree completion program. Career opportunities, roles of the dental hygienist, and the different emphases within the program are explored.

Prerequisite: Admission to the BDHO program

**DH 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 4

(Hours to be arranged each term.)

**DH 421 - Clinical Prac & Sem VII**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Further refinement of clinical instrumentation and assessment skills. Emphasis on individualized care for patients with diverse oral needs. Variety of off-campus practice settings experienced.

Prerequisite: DH 323 and DH 352

**DH 422 - Clinical Prac & Sem VIII**

Lecture Hours: 1

Lab Hours: 12

Credit Hours: 5

Further refinement of clinical instrumentation and assessment skills. Emphasis on individualized care for patients with diverse oral needs. Variety of off-campus practice settings

experienced.

Prerequisite: DH 421

**DH 423 - Clinical Prac & Sem IX**

Lecture Hours: 1

Lab Hours: 12

Credit Hours: 5

Further refinement of clinical instrumentation and assessment skills. Emphasis on individualized care for patients with diverse oral needs. Variety of off-campus practice settings experienced.

Prerequisite: DH 422

**DH 430 - Dental Hyg Board Review**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Designed to help students prepare for their national board exam. Multiple-choice test-taking skills practiced. Mock tests simulating the real exam are used.

**DH 454 - Dental Prac Mgmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Profitability of the dental hygiene department; practice models, office design; patient satisfaction; financing options for the patient. Technology's impact on practice management.

Prerequisite: DH 323

**DH 461 - Restorative Dentistry I**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Emphasis on restoration placement techniques. Practical experience using restorative dental materials. Placement and finishing of amalgam and composite restorations on typodonts in Restorative Dentistry I and on patients in Restorative II and III.

Prerequisites: DH 266, DH 352, and DH 363

**DH 462 - Restorative Dentistry II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Emphasis on restoration placement techniques. Practical experience using restorative dental materials. Placement and finishing of amalgam and composite restorations on typodonts in Restorative Dentistry I and on patients in Restorative

II and III.

Prerequisite: DH 461

**DH 463 - Restorative Dentistry III**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

Emphasis on restoration placement techniques. Practical experience using restorative dental materials. Placement and finishing of amalgam and composite restorations on typodonts in Restorative Dentistry I and on patients in Restorative II and III.

Prerequisite: DH 462

**DH 465 - Independent Dental Hygiene Practice**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to independent dental hygiene practice. Designed for those interested in developing their own business venture (self-employment) as an Expanded Practice Dental Hygienist. Various practice opportunities are explored. Students develop and submit a business plan for a dental hygiene practice.

**DH 467 - Restorative Func Endorsement**

Lecture Hours: 2

Lab Hours: 2

Credit Hours: 4

This course fulfills the Oregon Board of Dentistry (OBD) requirements for the restorative endorsement for dental assistants and dental hygienists. Lecture, lab practice on typodonts and clinical practice with patients. Additional testing is required by the OBD following course completion.

Prerequisite: AS or BS in Dental Hygiene or EFDA (Expanded Function Dental Assistant)

**DH 470 - Community Program  
Planning I**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

First in a two course sequence. Students identify a target population and work with the community to assess, analyze, plan and budget for a community health project. Requires communication skills, networking, critical thinking and research. Prerequisite: Admission to the BDHO program

**DH 471 - Community Program  
Planning II**

Lecture Hours: 1  
Lab Hours: 6  
Credit Hours: 3

Second course in Community Program Planning sequence. Community projects planned in DH 470 are implemented and evaluated. Prerequisites: AHED 450, DH 470, and admission to the BDHO program

**DH 475 - EBDM in Healthcare I**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

First in a two-course sequence. Course emphasizes evidence-based decision making, identifying clinical treatment questions, describing types of research designs and sources of evidence, discussing importance of statistics, and conducting computerized searches. Critical appraisal of research introduced. Prerequisite: Admission to the BDHO program

**DH 476 - EBDM in Healthcare II**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Second in a two-course sequence. Emphasis on analysis of research studies for validity, reliability, statistical and clinical significance, and bias. Given clinical questions, students will conduct searches, critically analyze, and write summaries/reflections using EBDM guidelines. Prerequisite: DH 475, MATH 243 and admission to the BDHO program

**DH 477 - Dental Hyg Research Mthds  
III**

Lecture Hours: 2  
Lab Hours: 0  
Credit Hours: 2

Third in a series of three courses focusing on evidence-based decision making and critical analysis of current literature. In small groups, students will research a clinical question in PICO format, conduct and analyze research, and write a systematic review. Prerequisite: DH 476

**DH 480 - Community Health Pract**

Lecture Hours: 0  
Lab Hours: 9  
Credit Hours: 3

Students gain practical experience in public health by working in a public health setting. Individual goals and objectives are set by the student in consultation with the instructor. Prerequisites: AHED 450, DH 471, and admission to the BDHO program

**DH 495 - Individual Studies**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 4  
(Hours to be arranged each term.)

**DH 499 - Laboratory Practice**

Lecture Hours: 0  
Lab Hours: 6  
Credit Hours: 6  
(Hours to be arranged each term.)

**DHE 100 - Introduction to Dental  
Hygiene I**

Lecture Hours: 2  
Lab Hours: 0  
Credit Hours: 2

Orientation to the theory and practice of all aspects of the dental hygiene profession. The history of dental hygiene, professional organization and career opportunities are discussed.

**Diagnostic Medical  
Sonography**

**DMS 107 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15  
(Hours to be arranged each term.)

**DMS 207 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 6  
(Hours to be arranged each term.)

**DMS 223 - App of Abdominal Sonogr I**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
History of sonography. Orientation to patient history, abdominal cross-sectional anatomy, scanning, and normal sonographic presentations. Prerequisite: MIT 103 with grade "C" or better

**DMS 224 - App of Abdominal Sonogr II**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Orientation to cross-sectional abdominal anatomy and pathology of organs and vessels. Procedures and techniques, including scanning. Prerequisite: DMS 223 with grade "C" or better

**DMS 225 - App of Abdominal Sonogr  
III**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Advanced abdominal scanning procedures and techniques. Emphasis on superficial structures invasive procedures and Doppler correlation, including scanning. Prerequisites: DMS 224 and DMS 253 with grade "C" or better

**DMS 234 - Pelvic Sonography**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Orientation to male and female pelvic cross-sectional anatomy and pathology, differentiating between normal variations and abnormalities to include first trimester obstetrics and trans-vaginal scanning. Prerequisites: DMS 224 and DMS 253 with grade "C" or better

**DMS 252 - Sophomore Lab I**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Applied scanning of right upper quadrant anatomy stressing imaging planes. Gray scale instrumentation, system-

optimization, preventive maintenance, and quality hard copy imaging.  
Prerequisite: Sophomore standing in the DMS program  
Corequisite: DMS 223

**DMS 253 - Sophomore Lab II**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Applied scanning of the remainder of the abdominal cavity stressing anatomy, standard imaging planes, and hard copy quality. Doppler instrumentation as applied to the cerebrovascular system stressing pulse wave Doppler, color Doppler, Doppler optimization and standard imaging planes. Imaging review of prior anatomical areas.  
Prerequisites: BIO 335, DMS 223, and DMS 252, all with grade "C" or better  
Corequisites: DMS 224 and MIT 231

**DMS 254 - Sophomore Lab III**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
DMS orientation to cross-sectional pelvic anatomy and pathology of the male and female pelvis. Procedures and techniques, including scanning.  
Prerequisites: DMS 224 and DMS 253 both with grade "C" or better  
Corequisite: DMS 225

**DMS 307 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15  
(Hours to be arranged each term.)

**DMS 316 - Survey of Vascular Tech**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Orientation to vascular physics, equipment, and colorflow imaging. Explanation of Doppler imaging in relation to vascular anatomy.  
Prerequisites: DMS 234 and DMS 352, both with grade "C" or better

**DMS 337 - Breast Sonography**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Breast sonographic scanning procedures with an emphasis on sonographic applications. Correlation with other

imaging modalities.  
Prerequisite: DMS 225 with grade "C" or better

**DMS 343 - Neonatal/Pediatric Sonography**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Neonatal topics include hip, abdominal and neurological sonographic applications. General sonographic pediatric pathologies and anomalies will be discussed.

**DMS 346 - Musculoskeletal Sonography**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Survey of sonographic musculoskeletal imaging with emphasis on normal and abnormal findings.  
Prerequisite: DMS 225 with grade "C" or better

**DMS 352 - Junior Lab I**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Topics to include the male/female pelvis, first trimester, musculoskeletal, and breast stressing sonographic anatomy, standard imaging planes, and image quality.  
Prerequisite: DMS 254 with grade "C" or better

**DMS 353 - Junior Lab II**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Topics to include normal first, second, third trimester, and cardiovascular stressing anatomy, standard imaging planes, and image quality.  
Prerequisite: DMS 352 with grade "C" or better

**DMS 354 - Junior Lab III**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1  
Applied sonographic laboratory procedures and techniques. Emphasis on protocols and case reviews.  
Prerequisite: DMS 353 with grade "C" or better

**DMS 365 - Sonographic Pathology**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Differential diagnosis and concepts of disease processes as applied to sonographic examination.  
Prerequisite: Junior standing in the DMS program

**DMS 370 - Obstetrical Sonography**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Orientation to obstetrical scanning procedures and techniques. Emphasis on normal obstetrical anatomy and fetal development.  
Prerequisites: DMS 224, DMS 225, and DMS 234 all with grade "C" or better

**DMS 373 - Obstetrical Pathology**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Advanced obstetrical scanning of second and third trimester obstetrical patients with emphasis on pathology.  
Prerequisite: DMS 370 with grade "C" or better

**DMS 375 - Fetal Echocardiography**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Survey of fetal echocardiographic imaging applications with emphasis on parasternal, apical, subcostal and suprasternal 2-D views. Standard M- Mode measurements, Doppler and color Doppler. Common congenital cardiac pathology.

**DMS 388 - Externship Preparation**

Lecture Hours: 2  
Lab Hours: 0  
Credit Hours: 2  
Presentation of key concepts related to Diagnostic Medical Sonography externship and required in-services. Focus is on patient care and interpersonal scenarios the externship student will likely face while in the clinical environment. Review and discussion of the DMS Externship Handbook.  
Prerequisites: DMS 316, DMS 353, and DMS 370, all with grade "C" or better



**DMS 407 – Seminar**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

**DMS 430 - DMS Externship**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

All B.S. students must complete four terms (12 months) of clinical experience in sonography at an OIT approved clinical site. Students will work under the direct supervision of registered sonographers. Prerequisite: All academic coursework in the DMS curriculum

**DMS 430A - DMS Externship**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 8

This two-term special externship is designed for the degree completion student. Students working in a clinical ultrasound setting will prepare clinical case studies.

Prerequisites: Be an ARDMS Sonographer in good standing and have completed all academic coursework in the Medical Imaging curriculum with grade "C" or better

**DMS 430B - DMS Externship**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 7

This two-term special externship is designed for the degree completion student. Students working in a clinical ultrasound setting will prepare clinical case studies.

Prerequisites: Be an ARDMS Sonographer in good standing and have completed all academic coursework in the Medical Imaging curriculum with grade "C" or better

**Echocardiography****ECHO 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**ECHO 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**ECHO 227 - Basic ECG Recognition/Testing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basics of ECG testing, heart pressures, blood volume/physiology and the electrical conduction system. Focus on interpretation of ECG rhythms: normal ECG, ventricular hypertrophy, bundle branch block, AV block, myocardial ischemia, bradycardia, tachycardia, atrial fibrillation, ventricular fibrillation and irregular rhythms.

**ECHO 231 - Echocardiography I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to scanning techniques and tomographic views according to the American Society of Echocardiography standards. B-mode image, pulsed and continuous wave Doppler, and color flow imaging.

Prerequisite: ECHO 320

**ECHO 232 - Echocardiography II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An intermediate level of instruction in scanning techniques with tomographic views according to the American Society of Echocardiography standards. Emphasis on cardiac pathology and the echocardiography evaluation.

Prerequisite: ECHO 231

**ECHO 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ECHO 320 - Cardiographic Methods**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Recognition of ECG tracing with normal and abnormal arrhythmias, treadmill testing, holter monitoring, phonocardiography, and heart auscultation. Review of case examples for analysis and

synthesis. Integration of cardiographic monitoring methods with cardiac ultrasound imaging. Review of cardiac anatomy.

Prerequisite: ECHO 232

**ECHO 321 - Stress & Transesophageal Echo**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Cardiac applications, protocols, and techniques related to stress echo and transesophageal echo. TEE anatomy, acquisition of images and the cardiovascular operating room. Particular emphasis on the mitral valve and surgical repairs.

Prerequisite: Admission to the Echocardiography program

**ECHO 325 - Pediatric Echo**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Congenital heart disease, including neonate/infant and adult disorders. Congenital disorders including cardiac situs, ventricular morphology, great artery connections, valvular and subvalvular obstruction, atrial septal defect, ventricular septal defect.

Prerequisite: ECHO 333

**ECHO 332 - Invasive Cardiology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Cardiac catheterization testing. Coronary artery interventions such as percutaneous transluminal coronary intervention (PCI), and chamber pressure measurements.

Prerequisite: ECHO 231

**ECHO 333 - Echocardiography III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An advanced level of instruction in scanning techniques and tomographic views according to the American Society of Echocardiography standards. Cardiac pathology, and advanced methods in echocardiography.

Prerequisite: ECHO 232

**ECHO 334 - Echocardiography IV**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An advanced level of instruction in scanning techniques and tomographic views according to the American Society of Echocardiography standards. Special topics including 3-D, 4-D, tissue Doppler, cardiac resynchronization and other technological advances.

Prerequisite: ECHO 333

**ECHO 365 - Abdominal/Renal Testing**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Abdominal vascular anatomy and common disease processes. Students will be asked to perform basic abdominal vascular tests following very specific protocols and interpretations.

Prerequisites: ECHO 325 and ECHO 376

Corequisites: ECHO 385 and ECHO 388

**ECHO 376 - Survey of Vascular Testing**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Basic vascular pathophysiology in carotid, arterial, and venous testing. Waveform recognition, interpretation, and protocols for testing.

Prerequisite: ECHO 333

**ECHO 385 - Echo Lab Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focus on human resource skills as necessary to manage an echocardiography laboratory. Includes the interview process, hiring and firing, as well as employee performance evaluation. Other topics will include reimbursement, licensure, accreditation and other management issues.

**ECHO 388 - Externship Preparation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Review and summarization of key concepts in Echocardiography. Focus on patient care and interpersonal scenarios the student will likely face in the hospital environment or independent echo lab. Review and interpretation of case studies in preparation for clinical analysis and

documentation using structured reporting systems. Review and discussion of the Echocardiography Externship Handbook. Corequisite: ECHO 334

**ECHO 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ECHO 420 - Echo Externship**

Lecture Hours: 0

Lab Hours: 40

Credit Hours: 15

Students work as registered professionals in the field and must complete nine months (three quarters) of experience in Echocardiography.

Prerequisite: Admission to the Echocardiography Degree Completion program

**ECHO 420A - Echo Externship**

Lecture Hours: 0

Lab Hours: 22

Credit Hours: 8

Students work as registered professionals in the field. Patient echo exams with normal and abnormal stress tests, normal and abnormal wall motion. Case study presentation.

Prerequisite: Admission to the Echocardiography Degree Completion program

**ECHO 420B - Echo Externship**

Lecture Hours: 0

Lab Hours: 18

Credit Hours: 7

Students work as registered professionals in the field. Cardiac surgical echoes (TEE) and contrast studies using various pharmacological agents. Case study presentation.

Prerequisite: Admission to the Echocardiography Degree Completion program

**ECHO 421 - Echo Senior Project**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Students design a research based senior project in the field of echocardiography, including interviews, research, literature review and formal presentation of the project.

Prerequisites: ECHO 420, and WRI 123 or WRI 227

**Economics****ECO 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**ECO 201 - Principles of Microeconomics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Topics include scarcity, consumer choice, supply and demand, elasticity, cost and pricing theory, theory of market structures (competition, monopoly, monopolistic competition, oligopoly).

Prerequisite: MATH 100 or higher

**ECO 202 - Principles of Macroeconomics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the economic problem. Topics include gross domestic product, unemployment, monetary policy, fiscal policy, macro equilibrium, inflation, and supply and demand.

Prerequisite: MATH 100 or higher

**ECO 203 - Prin of Econ-Spec Topics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A survey of micro- and macroeconomic topics of current interest. Topics may include labor practices, international economics, natural resource economics, urban planning, and economic policy issues. Students prepare a research paper and present results to the class.

Prerequisites: ECO 201 and ECO 202

**ECO 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ECO 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**ECO 357 - Energy Economics & Policy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores the role of energy and energy resources from the economic perspective. Analyzes US and global energy markets and policy; traditional and alternative energy sources; pricing of externalities and public goods; the use of market instruments, subsidies and taxes; and the political economy.

Prerequisites: ECO 201 or ECO 202, and MATH 243 or MATH 361

**ECO 367 - Int'l Economics & Finance Mgt**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Financial management involving international monetary environment; foreign exchange risk management; source and availability of funds to finance trade and multinational operations; taxation planning and control; international portfolio diversifications; international banking; capital budgeting; political risk evaluation of performance.

Prerequisites: BUS 308, and ECO 201 or ECO 202

**ECO 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**Electrical Engineering****EE 101 - Intro to Engineering I**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A three course sequence introducing the field of engineering focusing on electrical engineering and renewable energy. Success strategies. Engineering and scientific notation. Ohm's Law, problem solving. Communication skills. Ethics in engineering. Professional development and life-long learning. Introduction to the

design process culminating in a term design experience.

**EE 102 - Intro to Engineering II**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A three course sequence introducing the field of engineering focusing on electrical engineering and renewable energy. Success strategies. Engineering and scientific notation. Ohm's law, problem solving. Communication skills. Ethics in engineering. Professional development and life long learning. Introduction to the design process culminating in a team design experience.

**EE 103 - Intro to Engineering III**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A three course sequence introducing the field of engineering focusing on electrical engineering and renewable energy. Success strategies. Engineering and scientific notation. Ohm's law, problem solving. Communication skills. Ethics in engineering. Professional development and life-long learning. Introduction to the design process culminating in a team design experience.

**EE 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**EE 121 - Fund of Electric Circuits I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

DC Analysis and First-Order transients. Ohm's Law, Kirchoff's laws, nodal analysis, mesh analysis, source transformations, Thevenin and Norton equivalents, maximum power transfer, superposition, introduction to op-amps, inductance and capacitance, transient response of RC and RL circuits.

Prerequisite: MATH 111

**EE 123 - Fund of Electric Circuits II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

AC analysis, second-order transients, introduction to electric power. Transient

response of second-order circuits, sinusoids and phasors, sinusoidal steady-state analysis, nodal analysis, mesh analysis, source transformations, Thevenin and Norton equivalents, sinusoidal steady-state power calculations, balanced three-phase circuits, mutual inductance, transformers.

Prerequisites: EE 121 and MATH 112

**EE 131 - Digital Electronics I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to combinational logic, gates, Boolean Algebra, Karnaugh Mapping, Number Systems/Codes, arithmetic circuits, decoders/encoders, mux/demux, comparators, basic sequential gates (Latches/FF) and introduction to HDL (Verilog/VHDL), PLD HW implementation.

Pre- or Corequisite: MATH 111

**EE 133 - Digital Electronics II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to sequential logic with HDL, review latches and flip/flops, timers, counters/registers, HDL implementation, PLD HW implementation, finite state machine design/analysis, logic testing and timing analysis.

Prerequisites: EE 131 or CST 162 both with grade "C" or better, and MATH 111

**EE 207 – Seminar**

Lecture Hours: 10

Lab Hours: 0

Credit Hours: 10

(Hours to be arranged each term.)

**EE 219 - Intro Semiconduct Device & Amp**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to semiconductor devices, characteristics of biasing of diodes and transistors, analysis and design of circuits using diodes, bipolar junction transistors and field-effect transistors. Applications of transistors as amplifiers and switches.

Prerequisite: EE 123

**EE 221 - Circuits I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

DC and AC principles and analysis. Ohm's law. Kirchoff's laws. Nodal analysis. Loop analysis. Source transformations. Thevenin and Norton equivalent circuits, maximum power transfer, operational amplifiers, inductance, capacitance, and first-order transient circuit response. Students must also register for a laboratory section.

Corequisite: MATH 252

**EE 223 - Circuits II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Single phase AC power. Transformers. Balanced three-phase power. Ideal op-amp. Basic op-amp circuits. First- and second-order circuits and transients.

Steady-state frequency response. Bode plots. First- and second-order passive filters (LP, HP, BP). Resonance. Active op-amp filters.

Prerequisites: EE 221 and MATH 252, both with grade "C" or better

**EE 225 - Circuits III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introductory course in linear circuit analysis. Transfer functions, frequency response, Bode plots, passive and active filter, Laplace transforms, Fourier series, Fourier transforms, and two-port networks. Students must also register for a laboratory section.

Prerequisite: EE 223 with grade "C" or better

Corequisite: MATH 321

**EE 236 - LabVIEW Programming**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An object oriented programming course using National Instruments LabVIEW programming language designed for programming data-logging, instrumentation and control applications. Basic flow-charting is introduced. Logical constructs as implemented by LabVIEW are investigated. Example control problems are investigated and programmed using LabView.

Prerequisite: MATH 112

**EE 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**EE 311 - Signals and Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Spectrum. Fourier Series. Time Frequency Spectrum. Sampling and Aliasing. Reconstruction. Sampling Theorem. Discrete Time Signals and Systems. Convolution Sum. Continuous Time Signals and Systems. Frequency Response. Continuous Time Fourier Transform. Relationship between CTFT, DTFT, DFT, and FFT. Spectrogram. Z Transform. Prerequisite: EE 225 with grade "C" or better

**EE 320 - Adv Circuit Systems Analysis**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Methods of circuit analysis and circuit theorems. Introduction to the Laplace transform and its applications. Advanced circuit analysis using Laplace transform techniques. Transfer function analysis. Impulse and frequency response of circuits and systems. Bode plots. Stability. Prerequisites: EE 123 or EE 223, and MATH 252

**EE 321 - Electronics I**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Basic semiconductor theory. Diodes and diode circuits. Bipolar-junction transistor (BJT). Ebers-Moll model. BJT amplifiers (CE, CB & CD). Multistage and differential amplifiers. Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET). MOSFET amplifiers (CS, CG & CD). Multistage MOSFET amplifiers. Op-Amps.

Prerequisites: EE 123 or EE 223, and MATH 252

Corequisites: EE 225 or EE 320

**EE 323 - Electronics II**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Current sources. Current mirrors. Cascade active loads. Multistage amplifiers.

Differential amplifiers. Frequency response. Miller's theorem. Negative feedback amplifier types: Voltage, Current, transconductance and transresistance. Stability and pole location. Gain and phase margins. Frequency compensation. Prerequisites: EE 321 with grade "C" or better, and EE 225 or EE 320

**EE 325 - Electronics III**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Real operational amplifiers and basic circuits. Output stages. Power amplifiers. Filters, passive and active. Oscillators. Wave-shaping circuits. D/A and A/D circuits.

Prerequisite: EE 323 with grade "C" or better

**EE 331 - Digital System Design w/HDL**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces the student to a Hardware Descriptive Language and describes its role in digital design. Dataflow, Behavioral and Structural Modeling, Logic Partitioning, Hierarchical Design, CPLDs, and FPGAs. DC parameters and CPLD Timing Models. Design examples including keyboard scanner, counters, ALUs, multipliers and controllers. Prerequisite: EE 133 with grade "C" or better

**EE 333 - Intro to Microcontrollers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introductory course in microcontroller design. Topics include interrupt controller, time/counters, A/D converters, PWM channels, USARTs, SPI, two-wire interfaces, LEDs, LCDs, motors, and various sensors. Hands-on projects or lab assignments require C and/or assembly language programming to develop applications.

Prerequisite: CST 116

Corequisites: EE 131 or EE 133 or EET 216

**EE 335 - Advanced Microcontrollers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in design and

development of micro-controller-based systems. Topics include internal peripheral devices, external devices interfacing, and micro-controller system design. Learning objectives are accomplished through design of fully integrated projects or lab assignments using C and/or assemble language programming.

Prerequisite: EE 333 with grade "C" or better

### **EE 341 - Electricity/Magnetism w/Transm**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Review vector calculus. Flux, potential, gradient, divergence, curl and field intensity. Static electric and magnetic fields. Maxwell's equations. Boundary conditions. Uniform plane waves in media and free space. Reflection and transmission at interfaces. Propagation of guided waves. Transmission line.

Antennas.

Prerequisites: EE 123 or EE 221, MATH 252, MATH 254, and PHY 202 or PHY 222

### **EE 343 - Solid State Electronic Devices**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Crystal properties and growth of semiconductors. Atoms and electrons. Energy bands and charge carriers in semiconductors. Excess carriers in semiconductors, p-n junctions. FETs and BJTs. Optoelectronic devices. High-frequency and high-power devices.

Prerequisites: MATH 252, and PHY 202 or PHY 222

Corequisite: EE 321

### **EE 347 - Digital Logic**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Number systems; combinational logic including Boolean algebra, DeMorgan's Theorems and Karnaugh Maps; digital TTL, CMOS IC characteristics, conventional IC functions; sequential logic including flip-flops, counters, registers and state diagrams. Combinational and sequential logic circuits will be simulated, built and tested.

Prerequisite: MATH 112

### **EE 355 - Control System Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Continuous-domain systems and Laplace transform review. System modeling, identification and linearization. System response and stability analysis. Classical tracking and regulating controller design using computers. PID tuning, Lab exercises in modeling, design and implementation.

### **EE 401 - Communication Systems**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Signal Analysis, Fourier series, Fourier Transforms; analog signal transmission and Reception (AM, FM, PM); effects of noise in Analog Systems. Digital Data and Communication Systems; effects of noise in Digital Systems.

Prerequisite: EE 311 or EE 430

### **EE 407 - Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **EE 419 - Power Electronics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Power electronic device characterization. Rectifiers, DC-DC converters and inverters design, modeling, and build.

Prerequisite: EE 321

### **EE 421 - Analog Intgrted - Circuit Dsgn**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Models of IC active devices. Review single-transistor and multiple-transistor amplifiers. Current mirrors, active loads, and references. Output stages. Operational amplifiers with single-ended outputs. Frequency response of ICs, noise in ICs bipolar, MOS and BiCMOS IC technology. Student must register for laboratory section.

Prerequisite: EE 323

Corequisite: EE 325

### **EE 423 - CMOS Digital Intg Circuit Dsgn**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

MOSFETs, threshold voltage, body effect, channel lengths, CMOS, inverter characteristics, transmission gates, performance (latch-up, parameter estimation, capacitance), domino logic, registers, scan test, layout.

Prerequisites: CST 133 or EE 133, and EE 321

### **EE 425 - Wireless Communication**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Baseband digital systems, messages, characters and symbols, sampling theorems. Noise sources, M-ary signals, baseband formatting including PCM waveforms, digital filters including FIR and IIR. Matched filters, band-pass modulation and demodulation techniques, and an introduction to spread spectrum transmission. Student must register for laboratory section.

Prerequisites: EE 133/CST 133 and EE 223, both with grade "C" or better

### **EE 426 - RF/Wireless Systems**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Hardware components, system parameters, and architectures of RF and microwave wireless systems. Topics include microwave transmission lines, Smith charts, impedance matching networks, antenna systems, microwave components, receivers and transmitters, radar systems and sensors, and wireless communication systems.

Prerequisite: EE 341

**EE 430 - Linear Sys & Digital Signal**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Introduction to signals and systems. Spectral analysis techniques. Fourier Series and the continuous-time Fourier transform (CTFT). Discrete-time Fourier transform (DTFT) and digital Fourier transform (DFT). Computational spectral analysis using the FFT. FIR and IIR filters. Z-transform. Practical implementation of digital filters and computational spectral analysis using MATLAB.

Prerequisite: EE 225 or EE 320

**EE 431 - Digital Signal Processing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Discrete systems and signals, linear time invariant systems, difference equations, frequency response, Z-transforms, analysis software, discrete Fourier transforms.

Prerequisites: EE 311 and EE 335, both with grade "C" or better

**EE 432 - Advanced Digital System Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced digital system design with Field Programmable Gate Arrays (FPGAs). Students implement designs with pre-generated and custom digital logic functions using VHDL and/or Verilog hardware description languages. Projects include digital systems design, simulations, and hardware implementation.

Prerequisites: CST 116 and EE 331, both with grade "C" or better

**EE 435 - Embedded Systems I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in embedded systems design and development. Topics include an introduction to operating systems, cross-compilation, device tree overlays, ARM processor architecture, embedded networking, inter process communications, external hardware interfaces, and development of graphic user interfaces. Students must have completed CST 116 and EE 335 with grade "C" or better.

**EE 441 - Biomedical I Intro Biomed Engr**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to biomedical engineering anatomy and physiology for engineers, bioelectric phenomena, biomedical sensors, biomedical instrumentation, biosignal processing, cardiovascular mechanics, biomaterials, tissue engineering, biomedical imaging and clinical engineering. Student must register for a laboratory section.

Prerequisite: EE 311 with grade "C" or better

**EE 443 - Biomedical II Signal Processing**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamental problems of biomedical signal processing; signal analysis; signal modeling, sources and types of biomedical signals. Arterial and ambulatory blood pressure (ABP/ABPM); intracranial pressures (ICP); pulse oximetry (SpO<sub>2</sub>); electrocardiogram (ECG). Stochastic, harmonic models, spectrum analysis and time-frequency analysis. Student must register for a laboratory section.

Prerequisite: EE 311 with grade "C" or better

**EE 445 - Biomedical III Instrumentation**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Review of biological systems (human), signals, measurements and transducers; bio-electrical signals and amplifiers; electrocardiograph (ECG); blood pressure; ultrasonography; x-ray; radiology and nuclear medicine equipment; power sources; electro-magnetic interference (EMI) effects; and electrical safety. Student must register for a laboratory section.

Prerequisite: EE 311 with grade "C" or better

**EE 448 - Geometric Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Reflection and refraction at plane and curved surfaces; imaging properties of lenses; first-order Gaussian optics and thin-lens system layout; matrix optics; ray-

tracing software; spherical and chromatic aberrations.

Prerequisite: PHY 223

**EE 449 - Radiometry & Optical Detect**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamentals of radiometry and photometry; detection of light using thermal and photon (photoemissive, photoconductive, and photovoltaic) methods; noise processes; blackbodies; charge transfer devices; spectroradiometry.

Prerequisites: EE 223 and PHY 223

**EE 450 - Physical Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Spherical and planar waves; scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; interference and interferometers; optical transfer functions; coherent optical systems and holography.

Prerequisite: PHY 223

**EE 451 - Lasers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Laser radiation properties, laser cavities, coherence, atomic spectra, pumping rate, power gain threshold conditions, beam shape, mode structure; Ion, molecular, solid-state, dye, semiconductor, and fiber lasers.

Prerequisite: EE 450 or PHY 450

**EE 452 - Waveguides and Fiber Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Light propagation in fibers and waveguides; termination, coupling, and splicing of fibers; fiber optic communication; optical time domain reflectometry, fiber amplifiers, and fiber sensors.

Prerequisite: EE 450 or PHY 450

**EE 453 - Optical Metrology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Modern optical metrology with emphasis on non-destructive testing; Fourier optics; Moire and polarization methods; classic and holographic interferometry; speckle techniques; fringe analysis.

Prerequisite: EE 450 or PHY 450

**EE 461 - Control Engineering I: Classical Methods**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to the design and compensation of linear control systems using a complex frequency-domain approach. Feedback control of first- and second-order systems, controller sensitivity, disturbance rejection, stability, frequency response methods. Introduction to state-space modeling. Computer simulation of feedback control systems. Prerequisites: EE 225 or EE 320, ENGR 267, and MATH 321, all with grade "C" or better. Engineering majors who have completed MECH 326 and MECH 480, both with grade "C" or better, may also enroll.

**EE 465 - Sensors and Instrumentation**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in sensors and instrumentation for embedded applications. Topics include a study of transducers, medical sensors, position sensors, automotive sensors, and sensor arrays. Students will also study sensor synchronization, A/D converters, linearization, sampling, error sources/budget, and noise margin analysis.

Prerequisite: EE 331 with grade "C" or better

Corequisite: PHY 223

**EE 471 - Machine Learning I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Theory and practice of Genetic Algorithms, Evolution Strategies, Backprop, Kernel Methods, Naive Bayes, Bayesian Belief Nets, Fuzzy Inference; brief discussion of Genetic Programming, Swarm Intelligence, Reinforcement Learning, Bayes Optimal.

Prerequisite: EE 430, or CST

116 and MATH 341, or ENGR 267 and

MATH 341

**EE 473 - Machine Learning II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Integration of Information Theory and Statistical Learning into a generalized framework including Support-Vector Machines, Adaptive Resonance, and Adaptive Critics, plus project.

Prerequisite: EE 471

**EE 475 - Micropower Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in low-power solutions for embedded systems. Topics will include low-power processor architectures, power management subsystems, processor sleep modes, power circuits, power supply sequencing, battery technology, rechargeable power sources, charge capacity models, IoT applications. Prerequisite: EE 323 with grade "C" or better

**EE 485 - Printed Circuit Board Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A course on modern PCB technology and design skills required for successful implementation of PCB designs in industry. This course provides direct, hands-on experience with industry standards, tools, and design techniques. Students will learn schematic capture and PCB layout. Cross-listed with EE 585. Prerequisites: EE 335 and EE 341, both with grade "C" or better

**EE 501 - Communication Systems**

Lecture Hours: 3

Lab Hours: 4

Credit Hours: 5

Single Analysis, Fourier series, Fourier Transforms; Analog signal transmission and Reception (AM, FM, PM); effects of noise in Analog Systems. Digital Data and Communication Systems; effects of noise in Digital Systems. Cross-listed with EE 401.

Prerequisite: Graduate standing

**EE 507 - Seminar**

Lecture Hours: 12

Lab Hours: 12

Credit Hours: 12

(Hours to be arranged each term.)

**EE 525 - Wireless Communications**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Baseband digital systems, messages, characters and symbols, sampling theorems. Noise sources, M-ary signals, baseband formatting including PCM waveforms, digital filters including FIR and IIR. Matched filters, band-pass modulation and demodulation techniques, and an introduction to spread spectrum transmission. Cross-listed with EE 425.

Prerequisite: Graduate standing

**EE 526 - RF/Wireless Systems**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Hardware components, system parameters, and architectures of RF and microwave wireless systems. Topics include microwave transmission lines, Smith charts, impedance matching networks, antenna systems, microwave components, receivers and transmitters, radar systems and sensors, and wireless communication systems.

Prerequisite: Graduate standing

**EE 530 - Linear Sys & Digital Sig Prcsg**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Introduction to signals and systems. Spectral analysis techniques. Fourier Series and the continuous-time Fourier transform (CTFT). Discrete-time Fourier transform (DTFT) and digital Fourier transform (DFT). Computational spectral analysis using the FFT. FIR and IIR filters. Z-transform. Practical implementation of digital filters and computational spectral analysis using CAD tools.

**EE 532 - Advanced Digital System Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced digital system design with Field Programmable Gate Arrays (FPGAs). Students implement designs with pre-

generated and custom digital custom logic functions using VHDL and/or Verilog hardware description languages. Projects include digital system design, simulation, and hardware implementation. Cross listed with EE 432.

Prerequisite: MSE Graduate standing

### **EE 535 - Embedded Systems Hardware**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in embedded systems hardware design and development. Topics include system-on-chip design, ARM processor architecture, digital signal processors, multicore processing, vector processors, graphics processing units, external serial interfaces, external memory interfaces, network interfaces, debuggers, in-circuit emulators, and hardware security. Cross-listed with EE 435

Prerequisite: MSE Graduate standing

### **EE 548 - Geometric Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Reflection and refraction at plane and curved surfaces; imaging properties of lenses; first-order Gaussian optics and thin-lens system layout; matrix optics; ray-tracing software; spherical and chromatic aberrations.

Prerequisite: PHY 223

### **EE 549 - Radiometry & Optical Detection**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamentals of radiometry and photometry; detection of light using thermal and photon (photoemissive, photoconductive, and photovoltaic) methods; noise processes; blackbodies; charge transfer devices; spectroradiometry.

Prerequisite: PHY 223

### **EE 550 - Physical Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Spherical and planar waves; scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; interference and interferometers; optical transfer functions;

coherent optical systems and holography.

Prerequisite: PHY 223

### **EE 551 – Lasers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Laser radiation properties, laser cavities, coherence, atomic spectra, pumping rate, power gain, threshold conditions, beam shape, mode structure; ion, molecular, solid-state, dye, semiconductor, and fiber lasers.

Prerequisite: EE 450/PHY 450 or EE 550/PHY 550

### **EE 553 - Optical Metrology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Modern optical metrology with emphasis on non-destructive testing; Fourier optics; Moire and polarization methods; classic and holographic interferometry; speckle techniques; fringe analysis.

Prerequisite: EE 450/PHY 450 or EE 550/PHY 550

### **EE 555 - Embedded Systems Software**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in embedded systems software design and development. Topics include bootloaders, embedded operating systems (RTOS, Embedded Linux), memory management systems, file systems, device drivers, integrated development environments (Eclipse, Compilers/Linkers/Makefiles), software revision control, and embedded programming (C++). Cross listed with EE 455

Prerequisite: MSE Graduate standing

### **EE 560 - Computational Data Science & Big Data**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Applied data science, statistical techniques for data science, applied machine learning, big data analysis, big data processing, visualization and representation, applied computational & mathematical methods for data science, data analytics, applied text mining and network analysis.

Prerequisite: Graduate standing

### **EE 561 - Control Engineering I:**

#### **Classical Methods**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to the design and compensation of linear control systems using a complex frequency-domain approach. Feedback control of first- and second-order systems, controller sensitivity, disturbance rejection, stability, frequency response methods. Introduction to state-space modeling. Computer simulation of feedback control systems.

Prerequisite: Graduate standing

### **EE 565 - Sensor and Instrumentation**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in sensors and instrumentation for embedded applications. Topics include a study of transducers, medical sensors, position sensors, automotive sensors, and sensor arrays. Students will also study sensor synchronization, A/D converters, linearization, sampling, error sources/budget, and noise margin analysis. Cross-listed with EE 465.

### **EE 575 - Micropower Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced course in low-power solutions for embedded systems. Topics will include low power processor architectures, power management subsystems, processor sleep modules, power circuits, power supply sequencing, battery technology, rechargeable power sources, charge capacity models, IoT applications. Cross-listed with EE 475.

Prerequisite: MSE Graduate standing

### **EE 585 - Printed Circuit Board Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A course on modern PCB technology and design skills required for successful implementation of PCB designs in industry. This course provides direct, hands-on experience with industry standards, tools, and design techniques. Students will learn schematic capture and PCB layout. Cross-listed with EE 485.

Prerequisite: MSE Graduate standing



**EE 595 - Selected Grad Topics in EE**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Selected electrical, computer, and embedded engineering topics at the graduate level. Course may be repeated for credit.

**EE 596 - Grad Research & Development**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Research and development in electrical, computer, and embedded engineering topics at the graduate level. Course may be repeated for credit.

**EE 597 - Graduate Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Graduate project in electrical, computer, and embedded engineering topics. Course may be repeated for credit.

**EE 598 - Graduate Thesis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Graduate thesis in electrical, computer, and embedded engineering topics. Course may be repeated for credit.

**EE 599 – Practicum**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Supervised practical experience in electrical, computer, and embedded engineering topics at the graduate level. Course may be repeated for credit.

## Electronics Engineering Technology

**EET 215 - Digital Circuits I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to combinational logic, gates, boolean algebra. Karnaugh mapping, number systems/codes, arithmetic circuits, encoders/decoders, multiplexers/demultiplexers, comparators, parity, code conversions, introduction to HDL, PLD HW implementation.  
Prerequisite: MATH 111

**EET 216 - Digital Circuits II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to sequential logic, latches, flip-flops, timers, counters, registers, finite state machines, logic testing, DC parameters and timing analysis.  
Prerequisite: EET 215

**EET 217 - Electric Circuits I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

DC Analysis and First-Order Transients. Ohm's law, Kirchoff's laws, nodal analysis, mesh analysis, source transformations, Thevenin and Norton equivalents, maximum power transfer, superposition, introduction to op-amps, inductance and capacitance, transient response of RC and RL circuits.  
Prerequisite: MATH 111

**EET 218 - Electric Circuits II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

AC Analysis, Second-Order Transients, introduction to electric power. Transient response of second-order circuits, sinusoids and phasors, sinusoidal steady-state, nodal analysis, mesh analysis, source transformations, Thevenin and Norton equivalents, sinusoidal steady-state power calculations, balanced three-phase circuits, mutual inductance, transformers.  
Prerequisites: EET 217 and MATH 112

**EET 219 - Semiconductor Devices & Amp**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to semiconductor devices, characteristics and biasing of diodes and transistors, analysis and design of circuits using diodes, bipolar junction transistors, and field-effect transistors. Applications of transistors as diodes and switches.  
Prerequisite: EET 218

**EET 237 - AC Circuits, Filters & Signals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

RC transient analysis, sinusoidal AC voltage, phasors, average and effective

value, the decibel, simple RC transfer functions. low-pass, high-pass, and band-pass filters, periodic and aperiodic signals in time and frequency, bandwidth. For non-EET majors.

Prerequisites: EE 221 or EET 115 with grade "C" or better, and MATH 252  
Corequisite: EET 238

**EET 238 - AC Circuits, Filters Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lab to accompany EET 237. For non-EET majors.

Prerequisites: EE 221 or EET 115 with grade "C" or better, and MATH 252  
Corequisite: EET 237

**EET 308 - Intro MOS Microelectronics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to microelectronics, semiconductor physics, integrated circuit (IC) technology, pn junction and MOS (Metal-Oxide-Semiconductor) electrostatics, MOS FETs (Field-Effect Transistors), selected digital circuits using CMOS (Complimentary MOS) FETs, PSPICE modeling of IC MOSFETs.  
Prerequisites: CST 262 and EET 237, or instructor consent  
Corequisite: EET 309

**EET 309 - Intro MOS Microelec Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Laboratory companion to EET 308. Theoretical concepts discussed in lecture verified using available components and instrumentation. Computer simulation using PSPICE. Written and oral laboratory reports required.  
Prerequisites: CST 262, and EET 238 or EET 246, or instructor consent  
Corequisite: EET 308

## Emergency Medical Technology-Paramedic

**EMS 107 – Seminar**

Lecture Hours: 10

Lab Hours: 0

Credit Hours: 10

(Hours to be arranged each term.)

**EMS 115 - Introduction to EMS**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces the fundamentals of an emergency medical services system, history, and professional roles and responsibilities. Discusses medical/legal and ethical issues, research and evidence based practice.

**EMS 135 - Wilderness First Aid**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Basic First Aid and CPR training for the outdoor adventurer or world traveler. Scenario-based learning using medical equipment improvised for wilderness settings. Course completion earns Wilderness First Aid and CPR certifications meeting the outdoor industry requirements. Customized group courses available.

**EMS 151 - Emerg Med Tech (EMT) I**

Lecture Hours: 3

Lab Hours: 9

Credit Hours: 6

The first of two courses required for an entry-level career in emergency medical services. The course introduces students to the EMS system, professional attributes of an EMT, ambulance operations and the basic knowledge and skills of an EMT. Prerequisite: Current CPR certification

**EMS 152 - Emerg Med Tech (EMT) II**

Lecture Hours: 3

Lab Hours: 9

Credit Hours: 6

The second of two course focuses on the basic recognition and treatment of specific illnesses and injuries. The course includes 16-hours clinical and ambulance experience. Students successfully completing the course are eligible for Oregon and national certification examinations.

Prerequisite: EMS 151

**EMS 190 - EMT Externship**

Lecture Hours: 0

Lab Hours: 12

Credit Hours: 4

EMS field experience with an affiliated transport agency. Students work at a BLS level under the direct supervision on one of the local EMS agency ambulances.

Prerequisite: EMS 152 or Oregon EMT certification

**EMS 200 - Medical Terminology**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 3

Students build a strong medical vocabulary using prefixes, suffixes, and Greek and Latin verbs and adjectives. Students learn anatomical roots and examine anatomical structures, disease, procedures, tumors, and descriptive terms using simple word analysis.

**EMS 207 – Seminar**

Lecture Hours: 10

Lab Hours: 0

Credit Hours: 10

(Hours to be arranged each term.)

**EMS 211 - Prehospital Emerg Pharmacology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Lectures relating specific emergencies to the types of medications used for treatment. Includes classifications, actions, indications, administration and dosages, precautions and side effects of each of the medications used in prehospital treatment of medical and traumatic emergencies. In addition, students learn common prescription medications found in the home.

Prerequisite: CHE 210

**EMS 218 - Trauma Emergencies**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces the epidemiology and kinematics of trauma, and integrates the assessment findings with pathophysiology in the management of the acutely injured patient. Discusses considerations for special patient populations and includes a Prehospital Trauma Life Support Course.

**EMS 231 - Medical Emergencies**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The first in a series of three courses addressing the epidemiology and pathophysiology of various medical complaints; integrates assessment findings

with the formulation of a treatment plan for the acute illness.

**EMS 232 - Medical Emergencies II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A continuation of the series of three courses addressing the epidemiology and pathophysiology of various medical complaints; integrates assessment findings with the formulation of a treatment plan for the acute illness.

Prerequisite: EMS 231

**EMS 233 - Medical Emergencies III**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

The conclusion of the sequence in medical emergencies where the epidemiology, pathophysiology and assessment findings are integrated to form a treatment plan for acute illnesses in the emergency setting.

Prerequisite: EMS 232

**EMS 235 - Basic Electrocardiography**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamentals of electrocardiography and interpretation of normal and abnormal ECG patterns. Normal and abnormal wave patterns, presentation and treatment of common cardiac diseases.

**EMS 236 - Advanced Electrocardiography**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Building upon basic EKG knowledge, this course advances into 12-lead EKG interpretation and prehospital treatment. Focusing on signs and symptoms of ischemia or infarction, axis deviation, and other EKG anomalies, students learn about various treatment modalities.

**EMS 237 - Paramedic 12-Leads**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Building upon knowledge that was presented in EMS 236, this course explores 12-lead ECG interpretation further, and specifically how this skill can be used by paramedics.

Prerequisite: EMS 236

**EMS 241 - Paramed Crisis Resrce Mgmt I**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

The first in a series of 3 courses addressing human factors contribution to EMS scene management. PCRM I focuses on human error, perception modalities, human emotion and motivation, and teamwork theory.

**EMS 242 - Paramed Crisis Resrce Mgmt II**

Lecture Hours: 1  
Lab Hours: 0  
Credit Hours: 1

The second course in a series of 3 addressing the theory and practice of human factors contribution to EMS scene management. PCRM II focuses on the following human factor contributions to scene performance; review of acute healthcare environment challenges, cognitive attention, and crisis communication strategies.  
Prerequisite: EMS 241

**EMS 243 - Paramed Crisis Resrce Mgmt III**

Lecture Hours: 1  
Lab Hours: 0  
Credit Hours: 1

The third class in a series of 3 courses addressing the theory and practice of human factors contribution to EMS scene management. PCRM III focuses on the following human factor contributions to scene performance; stress and coping on decision-making, on-scene leadership characteristics, and organizational influences on error.  
Prerequisite: EMS 242

**EMS 271 - Paramedic Skills Lab I**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

The first of three courses reviews EMT level skills and introduces the advanced level paramedic skills. Students learn safe and effective skills performance and begin to integrate assessment, management and skills performance.

**EMS 272 - Paramedic Skills Lab II**

Lecture Hours: 1  
Lab Hours: 3  
Credit Hours: 2

The second course in the series continues the development of advanced level skills proficiency. Students integrate knowledge of specific patient complaints with assessment and management skills.  
Prerequisite: EMS 271

**EMS 273 - Paramedic Skills Lab III**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1

This course is designed to strengthen the students team lead abilities and to enhance critical thinking and decision making skills through scenario based skills practice sessions. Studens prepare for national certification practical exam stations.  
Prerequisite: EMS 272

**EMS 283 - Clinical Practicum I**

Lecture Hours: 0  
Lab Hours: 18  
Credit Hours: 6

Focusing on the emergency medical practices of a paramedic, students integrate classroom studies into clinical practices while working under the direct supervision of health care professionals.  
Prerequisites: CHE 210, EMS 218, EMS 231, EMS 235, EMS 241, and EMS 271

**EMS 284 - Clinical Practicum II**

Lecture Hours: 0  
Lab Hours: 18  
Credit Hours: 6

Students integrate knowledge and skills with patient care practices as they rotate through clinical experience in a variety of medical specialties. Students work under the direct supervision of health care professionals in each medical specialty.  
Prerequisites: CHE 210, EMS 218, EMS 231, EMS 235, EMS 241, and EMS 271

**EMS 291 - Pramed Field Extern Practic I**

Lecture Hours: 0  
Lab Hours: 12  
Credit Hours: 4

The first of two field experience courses with an affiliated advanced life support agency. Students complete an orientation to the field and work under the direct supervision of a paramedic preceptor responding to 911 emergency calls.

**EMS 292 - Paramed Field Extern Prac II**

Lecture Hours: 0  
Lab Hours: 36  
Credit Hours: 12

The continuation of the field experience courses with an affiliated advanced life support agency. Students work in the field and work under the direct supervision of a paramedic preceptor responding to 911 emergency calls.  
Prerequisite: EMS 291

**EMS 321 - Community Paramedic I**

Lecture Hours: 4  
Lab Hours: 0  
Credit Hours: 4

First course in a two course series addressing the management of chronic illness, social service connection, and healthcare system navigation as it relates to the prehospital environment.  
Prerequisite: Current National or State Paramedic Certification

**EMS 322 - Community Paramedic II**

Lecture Hours: 4  
Lab Hours: 0  
Credit Hours: 4

Second course in a two course series addressing the management of chronic illness, social service connection, and healthcare system navigation as it relates to the prehospital environment.  
Prerequisite: Current National or State Paramedic Certification

**EMS 331 - Critical Care Transport**

Lecture Hours: 4  
Lab Hours: 0  
Credit Hours: 4

The first of two courses is designed to prepare paramedics to provide advanced critical care during transports, including performing advanced clinical patient assessments and providing invasive care beyond the standard scope of advanced pre-hospital care.  
Prerequisite: Paramedic credentials or instructor consent

**EMS 332 - Critical Care Transport II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The second of two courses is designed to prepare paramedics to provide advanced critical care during transports, including performing advanced clinical patient assessments and providing invasive care beyond the standard scope of advanced pre-hospital care.

Prerequisites: EMS 331 and EMS 381

**EMS 341 - Community Para Clinical I**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

The first course in a series of two courses addressing the management of chronic illness, social service connection, and healthcare system navigation as it relates to the prehospital environment. This course focuses on the management of chronic/sub-acute illness.

Prerequisite: Current National or State Paramedic Certification

Corequisite: EMS 321

**EMS 342 - Community Para Clinical II**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

The second course in a series of two courses addressing the management of chronic illness, social service connection, and healthcare system navigation as it relates to the prehospital environment. This course focuses on the management of chronic/sub-acute illness.

Corequisite: EMS 322

**EMS 381 - Crit Care Clin Pract I**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

The first of two practicum classes that exposes students to critical care transport topics focusing on psychomotor skills and the science behind them. This practicum is designed to prepare the student for EMS 382 ICU and critical care transport experience.

Corequisite: EMS 331

**EMS 382 - Crit Care Clin Pract II**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

The second of two practicum classes that

exposes students to critical care transport environments that may include experiences with intensive care units, fixed wing transport, rotor wing transport, critical care ground transport, as well as various specialty critical care teams.

Prerequisite: EMS 331

Corequisite: EMS 332

**EMS 444 - EMS Systems, Lead & Mgt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores the fundamental skills of managing and leading in EMS: concepts, principles and practices of leaders in the EMS industry. Case study discussions and analysis. Examines EMS systems, operations, resources and regulation of EMS. Industry leaders provide guest lectures.

Prerequisites: BUS 317 and PSY 347

**EMS 456 - Research Methods in EMS**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

An introductory course in EMS research covering hypothesis formulation, design and use of data-gathering instruments, data collection, and methods of data analysis and presentation. Research and technical reports appearing in professional publications and archives are examined.

Prerequisite: MATH 361

**EMS 496 - EMS Capstone Project I**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Students formulate a detailed plan for a project or independent research study within the EMS industry. Project plan will include topic outline and goals, timeline, industry contacts. Faculty advisor will be assigned.

Prerequisites: MATH 361 and WRI 227

**EMS 497 - EMS Capstone Project II**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Implementation and completion of student project planned in EMS 496. Project results to be delivered in a report presented to an audience of EMS peers. Students will have scheduled meeting with a faculty advisor to track progress and determine

readiness for presentation.

Prerequisite: EMS 496

**Engineering****ENGR 101 - Intro to Engineering I**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Introduces the student to engineering with a focus on academic success, professional development, ethics, communication, and creative problem solving techniques, engineering tools (CAD/CAE), and design concepts. A discipline-specific team-based laboratory experience encourages consideration of a chosen engineering discipline.

**ENGR 102 - Intro to Engineering II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

The student will focus on their chosen discipline through an interdisciplinary team-based design project including problem identification, measurement, analysis, and presentation to peers. Emphasis will be placed on proper usage of engineering tools and instruments and sound design practices.

Prerequisite: ENGR 101

**ENGR 111 - MMET Orientation**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Topics include: survey of the engineering profession, educational and professional development, standards of practice; engineering information, calculations, and analysis. An engineering design project will be incorporated. This course provides knowledge and skills to engineering students which will benefit their future academic and professional endeavors.

Prerequisite: Declared major in the BSME, BSMET, or BSMFG program

**ENGR 120 - Fundamentals of Engineering Design, Analytical Tools, and CAD**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Fundamentals of engineering design, including analytical and computational tools that introduce design concepts and build a foundation of engineering

knowledge that will be helpful to students starting off in engineering and technology disciplines. Computer aided design and drafting, problem solving, documentation, analysis, teamwork, and multi-step engineering calculations.

### **ENGR 121 - Engineering Principles and Problem Solving**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Topics include modeling of real-world concepts and systems, basic statics, electronics, energy generation, and robotics. Using both analytical and computational tools to represent, analyze, and improve on real-world situations. Identifying the correct type of system to employ, improving the efficiency of existing systems, working in multi-disciplinary groups, developing and presenting ideas, prototyping as well as testing iteratively.

### **ENGR 122 - Electronics and Computation in Engineering**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Fundamental electrical and computational topics in engineering. Building and analyzing circuits, using mathematical concepts to develop solutions, and using both analytical and computational tools to gain knowledge and hands-on skills. Troubleshooting and testing of ideas as well as presenting ideas in an organized and systematic manner to others. Provides a basic foundation of knowledge and skills that will transfer well to continued education, technical jobs and self-confidence.

### **ENGR 207 – Seminar**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

### **ENGR 211 - Engineering Mechanics: Statics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Fundamental principles of mechanics of rigid bodies and the application of these principles to engineering problems.

Prerequisite: PHY 201 or PHY 221

Pre- or Corequisite: MATH 252

### **ENGR 212 - Engineering Mech: Dynamics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Kinematics of particles and rigid bodies. Kinetics of particles and rigid bodies in plane motion, including Newton's second law, work and energy, and impulse and momentum.

Prerequisites: ENGR 211 and MATH 252

### **ENGR 213 - Engr Mech: Strength of Mat**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Internal stresses and deformations of structural members and machines when subjected to external forces.

Prerequisites: ENGR 211 and MATH 252

### **ENGR 236 - Fund of Elec Circuits**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Resistive circuits, operational amplifiers, capacitors, inductors, transient analysis, sine waves, AC circuit analysis, resonance, transformers. Not for Electronics Engineering Technology and Computer Engineering Technology students.

Prerequisites: MATH 252, and PHY 202 or PHY 222

### **ENGR 266 - Engineering Computation**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Programming and problem solving using current computer software. General programming techniques using conditional statements, looping, subroutines, and data input/output will be stressed.

Consideration of features specific to the software being used will also be presented. Prerequisite: MATH 112

### **ENGR 267 - Engineering Programming**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Computer programming principles. Control structures. Structural programming principles. Functions and scripts. MATLAB programming. LabVIEW

programming. Application of engineering programming principles in projects.

Prerequisite: MATH 251

### **ENGR 305 - Nanoscience & Nanotech**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Survey of chemical and physical phenomena as applied to nanoscale materials, including metal and semiconductor nanoparticles and carbon nanostructures. Discussion of major synthesis and characterization techniques. Biological and engineering applications of nanoscale materials.

Prerequisites: CHE 202 or CHE 222, and PHY 222 or PHY 223

### **ENGR 318 - Engineering Mech: Fluids**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamental properties of fluids, fluid statics and pressure variation, flow characterization, momentum and forces due to fluid motion, energy of fluids in motion, and flow in conduits. Emphasis on civil and mechanical engineering applications of fluid mechanics principles. Prerequisites: ENGR 211 and MATH 252

### **ENGR 326 - Electric Power Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study related to theory and application of industrial electric power systems. Topics covered include transformers, motors, generators, motor controls, and protective devices.

Prerequisite: ENGR 236

### **ENGR 355 – Thermodynamics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introductory course in thermodynamics, the science of heat energy conversion. Develops understanding of energy, heat, work, efficiency, and ideal thermodynamic cycles. Teaches first and second laws of thermodynamics and perfect gas law. Prerequisites: MATH 252, and PHY 202 or PHY 222

**ENGR 407 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ENGR 415 - Occupational Safety**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Topics include current occupational safety and health issues. Practical application of regulations in the industrial setting.

Compliance to Industrial Hygiene and General Safety Standards. Common safety violations and implementation of safety programs.

Prerequisite: Junior standing in any MMET program

**ENGR 422 - Process Control**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Design of continuous and batch process control systems. Advanced control schemes, including model-based methods.

Prerequisite: ENGR 464

**ENGR 445 - Engineering Project Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applications of the Critical Path Method to organization and control of engineering projects. Applications software will be used to create and evaluate project networks to develop management reports.

Prerequisite: Junior standing in Engineering or Engineering Technology

**ENGR 461 - Modeling and Simulation of Dynamic Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Conservation laws of physics are used to develop lumped-parameter models of continuous-time dynamic systems.

Modeling and analysis of engineering systems containing mechanical, electrical, electromechanical, fluid, and thermal components. Computational methods are used to simulate a range of practical engineering problems.

Prerequisites: EE 225 or EE 320, ENGR 267, MATH 321, MATH 322 or MATH 341, and PHY 223, all with grade "C" or

better. Mechanical Engineering majors who have completed MECH 326 and MECH 480, both with grade "C" or better may enroll without having completed EE 225 and/or EE 320.

**ENGR 462 - Control Engineering II: Modern Methods**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Modeling, simulation, and control of continuous and discrete processes using state-space methods. State functions, state equations, transfer matrices. State-space model building, state-feedback control and observation, pole placement, state vector transformations. Discrete-time control systems.

Prerequisites: EE 461 and ENGR 461, both with grade "C" or better

**ENGR 463 - Motion Control in Mechanisms and Robotics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Motion control components, beginning with the study of the function, classification, position, velocity, and acceleration of fundamental mechanisms and robot kinematic chains. Dynamic response of open- and closed-loop mechanisms to periodic and non-periodic loading. Motion and torque control.

Prerequisite: ENGR 461 with grade "C" or better

**ENGR 464 - Autonomous Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A capstone course in the Robotics, Control, and Autonomous Systems Engineering sequence. A unified treatment using dynamics, modeling, simulation, and control in the analysis and synthesis of autonomous control systems.

Prerequisites: ENGR 462 and ENGR 463, both with grade "C" or better

**ENGR 465 - Capstone Project**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

Students apply material learned in other courses, develop expertise on a specific topic, work closely with a faculty member to implement the project, and improve

professional communication skills by writing a project report. Course may be repeated for credit.

Prerequisites: Junior standing and instructor consent

**ENGR 485 - Fund of Engineering Exam Prep**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

A preparation course covering the requirements of, and providing a review for, the NCEES FE exam.

Prerequisite: Senior standing in an MMET program

**ENGR 491 - MMET Senior Projects I**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

The first course of a three-term sequence that offers a capstone experience for students in an MMET program. This experience involves the application of knowledge and skills acquired from prior coursework to an engineered system, system optimization, project management, and material related to a group engineering project. This course will be focused on the proposal and planning stages of the project assigned.

Prerequisites: Senior standing in an MMET program and instructor consent

**ENGR 492 - MMET Senior Projects II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

The second course of a three-term sequence that offers a capstone experience for students in an MMET program. This experience involves the application of knowledge and skills acquired from prior coursework to an engineered system, system optimization, project management, and material related to a group engineering project. This course will be focused on the design and analysis of the project assigned.

Prerequisite: ENGR 491

**ENGR 493 - MMET Senior Projects III**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

The third course of a three-term sequence that offers a capstone experience for students in an MMET program. This experience involves the application of knowledge and skills acquired from prior coursework to an engineered system, system optimization, project management, and material related to a group engineering project. This course will be focused on the implementation and assessment stages of the project assigned.

Prerequisite: ENGR 492

**ENGR 507 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**ENGR 511 - Res Meth & Innov: Intel Prop**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Intellectual property (IP) development, evaluation, and strategy, IP fundamentals, patent fundamentals, conducting patentability searches, evaluating the patentability potential of an invention, drafting invention disclosures for patent applications, assessing the value of a patent or patent portfolio, and IP licensing.

**ENGR 512 - Res Meth & Innov: Res Meth**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Fundamental concepts of scientific research. An introduction to the concepts underlying peer-reviewed research, evaluating the relevance and impact of sources, conducting literature reviews, evaluating published findings, using research productivity tools, using statistical methods, designing research studies, and writing scholarly articles.

**ENGR 513 - Res Meth & Innov: Strat & Inno**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Strategy and innovation concepts with a focus on technology commercialization.

Business strategy frameworks, financial analysis, strategic marketing, operations management, business models, project management, business law, and entrepreneurship.

**ENGR 522 - Process Control**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Design of continuous and batch process control systems. Advanced control schemes, including model-based methods.

Prerequisites: ENGR 561 and ENGR 564

**ENGR 561 - Modeling and Simulation of Dynamic Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Conservation laws of physics are used to develop lumped-parameter models of continuous-time dynamic systems.

Modeling and analysis of engineering systems containing mechanical, electrical, electromechanical, fluid, and thermal components. Computational methods are used to simulate a range of practical engineering problems.

Prerequisite: Graduate standing in Engineering

**ENGR 562 - Control Engineering II: Modern Methods**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Modeling, simulation, and control of continuous and discrete processes using state-space methods. State functions, state equations, transfer matrices. State-space model building, state-feedback control and observation, pole placement, state vector transformations. Discrete-time control systems.

Prerequisites: EE 461 or an equivalent undergraduate course in control system engineering, and ENGR 561 both with grade "C" or better

**ENGR 563 - Motion Control in Mechanisms and Robotics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Motion control components, beginning with the study of the function, classification, position, velocity, and acceleration of fundamental mechanisms

and robot kinematic chains. Dynamic response of open- and closed-loop mechanisms to periodic and non-periodic loading. Motion and torque control. Prerequisites: ENGR 561 with grade "C" or better, and graduate standing in Engineering

**ENGR 564 - Autonomous Systems**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A capstone course in the Robotics, Control, and Autonomous Systems Engineering sequence. A unified treatment using dynamics, modeling, simulation, and control in the analysis synthesis of autonomous control systems.

Prerequisites: ENGR 562, ENGR 563 both with grade "C" or better, and graduate standing in Engineering

**ENGR 596 - Grad Research & Development**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Selected engineering topics at the graduate level. Course may be repeated for credit.

**ENGR 597 - Graduate Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Graduate project in engineering topics. Course may be repeated for credit.

**ENGR 598 - Graduate Thesis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Graduate thesis in engineering topics. Course may be repeated for credit.

**ENGR 599 – Practicum**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Supervised practical experience in engineering topics at the graduate level. Course may be repeated for credit.

# Engineering Technology

## **ENGT 101 - Engr Tech**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Engineering terminology and problem solving tools including computer aided drafting, technical sketching, word processing, spread sheets, multiview projections, significant figures, and engineering problem solving techniques.

Prerequisite: MATH 100

## **ENGT 103 - Engineering Terminology**

Lecture Hours: 3

Lab Hours: 2

Credit Hours: 4

Terminology, symbols, and units commonly used in the engineering field. Interpretation and reproduction techniques of engineering drawings and graphs. A brief overview of the field of civil engineering. This course is designed primarily for the Office Systems Technology program.

## **ENGT 104 - Elec**

### **Nomenclature/Symbols**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A survey course in basic electricity and electronics, emphasizing terminology and nomenclature. This course is designed primarily for the Office Systems Technology program.

## **ENGT 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **ENGT 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

## **ENGT 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **ENGT 310 - Intro to Geo Energy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Overview of geothermal energy: distribution, geology, hydrology, and geochemistry; exploration and extraction techniques; uses including power generation, space heating, agriculture, process and multistage utilization; and environmental, economic, and legal considerations. Field trips to local sites.

## **ENGT 311 - Passive Solar/Cell Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Residential passive solar heating and super-insulation construction techniques including heat load calculations using the Balcomb SHF method. Technical and economic analysis of solar electric cells, storage batteries, and inverter technology. Prerequisite: PHY 202 or instructor consent

## **ENGT 312 - Critical Path Techniques**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Scheduling techniques used by management on engineering and industrial projects. The course will concentrate on the Critical Path Method (CPM), but will also include comparisons with Gantt Charts and Program Evaluation Review Technique (PERT). Concepts will be applied to mini-projects in class and expanded through the use of selected computer software packages.

## **ENGT 370 - Intro to Auto/Robotics**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

A survey of automation and all areas of robotics with an emphasis on the industrial robot. It will include history, terminology, use, future, impact on society, and hands-on labs.

Prerequisites: MATH 112 and a programming course

## **ENGT 390 - Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

An approved work program related to the student's field of specialization for a

continuous three-month or six-month period. The employer and the type, level, and difficulty of the particular job must be approved by the student's engineering technology department prior to the employment period. A written comprehensive report of each season's activity must be submitted during the following term of residence.

Prerequisites: Associate degree and two terms of residence

## **ENGT 391 - Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

An approved work program related to the student's field of specialization for a continuous three-month period.

## **ENGT 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

Hours to be arranged with approval of curriculum coordinator.

## **ENGT 415 - Occupational Safety**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Topics include current occupational safety and health issues. Practical application of regulations in the industrial setting. Compliance to Industrial Hygiene and General Safety Standards. Common safety violations and implementation of safety programs.

Prerequisite: Junior standing in MFG

## **ENGT 471 - Micro/Appl/Auto/Robot**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This is an applied course in using microprocessors to support controlling motion, such as in robotic manipulators and automated equipment and interfacing sensor inputs.

Prerequisites: CST 331 and ENGT 370



**ENGT 490 - Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

An approved work program related to the student's field of specialization for a continuous three-month or six-month period. The employer and the type, level, and difficulty of the particular job must be approved by the student's engineering technology department prior to the employment period. A written comprehensive report of each season's activity must be submitted during the following term of residence.

Prerequisites: Associate degree and two terms of residence

**ENGT 491 - Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

An approved work program related to the student's field of specialization for a continuous three-month period.

**ENGT 500 - Research Methods**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of industrial analytical techniques used to develop new technologies, including the use of computer aided engineering systems and software for design purposes. Examination of research and development methods, current industrial practices and applications of new technologies.

**ENGT 507 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.) In-depth examination of current theories, research, trends, and processes of industry. Individual study, information exchange, and research of selected industrial topics.

**ENGT 518 - Data Communications**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Data communications and computer network protocols, hardware elements, and software algorithms. Error handling, routing, flow control, host-to-host communications, and local area networks.

**ENGT 521 - ASIC Design I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Techniques for designing Application Specific Integrated Circuits (ASICs). Comprehensive study of computer concepts using computer aided design tools. Implementation of ASIC devices in digital computing systems including: modeling (using VHDL), digital synthesis, place and routing functions, and layout. Design exercises accomplished using hardware description languages and simulation.

Prerequisite: VLSI or ASIC coursework or experience

**ENGT 522 - ASIC Design II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Techniques used to transform hardware description language-based designs to physical layout. Applications of synthesis tools for floor planning and layout of Application Specific Integrated Circuits. Comprehensive study of logic design, layout generated design, and advanced CMOS circuit techniques used when designing with standard cells.

Prerequisite: ENGT 521

**ENGT 523 - Advanced ASIC Design**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to very large scale integration (VLSI) technology and design of CMOS integrated circuits including: the device fabrication process and design rules as they apply to device layout. Analysis, design, simulation and layout rules presented. Logic gates and functions design.

Prerequisite: ENGT 522

**ENGT 545 - Adv Microcomputers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Microprocessor technology and its application to the design of practical digital computing systems. Design techniques used to develop and design newer generation microprocessor-based computing systems. Assembly language programming and interfacing of microprocessor-based systems.

Prerequisite: Microprocessor coursework or experience

**ENGT 546 - Adv Comp Architectures**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced topics in computer architectures including design of computer hardware, organizational structures, and architectural properties of parallel, vector and multi-processing systems. Computer organizational structures of memory and I/O subsystems, multiprocessor computer architectures, and data flow computers.

Prerequisite: Course work or experience in computer architecture and organization

**ENGT 565 - Semicond Dev Phy/Process**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Simple models and physical insight to solid state physics. Crystal structure and symmetry, crystal lattices, reciprocal lattices, equilibrium and nonequilibrium processes in semiconductors. Thermal properties, energy band, and semiconductor properties.

**ENGT 581 - Master's Project I**

Lecture Hours: 1

Lab Hours: 9

Credit Hours: 4

Students prepare the proposal for the Master's project under the guidance of a project advisor. Project proposal guidelines and accepted format presented. Approval of the proposal by the student's project committee constitutes completion of the course.

**ENGT 582 - Master's Project II**

Lecture Hours: 1

Lab Hours: 9

Credit Hours: 4

Students complete task specified by the project advisor. Preliminary results of the student's project presented to the student's project committee. Acceptance of these results constitutes completion of the course.

Prerequisite: ENGT 581

**ENGT 583 - Master's Project III**

Lecture Hours: 1

Lab Hours: 9

Credit Hours: 4

Students produce the final report demonstrating the completion of the project. Final results of the student's Master's project presented to the student's project committee. Acceptance of the report by the student's project committee constitutes completion of the course.  
Prerequisite: ENGT 582

## Environmental Sciences

**ENV 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

Prerequisite: ENV major or instructor consent

**ENV 108 - Mentorship and Team Building**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

We develop a strong sense of community, trust, inclusion, and belonging within the Environmental Science program among all students and faculty. We introduce student mentorship opportunities and engage in team building exercises and environmental exploration during a weekend camping trip. Course is required every Fall. Can be taken multiple times for credit.

**ENV 111 - Intro to Env Sciences**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A topical overview of environmental sciences stressing the integration of the social, natural and physical sciences. Emphasis on active learning.

**ENV 207 – Seminar**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

Prerequisite: ENV major or instructor consent

**ENV 214 - Watershed Sci & Tech**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Science and technology of watershed processes, monitoring, and assessment. Applications and case studies focused on sustainable management and restoration of water resources and their associated aquatic, riparian, and upland ecosystems. Local and regional sites of interest are highlighted.  
Prerequisite: ENV 111 or GEOG 105, or instructor consent

**ENV 217 - Intro to Natural Resources Management**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to management of natural resources including water, air, forests, wildlife and fisheries, minerals, and energy. Explore structured decision making, risk assessment, uncertainty, stakeholder engagement, adaptive management, conservation and scenario planning, and climate and environmental mitigation, adaptation, and resiliency.  
Prerequisite: ENV 111

**ENV 224 - Scientific Reason & Method**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamental principles and practices of scientific reasoning and methodology, including contrasts with other ways of making knowledge, the power of questions, theories versus hypotheses, understanding experiments, supporting claims, drawing inferences, reproducibility, and coping with uncertainty in typical uncontrolled natural experiments.  
Prerequisite: ENV 111 or GEOG 105, or instructor consent

**ENV 226 - Environmental Data Analysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to compilation, manipulation, and analysis of datasets common to environmental analysis. Includes measures of central tendency and spread; characterizing data distribution; linear regression; exceedance probability and cumulative frequency functions; understanding time series; and basic

principles of graphical data displays.  
Prerequisite: ENV 111 or GEOG 105, or instructor consent

**ENV 265 - Field Methods Environ Science**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Basic principles of experimental design, site and instrument selection for field research. Basic instrumentation and data acquisition techniques are used to contribute to authentic research programs at different locations alongside environmental science professionals.

**ENV 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

Prerequisite: ENV major or instructor consent

**ENV 314 - Environmental Law & Policy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Overview of legislative, regulatory, and policy-based activities involving the development, management, and restoration of natural resources. Emphasis on the National Environmental Policy Act, Environmental Impact Statements, Endangered Species Act, and Historical Preservation through local, regional, and national case studies.  
Prerequisite: ENV 111

**ENV 336 - Environmental Hydrology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Study of the hydrologic cycle; quantitative measurement of precipitation, infiltration, runoff, streamflow and storage in watersheds. Curve fitting, hydrographic analysis, statistical analysis of extreme flows, flood routing, and runoff modeling for small and urban watersheds.  
Prerequisites: MATH 252 and MATH 361

**ENV 355 - Careers/Professionalism in Env Sci**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Practical seminar focusing on career opportunities in environmental sciences, professional standards, culture, ethics, and skills to enhance communication and collegiality. Assists students with workforce transition, including job search, preparation of resume packages and portfolios, interviewing tips, and job-offer negotiation.

Prerequisite: ENV 111

**ENV 365 - Adv Field Methods in Env Sci**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Basic principles of experimental design, site and instrument selection for field research. Basic instrumentation and data acquisition techniques are used to contribute to authentic research programs at different locations alongside environmental science professionals.

Course may be repeated for credit.

Prerequisites: MATH 112 and WRI 122

**ENV 375 - Forest Ecology & Management**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Examine abiotic and biotic factors affecting the structure, function, composition, and distribution of forest communities including wildland fire; sustainable forest management practices and policies; and core concepts required for careers in forestry, wildland fire, natural resources, range, and wildlife.

Prerequisite: BIO 211 or BIO 212 or instructor consent

**ENV 407 – Seminar**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

Prerequisite: ENV major or instructor consent

**ENV 420 - Externship in Env Sci**

Credit Hours: Varies (1-9)

Students work in applied settings related to environmental sciences under the

supervision of a mentor. Regular contact with extern advisor and mentor. Written externship report and presentation required.

Prerequisites: BIO 211, BIO 212, BIO 213 or CHE 221, CHE 222, CHE 223

**ENV 427 - Greenhouse Gas Accounting/Footprints**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course topics include US and international greenhouse gas (GHG) management policies. GHG assessment methods and tools, emissions trading programs, climate risk and risk management, data and information sources, measurement standards and protocols and related sustainability concepts and policies.

Course also listed as REE 427 (cannot be used for graduation credit by students who have taken REE 427).

Prerequisites: Junior or Senior standing

**ENV 434 - Advanced Data Analysis**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Overview of advanced concepts and methods of analysis specific to ecological data sets using program R. Bayesian and parametric methods, analysis of variance, linear regression, generalized linear modeling, generalized additive modeling, mixed-effect models, multi-model inference, ordination, and time-series analysis.

Prerequisites: ENV 226 and MATH 361

**ENV 435 - Atmospheric Physics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The physics of transport and diffusion of air pollution. Atmospheric thermodynamics. Mixing heights, plume rise, and fundamentals of atmospheric turbulence. Eulerian and Lagrangian dispersion models.

**ENV 465 - Ecological Resto. & Monitoring**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Principles and practices of ecological restoration, including ecosystem assessment; evaluation; and restoration,

planning, design, implementation, and monitoring. Labs including fields visits and evaluation of local restoration projects.

Prerequisite: ENV 314

**ENV 469 - Treatment Wetlands**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Treatment wetland features: biological, chemical, and physical properties. Planning, design, and performance assessment principles for municipal, agricultural, and stormwater treatment wetlands. Considers vegetation and microbiology, aerobic and anaerobic biogeochemistry, hydraulics, and treatment efficiencies. Local case studies.

Prerequisites: CHE 202 and MATH 251

**ENV 484 - Sustainable Human Ecology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A multidisciplinary exploration of historic, contemporary, and future interactions of human communities, economies, technologies, and ecosystems from local to global scales and the biggest problems facing long-term planetary health including climate change, energy, food and water security, health and well-being.

Prerequisite: BIO 212 or ENV 111 or instructor consent

**ENV 485 - Ecoregional Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides an individual and team-based synthesis of the influence of human activities on ecoregions. Illustrates linkage between large scale climate-based ecoregions globally and their management and restoration by cooperation of land and aquatic management entities.

Prerequisites: BIO 212 and ENV 111

**ENV 495 - Research in Env. Sciences**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Supports student-initiated research projects in environmental sciences. Topic and scope must be reviewed and accepted by a faculty advisor. Registration by instructor consent. Counts as technical elective credit. May be repeated for up to nine total credits.

# Geography

## **GEOG 105 - Physical Geography**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Comprehensive introduction to physical geography, including maps and representation of the earth's surface, the climate system and weather phenomena, plate tectonics, landform evolution and interpretation, and human-landscape interactions. Satisfies lab science.

## **GEOG 106 - Cultural Geography I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Cultural geography of the major world developed regions other than the United States--Europe, Australia and New Zealand, the former Soviet Union, Canada and Japan. The course emphasizes the regional approach.

## **GEOG 107 - Cultural Geography II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Cultural geography of the world's underdeveloped realms--the countries of Middle and South Americas and Africa. The course emphasizes the regional approach.

## **GEOG 108 - Cultural Geography III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to cultural geography of selected world realms, namely The Middle East, South Asia, East Asia, Southeast Asia, and The Pacific Realm. Cultural imprints on the physical landscape will be discussed and regional approach emphasized.

## **GEOG 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 3

(Hours to be arranged each term.)

## **GEOG 305 – Geomorphology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Principles and practices of landform analysis, focusing on processes, patterns,

and their interactions. Emphasis on tectonic interactions; mountains; rivers; fans and deltas; glacial and periglacial landscapes; and coastlines.

Prerequisite: GEOG 105 or GEOL 201

## **GEOG 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

## **GEOG 315 - Climatology & Atmospheric Sci**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Overview and analysis of earth's climate system, focusing on radiative processes; heat distribution and budgeting; atmospheric chemistry, circulation, and precipitation; ocean-land-atmospheric interactions; and long- and short-term climate change.

Prerequisite: GEOG 105 or GEOL 201

## **GEOG 335 – Soils**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Processes and patterns of soil genesis and evolution, including weathering; profile development and identification; soil classification and mapping; abiotic-biotic components and interactions; and till, soil quality, and conservation.

Prerequisite: GEOG 105 or GEOL 201

## **GEOG 407 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

# Geology

## **GEOL 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **GEOL 201 - Physical Geology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A brief systematic description of the major rock-forming minerals and the three major

rock groups. The events of erosion, transportation, and deposition of chemically altered and physically fragmented rocks and the resulting sculpturing of the earth's surface are discussed.

## **GEOL 207 – Seminar**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

(Hours to be arranged each term.)

## **GEOL 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **GEOL 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

# Geographic Information Systems

## **GIS 103 - The Digital Earth**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to the digital representation of the features and attributes of our natural world. Concepts, vocabulary, and use of GIS and GPS, and how these systems help solve geospatial problems. Integration of GPS data into GIS. Acquisition of GIS data via "smart phones."

## **GIS 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GIS 134 - Geographic Info Systems**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Coordinate systems. Creating, editing, and querying feature and attribute data.

Symbolizing, classifying, and labeling features.

Creating and using tabular relationships. Introduction to elements of map design, Shapefile-KML and CAD-GIS data conversion.

Introduction to ModelBuilder software. Use of raster data, analyzing raster surfaces.

Use of web-based GIS applications and services.

Extensive use of ArcGIS software.

Prerequisite: CE 203 or GIS 103

Corequisite: CE 203 or GIS 103, or instructor consent

**GIS 205 - Mobile and Web GIS**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Theory and operation of GPS. Use of GPS and smart phones for field data collection.

Creation and use of apps for data collection via smart phones.

Web mapping. Real-time GIS. Creation of 3D scenes.

Extensive use and creation of web-based GIS applications and services.

Prerequisite: GIS 134

**GIS 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**GIS 306 - Geospatial Raster Analysis**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Manipulation and storage of raster data.

Measurement scales. Map algebra.

Georeferencing raster datasets. Least-cost path and corridor modeling techniques.

Distance, surface and density mapping techniques.

Use of local, focal, block, and zonal statistical functions.

Viewshed and hydraulic analyses.

Prerequisite: GIS 134

**GIS 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GIS 316 - Geospatial Vector Analysis I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Coordinates, datums, projections.

Advanced editing and annotation techniques.

Use of subtypes and domains. Map and geodatabase topology.

Linear referencing and dynamic segmentation.

Geocoding. Working with legal descriptions.

Professional map creation skills. GIS project design fundamentals.

Creation and use of online GIS resources and applications.

Prerequisite: GIS 134

**GIS 332 - Customizing the GIS Environ I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Use of the python scripting language to access, create, and manipulate geospatial data.

Overview of the Python scripting language.

Working with geometries. Use of cursors. Tool creation.

Prerequisites: GIS 306 or GIS 316

**GIS 407 – Seminar**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

(Hours to be arranged each term.)

**GIS 426 - Geospatial Vector Analysis II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced geospatial analysis. Extensive use and creation of relationship classes.

Extensive use of sub types, domains, validation rules, and cardinalities.

Use and creation of networks for geospatial analysis.

Routing. Conflation. Quantitative assessment of geographic patterns and distributions.

Geostatistics.

Prerequisite: GIS 316

**GIS 432 - Customizing the GIS Environ II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced mobile GIS data collection techniques.

GIS server environment.

Hosting feature and geoprocessing services.

Server site configuration and administration.

Developing mobile and

serve GIS applications.

Prerequisite: GIS 332

**GIS 446 - GIS Database Development**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Advanced geodatabase design. Study, use, design, and creation of data models.

Design and creation of user interfaces for data entry. Capstone experience for the GIS option.

Prerequisites: GIS 426, GIS 432, and MIS 442

**GIS 468 - GIS Practicum**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 0

(Hours to be arranged each term.)

**Geomatics****GME 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GME 161 - Plane Surveying I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamental concepts of plane surveying including theory of measurements,

systematic and random errors. Distance and angle measurement using total stations

and differential leveling. Calculation of bearings, azimuths, coordinates, area and

traverse adjustments. Introduction to horizontal and vertical curve

computations.

Corequisite: MATH 111

**GME 162 - Plane Surveying II**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Digital theodolites and data collectors, instrument testing and observational error

analysis. Theory of leveling. Solar observation and computation.

E.D.M. use and calibration. Field labs including solar observations, traversing, leveling and

horizontal curve layout. Introduction to COGO software.

Prerequisites: GME 161 and MATH 112

**GME 163 - Route Surveying**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Laboratory intensive project overview including horizontal and vertical control for preliminary location and construction surveys for a secondary road. Instruction in basic elements of horizontal and vertical route alignment and layout. Determination of earthwork quantities. CAD drafting of plan, profile and cross-sections.

Prerequisites: GME 162 and GME 175, both with grade "C" or better

**GME 175 - Computations and Platting**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Coordinate geometry concepts with emphasis on solutions to standard surveying computations. Introduction to calculator and Excel spreadsheet computations. Introduction to map composition and platting using industry standard software.

Prerequisite: GME 161

Corequisite: CE 203

**GME 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GME 241 - Boundary Law I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Statute law, common law, and legal principles relating to land boundaries. Each student will be required to use the county law library to research assigned cases.

Prerequisites: GME 161 and WRI 121, or instructor consent

**GME 242 - Land Descrip & Cadastre**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Real property descriptions and land record systems. Emphasis on interpreting and writing land descriptions, and introduction to researching records in various Land Information Systems.

Prerequisites: GME 161 and GME 241, both with grade "C" or better

**GME 264 - Digital Design for Surveying**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

Use of Carlson software to solve and plot assignments covering travers calculations, horizontal and vertical curve alignments, profiles and earthwork volumes. Hand calculations will be made to supplement the computer solutions.

Prerequisites: CE 203 and GME 163 with grade "C" or better

**GME 297 - Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**GME 299 - Independent Studies**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GME 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GME 324 - Geomatics Computer Programming**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Students develop Visual Basic programs and Excel spreadsheets to solve Geomatics problems. Extensive use of Excel spreadsheets including developing custom functions and VBA extensions. Students are introduced to MS Access relational database, and develop a functioning geomatics database.

Prerequisites: GME 264 and MIS 115

**GME 343 - Boundary Surveys**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Planning, organizing, calculating and applying field procedures for boundary and cadastral surveys. Writing deed descriptions; researching public record systems relative to property boundaries.

Prerequisites: GME 163 and GME 242, both with grade "C" or better

**GME 351 - Constr/Engr Surveying**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Organizing, planning and estimating costs for construction and engineering surveying projects. Field projects related to construction, layout of engineering works and site mapping.

Prerequisites: GME 163 and GME 264

**GME 355 - Digital Photogrammetry**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to Photogrammetry, topics include geometry of vertical image, the stereo pair, and parallax computations. Aerotriangulation of image blocks, and project planning and mission design. Students use Softcopy workstations to compile topographic maps.

Prerequisites: GME 264 and MATH 252

**GME 372 - Subdiv'n Planning and Platting**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Land use planning; governmental regulations as applied to subdivisions; subdivision planning, computations and preparation of subdivision plots.

Prerequisites: GME 242 and GME 264, both with grade "C" or better

**GME 381 - Adv Cadastral Surveying I**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

A brief history of the United States land surveying and pertinent boundary law. Introduction to land records research. Basic boundary law principles are covered along with analysis of legal descriptions contained in deeds and other documents that transfer land title. This is a subset of the BLM CFedS material.

Prerequisites: Instructor consent, ability to perform standard surveying computations, and an understanding of boundary law

**GME 395 - Cooperative Field Experience**

Lecture Hours: 0

Lab Hours: 40

Credit Hours: 4

An approved work program related to geomatics practice involving full-time

meaningful activity. The employer, type of work and level of difficulty must be approved by the Geomatics Co-op Coordinator prior to the work period. Progress reports are prepared by the student during the work period and submitted for review. A comprehensive written report is required at the end of each co-op period. A co-op period may be three months for 2 credits or six months for 4 credits. A tuition fee is required for credits earned by co-op work experience. Prerequisites: Completed freshman year and two terms residence

#### **GME 396 - Cooperative Field Practice**

Lecture Hours: 0  
Lab Hours: 40  
Credit Hours: 2  
Three month, two credit hour version of GME 395 and GME 495.

#### **GME 407 – Seminar**

Lecture Hours: 12  
Lab Hours: 12  
Credit Hours: 12  
(Hours to be arranged each term.)

#### **GME 415 - Advanced Road Design**

Lecture Hours: 2  
Lab Hours: 6  
Credit Hours: 4  
Complete road design project including 'L' and 'P' line locations; horizontal and vertical curve calculations with consideration of stopping and sight distances; earthwork and mass diagram calculations; drainage and road construction materials.  
Prerequisite: GME 351

#### **GME 425 - Remote Sensing**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4  
Topics in remote sensing and photogrammetry including an introduction to classic digital image processing techniques. Digital surface modeling using terrestrial and aerial LiDAR, and semi-global matching image processing. Students use softcopy image processing software.  
Prerequisites: MATH 252 and PHY 222

#### **GME 434 - Land Admin for Sust Land Dev**

Lecture Hours: 2  
Lab Hours: 6  
Credit Hours: 4  
Review and compare land tenure systems in the United States and Foreign countries. Introduction to principles of land administration. Use of geospatial data models for management of parcel data and use of ArcGIS software for creation of Land Information Systems designed to manage cadastral data.  
Prerequisites: GIS 134 and GIS 316  
Corequisite: GME 452

#### **GME 444 - Adjustment by Least Squares**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4  
Theory of the least squares method and error propagation; variances and co-variances of observed, derived and adjusted quantities. Modeling of geomatics problems using different techniques of least squares. Linearization and iteration of nonlinear equations. Adjustment validation using hypothesis testing.  
Prerequisites: MATH 254 and MATH 361

#### **GME 451 – Geodesy**

Lecture Hours: 4  
Lab Hours: 0  
Credit Hours: 4  
Size and shape of the earth. Geometry of the reference ellipsoid. Spherical, ellipsoidal and local coordinate systems. Coordinate transformations in 2-D and 3-D. Datums and datum conversion. Reduction of field observations to the ellipsoid. The geoid, orthometric heights, and leveling.  
Prerequisite: MATH 254 or instructor consent

#### **GME 452 - Map Projections**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3  
Overview of map projections used in cartography, and conformal map projections used in the geomatics profession. Emphasis on state plane coordinate systems and local map projections. Extensive use of Excel for analysis and computations.  
Prerequisite: GME 451 with grade "C" or better

#### **GME 454 - GNSS Surveying**

Lecture Hours: 2  
Lab Hours: 6  
Credit Hours: 4  
Study of the theory and operation of the Global Positioning System and other Global Navigation Satellite Systems. Design of GPS networks in accordance with current standards and specifications. Laboratory exercises introduce the student to a variety of GNSS applications.  
Prerequisites: GME 444 and GME 451, both with grade "C" or better

#### **GME 455 - GNSS Surveying for GIS**

Lecture Hours: 2  
Lab Hours: 6  
Credit Hours: 4  
Study of the theory and operation of the Global Positioning System and other Global Navigation Satellite Systems. Design of GPS networks in accordance with current standards and specifications. Laboratory exercises introduce the student to a variety of GNSS applications.  
Prerequisite: GME 451 with grade "C" or better

#### **GME 466 - Boundary Law II**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3  
Evidence, professional liability, written and unwritten transfers of land ownership and title interests. A term paper is required of each student.  
Prerequisite: GME 343 with grade "C" or better

#### **GME 468 - Geomatics Practicum**

Lecture Hours: 1  
Lab Hours: 3  
Credit Hours: 2  
Students design and complete a Geomatics project. Students demonstrate ability to work independently. Projects are under the supervision of faculty members and comply with any related state statutes and local ordinances.  
Prerequisites: GME 452, and GME 454 or GME 455

**GME 482 - Adv Cadastral Surveying II**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Introduction to the complex task of evaluating field evidence, and correlating it with written records. Many scenarios are presented that discuss various aspects of evidence analysis. Practical advice is discussed at length along with legal concepts and issues involved in evaluating corner evidence. This is a subset of the BLM CFedS material.

Prerequisite: GME 381 with grade "C" or better

**GME 483 - Adv Cadastral Surveying III**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Introduction to water boundaries to create awareness of basic riparian issues.

Subdivision of sections addresses normal subdivision lotted closing sections, elongated and fractional sections, and the three-mile method of section subdivision.

This is a subset of the BLM CFedS material.

Prerequisite: GME 482 with grade "C" or better

**GME 495 - Cooperative Field Experience**

Lecture Hours: 0

Lab Hours: 40

Credit Hours: 4

An approved work program related to the geomatics practice involving full-time meaningful activity. The employer, type of work and level of difficulty must be approved by the Geomatics Co-Op Coordinator prior to the work period and submitted for review. A comprehensive written report is required at the end of each co-op period. A co-op period may be three months for 2 credits or six months for 4 credits. A tuition fee is required for credits earned by co-op work experience.

Prerequisites: Completed freshman year and two terms residence

**GME 496 - Cooperative Field Practice**

Lecture Hours: 0

Lab Hours: 40

Credit Hours: 2

Three month, two credit hour version of GME 395 and GME 495.

**GME 497 – CfedS**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Provides academic credit for licensed professional land surveyors who successfully completed the rigorous BLM Certified Federal Surveyor (CFedS) examination.

Prerequisite: Successful completion of the CFedS examination

**GME 498 – Workshop**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**GME 499 - Independent Study**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 4

(Hours to be arranged each term.)

## Health Education

**HED 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**HED 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**HED 240 - Emergency Care and CPR**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Comprehensive coverage of emergency care for a wide variety of injuries or illnesses. Course content includes artificial respiration and cardiopulmonary resuscitation, wounds, and bleeding; shock; burns; poisonings; bone, joint, and muscle injuries; cold and heat-related injuries; alcohol and drug emergencies; and methods of transportation. Emphasis on victim examination, evaluation, and assessment tools and appropriate immediate and temporary care.

**HED 246 - Drgs/Alch Prb/Mdrn Soc**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Physiological and psychological effects of drugs, from caffeine to heroin. A brief study of neurophysiology and pharmacology. Investigation of the major drug classifications. Other topics include alcohol advertising, co-dependency, drug-affected babies, treatment and recovery, and legalization issues.

**HED 250 - Contemp Health Issues**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Topics related to the maintenance of a healthy lifestyle. Emphasis on lifestyle choices and behavior patterns that affect one's state of wellness. Topics include stress management; emotional, social, and spiritual well-being; nutrition, fitness and exercise; weight management; cardiovascular disease and cancer risk reduction; addictions; and other lifestyle-related health behaviors.

**HED 260 - Diet/Exer Life Fitness**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Practical concepts of nutrition and exercise, their role in disease risk, obesity, and weight control. Consumer concerns, advertising, fads, gimmicks. Fitness and dietary evaluations.

**HED 275 - Intro to Sports Medicine**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introduction to the principles and practice of sports medicine. Emphasis on the prevention and treatment of common sports injuries. Instruction includes understanding the basic mechanisms behind injury and practical experience in preventative measures and basic treatment.

**HED 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)



### **HED 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

## **History**

### **HIST 101 - Hist-Western Civil**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Development of Western civilization from early beginning to present, with attention to political, economic, religious, social, and cultural factors. Courses need not be taken in sequence. HIST 101: From the origins of human civilization to 1000 A.D. HIST 102: From 1000 A.D. to 1789. HIST 103: From 1789 to the present.

### **HIST 102 - Hist-Western Civil**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Development of Western civilization from early beginning to present, with attention to political, economic, religious, social, and cultural factors. Courses need not be taken in sequence. HIST 101: From the origins of human civilization to 1000 A.D. HIST 102: From 1000 A.D. to 1789. HIST 103: From 1789 to the present.

### **HIST 103 - Hist-Western Civil**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Development of Western civilization from early beginning to present, with attention to political, economic, religious, social, and cultural factors. Courses need not be taken in sequence. HIST 101: From the origins of human civilization to 1000 A.D. HIST 102: From 1000 A.D. to 1789. HIST 103: From 1789 to the present.

### **HIST 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **HIST 201 - US History**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The historical development of the United States, its economic, political, and social

institutions from the colonial period to the present. Courses need not be taken in sequence. HIST 201: Pre-Columbian and colonial times to 1840. HIST 202: 1840, Westward expansion and the Civil War to 1899. HIST 203: 1900 to present.

### **HIST 202 - US History**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The historical development of the United States, its economic, political, and social institutions from the colonial period to the present. Courses need not be taken in sequence. HIST 201: Pre-Columbian and colonial times to 1840. HIST 202: 1840, Westward expansion and the Civil War to 1899. HIST 203: 1900 to present.

### **HIST 203 - US History**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The historical development of the United States, its economic, political, and social institutions from the colonial period to the present. Courses need not be taken in sequence. HIST 201: Pre-Columbian and colonial times to 1840. HIST 202: 1840, Westward expansion and the Civil War to 1899. HIST 203: 1900 to present.

### **HIST 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **HIST 224 - Tech & Ancient World**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The interaction of technology and world civilization from earliest times to 1500 A.D. Topics include the development of agriculture, urbanization, the place of technology in the Roman and Chinese empires, Medieval engineering, and the technological roots of globalization.

### **HIST 225 - Tech & Rise of the West**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The economic and social roots of Western dominance of the world economy after 1500. Topics include the Trans-Atlantic Exchange, the Industrial Revolution,

urbanization, globalization, and the technological roots of colonialism.

### **HIST 226 - Tech & Modern World**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The interaction of technological change and world civilization in the 20th century. Topics include the role of corporations in technological change, the theory of Large Technological Systems (LTS), Cold War science and technology, and origins of the internet.

### **HIST 245 - Hitler & the Holocaust**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the history of the Holocaust, with a focus on the role of Adolph Hitler. Topics include Hitler's life and political career, the social, technological and economic structure of the Holocaust, and Hitler and the Holocaust in popular culture.

### **HIST 275 - Intro to Hist of Medicine**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the history of medicine, with a focus on American medicine in the 19th and 20th centuries. Topics include medical professionalization, the social, technological and economic structure of the medical industry, and medicine in popular culture.

### **HIST 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **HIST 335 - Engineering Profession**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The emergence and development of the engineering profession in Europe and North America. Topics include the changing nature of the profession's work and institutions, the role of engineering professional societies, the relationship between engineers, engineering technologists, and engineering technicians, and the place of engineers in society. Prerequisite: WRI 123 or WRI 227

### **HIST 356 - A History of Energy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of emphasis societies place on the development, safeguarding and exploitation of energy resources. Development of energy resources since the Industrial Revolution; exploitation of energy resources; oil shocks of the 1970's, glut of the 1980s; the modern energy paradigm.

Prerequisite: WRI 123 or WRI 227

### **HIST 357 - History of the Electric Grid**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the electric grid as a large technological system. Topics of study include the creation of the electric grid by Edison and others, rural electrification, the rise and fall of the utility consensus, and the politics of deregulation.

Prerequisite: WRI 123 or WRI 227

### **HIST 392 - Modern Asia**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

China, Japan, and Korea from the early nineteenth century to the present. Emphasis on modern political movements and economic and cultural transformation.

Prerequisite: WRI 123 or WRI 227

### **HIST 407 – Seminar**

Lecture Hours: 12

Lab Hours: 1

Credit Hours: 12

(Hours to be arranged each term.)

### **HIST 452 - Globalization & Pac NW**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This seminar addresses globalization in the PNW. Topics include colonialism, mercantilism, markets, imperialism, and cultural exchange. PNW industries involved in globalization such as timber, fishing, agriculture, tourism, and oil will be examined. Social movements and protests will also be considered.

Prerequisite: WRI 122

### **HIST 468 - History of the Pacific NW**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course will cover the history of the Pacific Northwest including Native American settlements, exploration and later American settlements. It will include the impacts of institutional growth, urbanization, and resource development. The impact of national events upon the region will be explored.

Prerequisite: WRI 122

### **HIST 478 - History of Oregon**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An overview of the history of Oregon. The primary focus is the pattern of European settlement of Oregon, the origins and development of state government and the impact of commercial and industrial development.

Prerequisite: WRI 123 or WRI 227

## **Health Sciences**

### **HSC 207 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

Prerequisite: Health Sciences major or instructor consent

### **HSC 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **HSC 485 - Resrch/Proj Proposal**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

General aspects of conducting research with emphasis on biomedical approaches, constructing and testing hypotheses, interpreting and validating data, assessment of selected research paper, development and submission of a research proposal to be implemented in HSC 499.

Prerequisites: MATH 361, Health Sciences major, or instructor consent

## **Humanities**

### **HUM 105 - EAC: Text, Images, Games**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the methods of literary analysis and cultural studies. How to effectively and thoroughly analyze, discuss and criticize the meanings behind literature, visual art, film, the graphic novel, and video games from the perspective of literary studies.

### **HUM 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **HUM 125 - Intro Tech, Soc, Value**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the relationship of economic, political and social contexts to technological development with a focus on human values.

### **HUM 147 - West Cult in the Classical Age**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the ideas and values from the classical period which have profoundly influenced Western culture. Readings and discussion will focus on arts, literature, and philosophy.

### **HUM 148 - West Cult in the Medieval Age**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the ideas and values from the early Medieval to the Renaissance period which have profoundly influenced Western culture. Readings and discussion will focus on arts, literature, and philosophy.

**HUM 149 - West Cult in the Modern Age**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Study of the ideas and values from the Age of Enlightenment to today which have profoundly influenced Western culture. Readings and discussion will focus on arts, literature, and philosophy.

**HUM 207 – Seminar**

Lecture Hours: 12  
Lab Hours: 0  
Credit Hours: 12

(Hours to be arranged each term.)

**HUM 225 - Cont Thtr: Ashland Plays**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Contemporary live drama viewed at Ashland Shakespearean Festival Theater. Review and analysis of original script prior to play experience. Post review and analysis of play performance, content: plot, character, diction, melody, spectacle.

**HUM 235 - Introduction to Film**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4

Introduction to film history and appreciation. Students will engage with film across periods, genres, and national traditions to develop their understanding and analysis of the art of cinema. Film making techniques and the evolution of film culture are addressed.

**HUM 307 – Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**HUM 335 - Video Game Studies**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Students will read essays and criticism about video games, including traditional console and PC games, 'serious games,' and social-media-powered games. If possible, some assignments will also involve playing the games we discuss. Prerequisite: WRI 122

**HUM 345 - Digital Culture and Society**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

In this class, students will study and analyze internet culture through a humanistic lens. Topics discussed may include online identity construction, social media's effects on relationships, the digital divide, the internet's influence on politics, and online representation for marginalized groups.

Prerequisite: WRI 122

**HUM 407 – Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**Journalism**

**JOUR 107 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15

(Hours to be arranged each term.)

**JOUR 207 – Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**JOUR 211 - Pub/Student Newspaper**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

Practical experience and training in the elementary principles of newspaper writing, makeup, and layout. Members of this class will publish the student newspaper.

Prerequisite: WRI 121

**JOUR 307 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15

(Hours to be arranged each term.)

**JOUR 311 - Adv Pub/Student News**

Lecture Hours: 1  
Lab Hours: 3  
Credit Hours: 3

Provides advanced experience and training in principles of newspaper editing, reporting, writing, makeup, layout, and

specialty areas. Class members serve as the editorial staff.

Prerequisite: JOUR 211

**JOUR 407 – Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**Literature**

**LIT 104 - Intro to Literature**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Literature and the nature of literary experience through reading prose and poetry drawn from American and other Literatures. Works representing principal literary types are read in their entirety when possible, with emphasis on such elements as structure, style, characterization, imagery, and symbolism.

**LIT 105 - Intro to Literature**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Literature and the nature of literary experience through reading prose and poetry drawn from American and other Literatures. Works representing principal literary types are read in their entirety when possible, with emphasis on such elements as structure, style, characterization, imagery, and symbolism.

**LIT 106 - Intro to Literature**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Literature and the nature of literary experience through reading prose and poetry drawn from American and other Literatures. Works representing principal literary types are read in their entirety when possible, with emphasis on such elements as structure, style, characterization, imagery, and symbolism.

**LIT 107 – Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**LIT 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**LIT 235 - American Multicultural Lit**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introductory study of short stories, poetry, essays, and a novel that illustrates the diversity of North American culture.

**LIT 253 - 19th Century American Lit**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Survey of American Literature from 1800-1900. Genres include short stories, novels, poetry, nonfiction narratives, and drama. Topics include Romanticism, Gothic literature, Transcendentalism, Colonialism, Emancipation, and Women's Rights.

Prerequisite: WRI 121

**LIT 254 - 20th Century American Lit**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Survey of American Literature from 1900-1970. Genres include short stories, novels, poetry, nonfiction narratives, and drama. Topics include Urban Gothic literature, Modernism, World Wars 1 and 2, and Environmentalism.

Prerequisite: WRI 121

**LIT 255 - Contemporary American Lit**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Survey of American Literature from 1970-present. Genres include short stories, novels, poetry, nonfiction narratives, graphic novels, and drama. Topics include Postmodernism, the Cold War, Cyberpunk Literature, Postapocalyptic Literature, and Environmentalism.

Prerequisite: WRI 121

**LIT 266 - Native American Lit & Film**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores connections to the human condition found in literature and stories authored by Native Americans with focus

on a variety of themes including assimilation, ethnicity, survival and stereotyping. Documentary films and commercial cinema support and lend context to the readings. Students are encouraged to define and/or redefine their worldviews.

**LIT 305 - Ecol Issues in Nature Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students will study how our perception of the environment has changed over the last two hundred years of Western culture. We will analyze the works of well-known nature writers as well as other related texts from a literary studies perspective.

Prerequisite: WRI 122

**LIT 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**LIT 315 - Science Fiction Lit & Film**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of science fiction literature and film as expressions of the relationship between technology and culture(s). Approach will primarily be from a literary analysis perspective, with elements of film studies included.

Prerequisite: WRI 122

**LIT 325 - The Metropolis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the history of the modern city in Western culture from a cultural studies perspective. Students discuss works of literature, film, and new media dealing with our understanding of urban space over time.

Prerequisite: WRI 122

**LIT 335 - Travel Lit: Fiction & Nonfict**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of travel narratives in Western Culture from the British Empire to today. Focus will be on narratives' depictions of wilderness vs. civilization and traveling as

a transformative experience.

Prerequisite: WRI 122

**LIT 345 - Postapocalyptic Lit & Film**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Inquiry into the recent popularity of postapocalyptic-themed literature and films. Study of postapocalyptic subgenres including natural disasters, rogue artificial intelligence, zombies, etc. and the historical context from which they each have emerged.

Prerequisite: WRI 122

**LIT 346 - Creative Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines the elements, structures and traditions of fiction writing through readings, discussions, and creative writing exercises. For students interested in writing fiction.

Prerequisite: WRI 122

**LIT 367 - Art & Trash in Contemp Fiction**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In-depth study of contemporary fiction, finding meaning in literature responsive to the human condition and relevant to the reader. Includes works from authors such as Margaret Atwood, Tim O'Brien, Alice Munro and Anthony Doerr.

Prerequisite: WRI 122

**LIT 373 - British Culture & Literature**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores features of culture and selected works and writers from the Nineteenth and Twentieth Centuries in Britain. Some film presentation included.

### **LIT 381 - Contemporary World Lit**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An in-depth study of selected writers and works organized thematically, geographically, and ethnically. The focus on contemporary works provides insight into current world cultures and explores globalization while encouraging students to critically examine their worldviews.

Prerequisite: WRI 122

### **LIT 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **LIT 456 - Topics in Film**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines films as stories using modern literary criticism techniques. Offerings include close analysis of contemporary film, selected directors, selected genres and surveys of film history.

Prerequisites: 3 credits of English or Humanities and WRI 121

## **Mathematics**

### **MATH 20 - Basic Mathematics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Operations with whole numbers, fractions and decimals. Ratio, proportion, and percent, with applications. Calculations using length, area, and volume. Estimation and unit conversion. Credits earned apply for enrollment (eligibility), but not apply toward a degree. An additional fee is required above regular tuition.

Note: Unless otherwise indicated with F, W, S courses will be offered as often as requested.

### **MATH 70 - Elementary Algebra**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

For students whose preparation contains no algebra background or whose placement examination scores do not qualify for entry into Intermediate Algebra. The topics covered stress the fundamental properties of algebra, solving

equations, and manipulating algebraic fractions. Credits earned apply for enrollment (eligibility) but do not apply toward a degree. An additional fee is required above regular tuition.

Note: Unless otherwise indicated with F, W, S courses will be offered as often as requested.

Prerequisite: MATH 20 with grade "C" or better, or equivalent

### **MATH 97 - Algebra Review**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Structured review for students whose Math Placement score may not reflect an accurate evaluation or students who want a refresher but who do not require a math placement. The course has individualized directed study using a comprehensive programmed instructional technology. Course is graded P/NP.

Note: Unless otherwise indicated with F, W, S courses will be offered as often as requested.

### **MATH 100 - Intermediate Algebra**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Fundamentals of algebra, linear and quadratic equations, systems of equations, inequalities, functions and graphs, radicals and exponents, and stated problems. (May not be used for graduation credit.)

Prerequisite: MATH 70 with grade "C" or better, or equivalent

### **MATH 101 - Accelerated Algebra**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

An accelerated algebra course with topics ranging from Elementary Algebra (MATH 70) to College Algebra (MATH 111). For entering students with good high-school algebra backgrounds. All students will start in Elementary Algebra, and may receive credit for one of MATH 70, MATH 100, or MATH 111, depending on individual level of achievement. An additional self-support course fee is required.

### **MATH 105 - Collegiate Mathematics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A variety of modern mathematical topics based on contemporary applications. Topics include combinatorics, probability, statistics, finance, matrices, and logarithmic and exponential functions.

### **MATH 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **MATH 111 - College Algebra**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Study of functions including graphs, operations and inverses. Includes polynomial, rational, exponential, logarithmic functions and their applications, and systems of equations.

Prerequisite: MATH 100 with grade "C" or better, or equivalent

### **MATH 111A - College Algebra**

Lecture Hours: 1

Lab Hours: 2

Credit Hours: 2

For students requiring MATH 111 but desiring to learn the material at a slower pace. MATH 111 content covered upon completion of MATH 111A and MATH 111B.

Prerequisite: MATH 100 with grade "C" or better, or equivalent

### **MATH 111B - College Algebra**

Lecture Hours: 1

Lab Hours: 2

Credit Hours: 2

For students requiring MATH 111 but desiring to learn the material at a slower pace. MATH 111 content covered upon completion of MATH 111A and MATH 111B.

Prerequisite: MATH 111A with grade "C" or better

### **MATH 112 – Trigonometry**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The trigonometric functions and their applications. Topics include graphs, identities, trigonometric equations, vectors and complex numbers.

Prerequisite: MATH 111 with grade "C" or better, or equivalent

**MATH 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MATH 211 - Fundamentals of Elem Math I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

This is the first course in the mathematics sequence for prospective teachers. Topics include problem solving strategies, set theory, numeration, computational algorithms for whole numbers and integers, estimation, relations; use is made of calculators and manipulatives.

Prerequisite: MATH 100 or equivalent with grade "C" or better

**MATH 212 - Fundamentals of Elem Math II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

This is the second course in the mathematics sequence for prospective elementary teachers. Topics include decimals, percents, ratios and proportions, real numbers, probability, and statistics; use is made of calculators and manipulatives.

Prerequisite: MATH 211 with grade "C" or better

**MATH 213 - Fundamentals of Elem Math III**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

This is the third course in the mathematics sequence for prospective elementary teachers and covers basic geometry. Topics include geometric shapes and their properties, measurement, congruence and similarity, and coordinate and transformational geometry; use is made of calculators and manipulatives.

Prerequisite: MATH 211 with grade "C" or better

**MATH 221 - Intro to Computational Sftware**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Solve applied problems involving formulas, functions, summations and iteration using Excel and MATLAB. Use

built-in functions and graphing capabilities of MATLAB and Excel. Do vector and matrix calculations and write files using MATLAB. Write and execute macros in Excel.

Prerequisite: MATH 112

**MATH 243 - Introductory Statistics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Descriptive statistics, numerical and graphical presentation of data, estimation and margin of error, hypothesis testing, correlation, interpretation of statistical results. Cannot be taken for graduation credit by students who have taken MATH 361.

Prerequisite: MATH 100 or instructor consent

**MATH 251 - Differential Calculus**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Theory, computational techniques and applications of the derivative.

Prerequisite: MATH 112 with grade "C" or better, or equivalent

**MATH 252 - Integral Calculus**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Computational techniques for and applications of the definite and indefinite integrals.

Prerequisite: MATH 251 with grade "C" or better

**MATH 253 - Sequences and Series**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Indeterminate forms and improper integrals. Infinite sequences and series, convergence, power series. Taylor series and applications.

Note: Unless otherwise indicated with F, W, S courses will be offered as often as requested.

Prerequisite: MATH 252 with grade "C" or better

**MATH 254 - Vector Calculus I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Vectors, vector functions, and curves in

two and three dimensions. Surfaces, partial derivatives, gradients, and directional derivatives. Multiple integrals using rectangular and other coordinate systems. Physical and geometric applications.

Note: Unless otherwise indicated with F, W, S courses will be offered as often as requested.

Prerequisite: MATH 252 with grade "C" or better

**MATH 261 - Introduction to Linear Algebra**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Matrices and matrix operations, systems of linear equations, vectors in a geometric setting, projections, dot products, cross products, inverse matrices, determinants, linear transformations. Eigenvalues, Eigenvectors. Use of MATLAB or equivalent CAS and/or a graphing calculator required.

Pre- or Corequisite: MATH 251 or instructor consent

**MATH 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MATH 310 - Mathematical Structures**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduction to proof and mathematical abstraction. Topics include logical statements, sets, set operations, functions, and relations.

Prerequisite: MATH 252 with grade "C" or better

**MATH 311 - Introduction to Real Analysis**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A one quarter stand alone course on topics in real analysis, covering properties of real numbers, completeness axiom, continuity, convergence of sequences and series of real numbers, convergence of sequences and series of functions. Emphasis will be placed on proofs.

Prerequisites: MATH 310 with grade "C" or better

**MATH 315 - History of Mathematics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

This course will explore major themes in mathematics and their development throughout history from cultures around the world. The course will address different perspectives on mathematics and how it influenced the growth of the field and the cultures it was developed in.

Prerequisites: MATH 252 with grade "C" or better, SPE 111, and WRI 122

**MATH 321 - Appl Diff Equation I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The first in a two term sequence on the solutions of ordinary differential equations. Introduction to differential equations, first and second order equations with applications.

Prerequisite: MATH 252 with grade "C" or better

**MATH 322 - Appl Diff Equation II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The second in a two quarter sequence on the solutions of ordinary differential equations. Introduction to systems of equations, the Laplace transform and series solutions.

Prerequisites: MATH 321 and MATH 341

**MATH 327 - Discrete Mathematics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduction to proof and mathematical abstraction. Topics include sets, set operations, functions, relations, sequences, series, recurrence relations, mathematical induction, equivalence relations.

Prerequisites: MATH 111 and MATH 252, both with grade "C" or better, or Junior standing

**MATH 341 - Linear Algebra I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The study of vectors and matrices in Euclidean space, their geometric interpretations and application to systems of equations. Includes linear independence of vectors, basis and dimension,

introduction to linear transformations, eigenvalues and eigenvectors, diagonalization, determinants.

Prerequisite: MATH 252 with grade "C" or better

**MATH 342 - Linear Algebra II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A continuation of the topics of MATH 341 to the setting of abstract vector spaces. Includes the study of orthogonality, inner spaces, eigenvalues and eigenvectors, matrix decompositions and a more advanced study of linear transformations.

Prerequisite: MATH 341

**MATH 346 - Number Theory**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A proof-based course in the theory of integers, including divisibility, primes, Euclid's Algorithm, Euler's Theorem, and an introduction to algebraic structures. The course also includes applications of number theory such as RSA encryption.

Prerequisite: MATH 327 with grade "C" or better

**MATH 347 - Fundmtls of Abstract Algebra**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduction to group theory and algebraic structures with applications.

Prerequisites: MATH 254 and MATH 327, both with grade "C" or better

**MATH 354 - Vector Calculus II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Review of vector functions, space curves, gradients, and directional derivatives. Introduction to vector analysis: vector fields, divergence, curl, line integrals, surface integrals, conservation fields, and the theorems of Gauss, Green and Stokes with application to force, work, mass and charge.

Prerequisite: MATH 254 with grade "C" or better

**MATH 361 - Statistical Methods I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Descriptive statistics, experimental design, introduction to probability, common probability distributions, random variables, sampling distributions, hypothesis testing and confidence intervals for means using one or two samples, simple linear regression.

Prerequisite: MATH 111 or instructor consent

**MATH 362 - Statistical Methods II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Review of inferential statistics, analysis of variance one factor and two factor, simple and multiple regression, analysis of categorical data using tests and confidence intervals for proportions and chi-square tests, correlation, goodness of fit, non-parametric tests. Data sets used will come from various fields including: business, psychology, biology, environmental science, engineering, manufacturing and communication.

Prerequisite: MATH 361 or instructor consent

**MATH 371 - Finite Math/Calc I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Linear functions, matrices, linear programming, mathematics of finance, derivatives and their applications. The integral and its applications, and calculus of several variables. (MATH 371 cannot be used for graduation credit by students who have taken MATH 251).

Prerequisite: MATH 111 with grade "C" or better

**MATH 372 - Finite Math/Calc II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Linear functions, matrices, linear programming, mathematics of finance, derivatives and their applications. The integral and its applications and calculus of several variables. (MATH 371 cannot be used for graduation credit by students who have taken MATH 251).

Prerequisite: MATH 371 with grade "C" or better

**MATH 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MATH 411 - Topics in Complex Analysis**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Complex numbers and functions, differentiation and integration, Cauchy's theorem and integral formula, Taylor and Laurent series, Residue theorem.

Prerequisite: MATH 254

**MATH 421 - Applied Partial Diff Equations**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The first course in a three quarter sequence in applied partial differential equations.

Modeling physical systems using differential equations, classifying differential equations and introduction to the methods of solving partial differential equations (separation of variables, Fourier series, transform methods).

Prerequisites: MATH 321 and MATH 254

**MATH 422 - Applied Partial Diff Equatns II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The second course in a three quarter sequence in applied partial differential equations. Introduction to solution techniques using eigenvalues and eigenfunctions. Presentation of eigenfunctions which form orthogonal bases such as Bessel functions and Legendre polynomials.

Prerequisites: MATH 421 and MATH 341

Corequisite: MATH 354

**MATH 423 - Applied Partial Diff Equ III**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The third course in a three term sequence.

Applications of linear and weakly nonlinear partial differential equations.

Analytical solution techniques for parabolic, elliptic, and hyperbolic equations. Green's functions, integral

methods, shocks, and the method of characteristics.

Prerequisite: MATH 422

**MATH 451 - Numerical Methods I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Computer applications of matrix methods, iterative solutions of equations, and systems of equations, polynomial interpolation and curve fitting, numerical differentiation and integration.

Prerequisites: CST 116 or ENGR

266 or ENGR 267, and MATH

252 and MATH 261 or MATH 341

**MATH 452 - Numerical Methods II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Numerical solution of ordinary differential equations. Numerical solution of initial-value problems using Runge-Kutta

methods and linear multistep methods;

introduction to boundary value problems.

Analysis of stability, accuracy, and

implementation of methods.

Prerequisites: MATH 451 and MATH 321

**MATH 453 - Numerical Methods III**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Numerical solution of partial differential equations. Numerical solution of boundary value problems and initial-boundary value problems using finite difference and finite element methods.

Analysis of stability, accuracy, and implementation of methods.

Prerequisites: MATH 421 and MATH 452

**MATH 465 - Mathematical Statistics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Counting techniques, probability, discrete and continuous random variables and

distribution functions, joint probability

distributions; expected value, variance and

covariance; decision making.

Prerequisite: MATH 254

**Mechanical Engineering****MECH 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MECH 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MECH 221 – Statics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamental principles of mechanics of rigid bodies and the application of these principles to engineering problems.

Prerequisite: PHY 221

Pre- or Corequisite: MATH 252

**MECH 222 - Strength of Materials I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Internal stresses and deformations of structural members and machines when subjected to external forces.

Prerequisite: ENGR 211 or MECH 221

**MECH 223 - Strength of Materials II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Internal stresses and deformations of structural members and machines when subjected to external forces. Analysis of stress in pressure vessels and column buckling.

Prerequisite: MECH 222

**MECH 260 - Engineering Materials I**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Survey of materials with emphasis on metals and metal alloys used in industry; their physical and chemical properties as related to structure, corrosion, and

engineering applications. Diffusion mechanisms and binary phase diagrams

are also examined. Tensile, impact, and fatigue failure of metallic materials.

Laboratory included.

Prerequisite: CHE 201 and CHE 204, or CHE 221, or instructor consent



**MECH 304 - Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Terms and hours to be arranged with approval of the curriculum coordinator.)

An approved work program related to the student's field of specialization for a continuous three-month period. The employer and the type, level, and difficulty of the particular job must be approved prior to the employment period. A written comprehensive report must be submitted during the following term of residence.

**MECH 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MECH 312 - Dynamics II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Continuation of the study of kinematics and kinetics of particles and rigid bodies, with applications to mechanical systems of current interest to engineers.

Prerequisites: ENGR 212 and MATH 321

**MECH 313 - Thermodynamics II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Application of laws and principles of thermodynamics to real thermodynamic cycles. Teaches analysis of performance and design of internal and external combustion engines, steam generators, heat pumps, compressors, and refrigeration machinery.

Prerequisite: ENGR 355

**MECH 315 - Machine Design I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of stress and fatigue analysis as applied to machine elements.

Prerequisites: ENGR 213 or MECH 223, and MECH 260

**MECH 316 - Machine Design II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A study of power transmission systems components, selection, and application to

power transmission systems. Special consideration is given to the dynamic characteristics of the systems.

Prerequisite: MECH 315 or instructor consent

**MECH 318 - Fluid Mechanics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Covers fluid properties, fluid statics, conservation laws, pipe flow, drag, lift fluid dynamics, measurement of flow, viscous flow, laminar, and turbulent flow, and forces due to fluid motion.

Prerequisites: ENGR 211 and MATH 252

**MECH 323 - Heat Transfer I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the three modes of heat transfer, conduction, convection, and radiation. Teaches the analytical and empirical techniques used for solving problems in heat transfer, including those for which computer application is most suited.

Prerequisites: ENGR 318 or MECH 318, ENGR 355, and MATH 321

**MECH 326 - Electric Power Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study related to theory and application of industrial electric power systems. Topics covered include transformers, motors, generators, motor controls, and protective devices.

Prerequisites: MECH 363 and ENGR 236

**MECH 351 - Finite Element Analysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course is an introduction to the use of finite analysis (FEA) in the solution of mechanical engineering problems. Existing FEA computer codes are used.

Prerequisite: MET 375

Pre- or Corequisite: MECH 315

**MECH 360 - Engineering Materials II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course extends the MET 160 Engineering Materials I course using a

more theoretical approach. Subjects include metals, polymers, ceramics, and composites.

Prerequisites: CHE 201 or CHE 221, and MECH 260

**MECH 363 - Engineering Instrumentation**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study of measurement techniques and equipment used in mechanical engineering. Instrumentation for measurements in mechanics, thermodynamics, fluid dynamics, and electrical systems are considered. Methods of calibration, correction, and data reduction are presented.

Prerequisite: ENGR 236

Pre- or Corequisite: ENGR 213 or MECH 223

**MECH 375 - Solid Modeling**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduces solid modeling techniques as applied to mechanical design. Topics include extruded and swept shapes, Boolean operations, and other construction techniques.

Prerequisite: MET 242

**MECH 404 - Co-op Field Practice**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 6

(Terms and hours to be arranged with approval of the curriculum coordinator.)

An approved work program related to the student's field of specialization for a continuous three-month period. The employer and the type, level, and difficulty of the particular job must be approved prior to the employment period. A written comprehensive report must be submitted during the following term of residence.

**MECH 405 - Reading and Conference**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**MECH 407 – Seminar**

Lecture Hours: 6

Lab Hours: 3

Credit Hours: 6

(Hours to be arranged each term.)

**MECH 414 - Intro to Aerodynamics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction course on the fundamentals of aerodynamics. Includes a review of the behavior of fluids in motion, definition of the important parameters in aerodynamic behavior, and study of flow about simple aerodynamic shapes.

Emphasis will be placed on low-speed aerodynamics.

Prerequisites: ENGR 355 and MECH 318

**MECH 415 - Design Project**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course involves using material from prior course work in individual student projects.

Prerequisites: MECH 315, MECH 318, and MET 242

Pre- or Corequisite: MECH 316

**MECH 417 - Fluid Mechanics II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Fluid Kinematics, differential analysis, similitude and modeling, and compressible flow. Computational fluid dynamics is introduced. An alternative to MECH 418. MECH 417 covers less topics/theory but does include a laboratory session.

Prerequisites: ENGR 355, MATH 321, and MECH 318

**MECH 418 - Fluid Mechanics II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A continuation of the study of the principles and applications of fluids in engineering, including: fluid kinematics, dimensional analysis and modeling, differential analysis of fluid flow, Navier-Stokes equations, compressible flow, open-channel flow, and turbomachinery. An alternative to MECH 417. MECH 418 covers more topics/theory but does not include a laboratory session.

Prerequisites: ENGR 355, MATH 321, and MECH 318

**MECH 421 - Intro to Wind Tunnels**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introductory course on the experimental techniques used in wind tunnel testing of aerodynamic shapes. Includes operating characteristics of wind tunnels, the characteristics of and use of models and model instrumentation, and the development of analytical techniques for reduction of wind tunnel data.

Prerequisites: MECH 318 and MECH 363

**MECH 426 - Fluid Power Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

A mechanical approach to industrial hydraulic applications with emphasis on selection and function of hardware and interfacing of hydraulic systems with mechanical, fluidic, and electrical/electronic controls.

Prerequisite: MECH 318 or instructor consent

**MECH 427 - Experiments in Thermodynamics**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Application of laws and principles of thermodynamics to performance testing of heat engines. Teaches measurement of power, determination of efficiency, preparation of heat balances, analysis of combustion products, and preparation of engineering reports.

Prerequisites: MECH 313 and MECH 363

**MECH 433 – HVAC**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Heating, ventilation, and air conditioning. Application of laws and principles of thermodynamics to analysis, design, and control of mechanically controlled environments for human comfort, animal health, and food preservation. Teaches computation of heating and cooling loads, humidity control, heating, and refrigeration.

Prerequisite: MECH 323

**MECH 436 - Classical Control Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to control systems. Both classic-control theory and programmable logic controllers. Topics include block diagrams, mathematical models, transfer functions, Laplace transforms, frequency response along with control components and PLC programming.

Prerequisite: MECH 480

**MECH 437 - Heat Transfer II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

A study of experimental heat transfer. Methods and instrumentation used for investigating heat transfer systems will be considered. Laboratory investigations include studies of heat exchangers, forced and free convection experiments, and determination of radiation and convection coefficients.

Prerequisite: MECH 323 or instructor consent

**MECH 438 - Reciprocating & Turbine Engine**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to construction, operation, and theory of reciprocating and turbine engines. Students will learn engine design, history of development, theory and practice of operation.

Prerequisites: MECH 313, MECH 315, and MECH 318

**MECH 475 - Parametric Modeling**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduces feature-based parametric solid modeling techniques as applied to Mechanical Design. Emphasizes the concepts and practices of parametric modeling from the user's perspective. Theoretical and developmental backgrounds are also covered.

Prerequisite: MET 375

**MECH 480 - Mechanical Vibrations**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introduction to mechanical vibration. Topics include the equations of motion, resonant frequencies, mode shapes, damping and applications. The laboratory will introduce vibration instrumentation. Prerequisites: ENGR 212, ENGR 266, MATH 321, MATH 341, MECH 315, and MECH 363

## Mechanical Engineering Technology

**MET 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MET 108 - Geo Dimen and Tolerance**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

The study and application of ANSI geometric dimensioning and tolerancing principles relative to the preparation of engineering drawings. Prerequisite: MET 241

**MET 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MET 218 - Fluid Mechanics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Covers fluid properties, laws of fluid statics, and fluid dynamics, measurement of flow, viscous flow, laminar, and turbulent flow, flow in ducts, forces due to fluid motion, and fluid machinery. Prerequisites: MATH 112, and PHY 201 or PHY 221

**MET 232 – Thermodynamics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introductory course in thermodynamics. Develops understanding of energy, heat, work, efficiency, the ideal gas law, the first and second laws of

thermodynamics, and the general energy equation.

Prerequisites: MATH 252, and PHY 202 or PHY 222

**MET 241 - CAD for Mechanical Design I**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Computer aided drafting (CAD) for mechanical design. The focus of this course is the construction of 2-D drawings using current industry software. Topics include construction principles, input schemes, command structures, and data management.

Prerequisite: ENGR 111 or instructor consent

**MET 242 - CAD for Mechanical Design II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Computer aided drafting (CAD) for mechanical design. The focus of this course is the construction of drawing sets using current industry software. Topics include detail part drawings, assembly drawings, and an introduction to 3-D drafting.

Prerequisite: MET 241

**MET 298 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours and content to be arranged each term.)

**MET 299 - Laboratory Practice**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 6

(Hours and content to be arranged each term.)

**MET 304 - MET Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Terms and hours to be arranged with approval of the curriculum coordinator.) An approved work program related to the student's field of specialization for a continuous three month period. The employer and the type, level, and difficulty of the particular job must be approved

prior to the employment period. A written comprehensive report must be submitted during the following term or residence.

**MET 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MET 313 - Applied Thermodynamics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Application of laws and principles of thermodynamics to real thermodynamic cycles. Teaches analysis of performance and design of internal and external combustion engines, steam generators, heat pumps, compressors, and refrigeration machinery.

Prerequisite: ENGR 355

**MET 315 - Machine Design I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Knowledge and skills developed in preceding courses are extended and applied to design and selection of machine elements and machines. Attention is given to functional requirements, methods of manufacture, choice of materials, and economic factors.

Prerequisites: ENGR 213 or MECH 223, and MECH 260

**MET 316 - Machine Design II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A study of power transmission components, their selection, and application to power transmission systems. Special consideration is given to the dynamic characteristics of the systems.

Prerequisite: MET 315

**MET 323 - Heat Transfer I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the three modes of heat transfer, conduction, convection, and radiation. Teaches the analytical and empirical techniques used for solving problems in heat transfer, including those for which computer application is most suited.

Prerequisites: ENGR 355 and MET 218

**MET 351 - Finite Element Analysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course is an introduction to the use of finite element analysis (FEA) in the solution of mechanical engineering problems. Existing FEA computer codes are used.

Prerequisite: MET 375

Pre- or Corequisite: MET 315

**MET 360 - Engineering Materials II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course extends the MET 160 Engineering Materials I course using a more theoretical approach. Subjects include metals, polymers, ceramics, and composites.

Prerequisite: MECH 260

**MET 363 - Engineering Instrumentation**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study of measurement techniques and equipment used in mechanical engineering. Instrumentation for measurements in mechanics, thermodynamics, fluid dynamics, and electrical systems considered. Methods of calibration, correction, and data reduction presented.

Prerequisite: ENGR 236

Pre- or Corequisite: ENGR 213

**MET 375 - Solid Modeling**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduces solid modeling techniques as applied to mechanical design. Topics include extruded and swept shapes,

Boolean operations, and other construction techniques.

Prerequisite: MET 242

**MET 404 - MET Co-op Field Practice**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

An approved work program related to the student's field of specialization for a continuous three-month period. The employer and the type, level, and difficulty of the particular job must be approved prior to the employment period. A written comprehensive report must be submitted during the following term of residence.

**MET 405 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MET 407 - Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MET 414 - Applied Aerodynamics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introductory course on the fundamentals of aerodynamics. Includes a review of the behavior of fluids in motion, definition of the important parameters in aerodynamic behavior, and study of flow about simple aerodynamic shapes. Emphasis will be placed on low-speed aerodynamics.

Prerequisites: ENGR 355 or MET 232, and MET 218

**MET 415 - Design Project**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course involves using material from prior course work in individual student projects.

Prerequisites: MET 218 and MET 315

Pre- or Corequisite: MET 316

**MET 416 - Energy Systems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Compares available energy resources by

application of laws and principles of thermodynamics. Provides computational skills for assessment of a given resource with respect to a given application.

Develops understanding of energy economics.

Prerequisites: ENGR 355 or MET 232

**MET 417 - Gas Laws**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Application of thermodynamics and fluid mechanics to the analysis of flow of both ideal and real gasses in pipes, nozzles, diffusers, compressors and turbines. The course also emphasizes the use of appropriate instrumentation.

Prerequisites: MET 218, MET 313, and MET 363

**MET 421 - Wind Tunnel Technology**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introductory course on the experimental techniques used in wind tunnel testing of aerodynamic shapes. Includes operating characteristics of wind tunnels, the characteristics of and use of models and model instrumentation, and the development of analytical techniques for reduction of wind tunnel data.

Prerequisites: ENGR 355 or MET 232, MET 218, and MET 363

**MET 426 - Fluid Power Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

A mechanical approach to industrial hydraulic applications with emphasis on selection and function of hardware and interfacing of hydraulic systems with mechanical, fluidic and electrical/electronic controls.

**MET 427 - Exper in Thermodynam**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Application of laws and principles of thermodynamics to performance testing of heat engines. Teaches measurement of power, determination of efficiency, preparation of heat balances, analysis of combustion products, and preparation of engineering reports.

Prerequisites: MET 313 and MET 363

**MET 433 – HVAC**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Heating, ventilating, and air conditioning. Application of laws and principles of thermodynamics to analysis, design, and control of mechanically-controlled environments for human comfort, animal health, and food preservation. Teaches computation of heating and cooling loads, humidity control, heating, and refrigeration.

Prerequisites: MET 313 and MET 323

**MET 436 - Control Systems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to control systems. Both classic control theory and modern digital process control are considered. Topics include block diagrams, mathematical models, transfer functions, Laplace transforms, frequency response along with control components and digital controllers.

Prerequisites: ENGR 212, ENGR 236, ENGR 355 or MET 232, MET 218, and MET 363

**MET 437 - Heat Transfer II**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

A study of experimental heat transfer. Methods and instrumentation used for investigating heat transfer systems will be considered. Laboratory investigations include studies of heat exchangers, forced and free convection experiments, and determination of radiation and convection coefficients.

Prerequisite: MET 323

**MET 438 - Reciprocating & Turb Eng**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to construction, operation, and theory of reciprocating and turbine engines. Students will learn engine design, history of development, theory and practice of operation.

Prerequisites: MET 218, MET 313, and MET 315

**MET 462 - Vacuum Technology**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introductory course defining the role of high and ultra-high vacua in the process of high vacuum technology. Material will include such topics as vacuum pumping, vacuum gauging, processing of materials in a vacuum, evaporative deposition, sputtering, thin films, mass spectrometry, and leak detection.

Prerequisite: MET 417

**MET 465 - Comput'n Strength of Materials**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced topics in structural mechanics using calculus and finite element approaches. Topics include stresses and deflections of non-uniform 2-d beams; shafts and connecting rods; axisymmetric shells; circular and rectangular plates; inertial stresses from rotation and seismic effects. Applications are emphasized.

Prerequisites: ENGR 211 or MECH 222, ENGR 213, MATH 252, MECH 221, and MET 351

**MET 475 - Parametric Modeling**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 2

Introduces feature-based parametric solid modeling techniques as applied to Mechanical Design. Emphasizes the concepts and practices of parametric modeling from the user's perspective. Theoretical and development backgrounds are also covered.

Prerequisite: MET 375

**MET 480 – Vibrations**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introduction to mechanical vibration. Topics include the equations of motion, resonant frequencies, mode shapes, damping and applications. The laboratory will introduce vibration instrumentation such as accelerometers and spectrum analyzers.

Prerequisites: ENGR 212, ENGR 266, MATH 321, MECH 315, and MECH 363

# Manufacturing Engineering Technology

**MFG 101 - Intro to Manufacturing**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

An introduction to the manufacturing engineering technology discipline. Orientation to the use of personal computers. Instruction in problem solving and laboratory procedures emphasized. Laboratory provides demonstration and practice in a variety of manufacturing equipment and procedures.

**MFG 103 - Intro Welding Proc**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Applications of welding in modern industry. Topics include: Oxyacetylene welding and cutting, shielded metal arc welding, gas tungsten arc welding, gas metal arc welding, and robotic welding. Prerequisite: Enrolled in any MMET program or instructor consent

**MFG 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MFG 112 - Intro to Mfg Processes**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A survey of common manufacturing processes, including a history of manufacturing technology. Manufacturing economic considerations. Influence of product design on process selection. Manufacturing taxonomy, surface finish, tolerances, and functional specifications.

**MFG 120 - Intro Machining Proc**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

An introductory course in metal removal processes emphasizing drilling, milling, and lathe processes. Included tool bit grinding. Emphasis on production speeds and feeds.

Prerequisites: ENGR 111 and MATH 100

**MFG 204 - Data Management**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Current topics in data acquisition and management.

**MFG 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 220 - Mfg Processes II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Advanced concepts in material removal. Turning, milling, shaping, and drilling. Cutting tools and cutting requirements. Prerequisites: MECH 260, MET 241, and MFG 120

**MFG 223 - Cast & Mold Proc**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Casting and molding processes including: pattern making, casting and molding methods, mold and core making, pouring, cleanup, sand conditioning and testing, quality considerations and economic factors.

Prerequisites: ENGT 115 and MECH 260

**MFG 245 - Electronics Mfg**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Processes and materials specific to the production of printed circuit board and integrated circuit components. Topics include surface mount technology, vacuum system theory, photolithography, etching and deposition processes, microbonding, and component packaging.

Prerequisites: CHE 101 and MET 112

**MFG 275 - CAD for Manufacturing**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Computer aided drafting for manufacturing. Presents equipment and programs from the user's perspective. Topics include construction principles, input schemes, command structures, and data management.

Prerequisite: One computer language

**MFG 295 - Individual Studies**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 298 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 299 - Laboratory Practice**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 313 - Mfg Analysis & Planning**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis and planning of manufacturing methods, procedures and equipment. Includes designing for manufacturing efficiency, tolerance analysis, equipment and resource allocation and scheduling.

Prerequisites: MET 242, MFG 112, and MFG 120

**MFG 314 - Geom Dimension/Tolerance**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

The study and application of ANSI and ISO geometric dimensioning and tolerancing principles and practices relative to product design and manufacturing operations.

Prerequisites: MATH 112 and MET 242

**MFG 317 - Machine Element Dsgn**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Stress calculations and design of machine elements for general applications. Theories of failure, fatigue considerations, and material selection of shafts and associated parts, gear and belt drives, bearings, power screws, threaded fasteners, riveting, welding, and springs.

Prerequisites: ENGR 213 or MECH 222, and MET 241, or instructor consent

**MFG 325 - Princ Mtrlgy, Mach, Weld**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Measuring techniques using precision devices. Metal removal processes such as lathe, mill, and grinder. Correct use of tools and cutting parameters. Basic welding processes and theory.

**MFG 326 - Solid Mechanics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Concentrated study of statics and strength of materials comprising the principles of equilibrium, strain-stress relationships, and analysis of internal stresses for different loading systems.

Prerequisite: MATH 112

**MFG 331 - Industrial Controls**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Fundamentals of control of manufacturing processes. Applications of relay logic, input and output devices, and programmable logic controllers (PLC). Design of complete control circuits, selection of components, and cost estimation. PLC programming for discrete event control and for analog applications.

Prerequisite: ENGR 326

**MFG 333 - Stat Methods Qual/Improv**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Strategies for continuous manufacturing process improvement. Graphical and numerical methods for data analysis. Methods for manufacturing process control and acceptance criteria.

Prerequisite: MATH 361

**MFG 334 - MFG Group Project**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Development of a product by a group of manufacturing students working together. This includes creating or modifying the design of a product, writing operation sheets, specifying materials, tools and equipment needed, design of special tooling, setup and operation of equipment and actual manufacturing of the project.  
Prerequisite: MFG 342

**MFG 341 - Numerical Control Prog**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to manual numerical control programming. Includes interpreting part drawings, process planning, machining setup and sequence. Program debugging and introduction to tool path simulation and computer-aided programming tools.  
Prerequisites: MATH 112, MET 242, and MFG 120

**MFG 342 - Computer Aided Machining**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Development of CNC machine tool manufacturing programs using computer-aided process planning and advanced CAD/CAM software. Emphasis on analysis and planning required for successful CNC production, development of CAD drawings and solid models for CAM program development, toolpath simulation, and manufacturing engineering issues.  
Prerequisites: MET 375 and MFG 341

**MFG 343 - Manufacturing Tool Dsgn**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamentals of jig and fixture design. Locating and clamping methods for manufacturing production. Design of sheetmetal stamping, piecing, and forming tools. Study of the effect of manufacturing machines and production methods on tooling design.  
Prerequisites: MET 315 or MECH 315, MFG 313, MFG 314, and MFG 341, or instructor consent

**MFG 344 - Dsgn of Mfg Tooling**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Using material from prior courses students work in individual and team design projects. Design and analyze a variety of manufacturing fixtures, jigs, molds, and stamping dies.  
Prerequisite: MFG 343

**MFG 351 - Microelec MFG Proc I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A three quarter sequence providing in-depth theory of the processes used in the manufacture of electronic components. Primary topics include integrated circuits, printed circuits, electronic assembly. Vacuum system theory, photo lithography, process specific chemistry, etching and deposition processes, and surface mount technology.  
Prerequisites: CHE 101 and PHY 202

**MFG 352 - Microelec MFG Proc II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A three quarter sequence providing in-depth theory of the processes used in the manufacture of electronic components. Primary topics include integrated circuits, printed circuits, electronic assembly. Vacuum system theory, photo lithography, process specific chemistry, etching and deposition processes, and surface mount technology.  
Prerequisite: MFG 351

**MFG 353 - Microelec MFG Proc III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A three quarter sequence providing in-depth theory of the processes used in the manufacture of electronic components. Primary topics include integrated circuits, printed circuits, electronic assembly. Vacuum system theory, photo lithography, process specific chemistry, etching and deposition processes, and surface mount technology.  
Prerequisite: MFG 352

**MFG 404 - MFG Co-Op Field Practice**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 3

An approved work program related to the student's field of specialization for a continuous three-month period. The employer and the type, level, and difficulty of the particular job must be approved prior to the employment period. A written comprehensive report must be submitted during the following term of residence. Terms and hours to be arranged with approval of curriculum coordinator.

**MFG 405 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 407 - Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 408 - Workshop**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 415 - Finishing Methods**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Review of material finishing technologies with focus on functional requirements of final product, life-cycle environmental considerations, and manufacturing technologies for material finishing.  
Prerequisite: MECH 260

**MFG 420 - Mfg Process III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to less conventional and recently developed manufacturing processes and materials. Emphasis on understanding unique characteristics, advantages, limitations, and applications. Analysis required for selection of appropriate materials and processes. Examples of computer programs that aid the selection process.

Prerequisites: MATH 112, MET 242, MFG 120, and PHY 221, or instructor consent

**MFG 425 - Plastic Manufacturing Processes**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Fundamentals of polymer science and plastic manufacturing methods. Introduction to the affect of chemistry and morphology of plastics on material selection, product design, and process design. Emphasis is on the thermoplastic processes such as injection molding.

Prerequisites: MECH 260 and MET 375, or instructor consent

**MFG 445 - Plant Layout and Handling Syst**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In-depth study of facilities planning for manufacturing engineers. Focus is on layout optimization algorithms and applications, work cell design, warehouse design, materials handling systems, process/product/material/labor cost estimates and evaluations, and agile manufacturing.

Prerequisites: MFG 112 and MFG 313

**MFG 447 - Lean Manufacturing**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction of principles, techniques, and skills of lean manufacturing. Process optimization and quality improvement for manufacturing. Plant layout, design and job scheduling. JIT skills, such as Kaizen, Kanban, value added analysis and one piece flow to reduce inventory and waste.

Prerequisite: MFG 333

**MFG 453 - Automation & Robotics**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study of the appropriate level of manufacturing automation based upon economics and productivity. Discussion of robotics and a study of automated manufacturing including automatic machine design and material handling. Prerequisite: Senior standing in MET or MfgET or instructor consent

**MFG 454 - Thermal Manufacturing Process**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamentals of thermal energy analysis, including introduction to thermodynamics and heat transfer. Emphasis is on solving manufacturing related problems in thermal process control and analysis.

Prerequisite: MATH 252

**MFG 456 - Materials Science**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the relationship of a material's structure to its properties. Materials studied include nonferrous metals, polymers, ceramics, composites, and electronics materials.

Prerequisite: MFG 420

**MFG 465 - Adv Welding Methods**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

High energy density, solid state, and plastics welding processes. Welding metallurgy supports, metal combination choices and solutions to typical welding problems. Codes, procedure qualification, welding design and nondestructive testing.

Prerequisites: MECH 260 and MFG 103

**MFG 503 – Thesis**

Lecture Hours: 9

Lab Hours: 0

Credit Hours: 9

Course may be repeated for credit.

**MFG 507 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MFG 521 - MFG Manag Tm in Global Entrpr**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Concepts and theories needed to understand the management of people, work groups, and organizations in a global environment. Exploration of cultural differences, organizations, communication and business relationships; strategic thinking in a global context, and international e-communications. Emphasis on contemporary case studies regarding the operational problems facing the international firm.

**MFG 522 - Mfg Business Philosophies**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Contemporary world class manufacturing concepts and philosophies including Just-in-Time (JIT) applications for manufacturing and inventory management; methods and practices of total quality control in manufacturing; and continuous improvement techniques in manufacturing. Focus on contemporary cases in global manufacturing.

**MFG 523 - Capitalization Prin for Manfg**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Theory and concepts of capitalization for manufacturing assets; land, buildings, and equipment. Historical cost for valuing an asset. Net income, real and tax depreciation, and timing the disposal or exchange of assets. Exploration of capitalization of cost, post-acquisition asset costs, interest capitalization and expense, asset impairments, and multinational capital budgeting and financial management.



### **MFG 524 - Proj & Budget Planning for MFG**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Exploration of the theories, tools, and techniques needed to effectively plan and manage manufacturing projects and budgets. Development of the characteristics of project plans including scope of work statements, work breakdown structure, project schedules, schedule and budget metrics, and project change cost analysis. Core topics include cost, time, and resource estimation, management and budgeting.

### **MFG 525 - International Economics MFG**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Exploration of international economics. Impact on manufacturing industries. Focus on the foundations of international trade including classical and modern theories of production and industrial organization. Free trade policies; foreign competition; direct foreign investment, fiscal and monetary policy; tariffs, quotas, and subsidies. International monetary market on production, and anti-globalization politics. Concentration on contemporary cases in manufacturing. Prerequisite: ECO 201 and ECO 202 or equivalent (see instructor)

### **MFG 531 - Engineering Mechanics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamentals of statics. Dry, viscous, and rolling friction. Kinematics of particles: rectilinear and curvilinear motion. Kinetics of particles: work and energy, impulse and momentum. Kinematics of rigid bodies: translation and rotation. Kinetics of rigid bodies: work and energy, impulse and momentum. Fundamentals of stress analysis.

### **MFG 533 - Thermal Process & Tech in MFG**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Review of the laws of thermodynamics. Review of heat transfer including conduction, convection, and radiation. Vacuum technology. Autoclave processes.

Cryogenics: materials, techniques, and safety. Plasma processes. The processing of non-metallics. The processing of insulation materials. Energy costs and conservation in manufacturing processes.

### **MFG 534 - Design Tech/Manufacturability**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Cutting costs and improving productivity. Managing the manufacturing supply chain. Reducing time to market. Establishing core competencies and maintaining vital corporate best practices. The role of standards and lean manufacturing in design.

### **MFG 535 - Product Life Software**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Use of high-end enterprise-wide software products for integrating design, automating the workflow, and comprehensively controlling security. Revisions management over all types of data. Creating document links. Leveraging subject matter experts across the extended enterprise.

### **MFG 536 - Auto Tech for Tool Path Gener**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Reviewing and validating manufacturing processes for administrators, managers, and designers. Reviewing the creation of tool paths using standard 3D and 2D mechanical design tools and the generative 2.5-axis and 3, 4, and 5-axis surface machining NC software tools. Controller, machine, and software selection and integration.

### **MFG 537 - Prod Data Mngm and Conf Cont**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Capturing intellectual property at its source from CAD design, manufacturing and maintenance, driving the product information across the extended enterprise, and enabling its use in other branches and partners in the enterprise. Creating the integration of better and more efficient

decisions and processes over the life cycle of the product.

### **MFG 538 - Special Problems In MFG Softwr**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Independent study using advanced functionality in high-end manufacturing and enterprise software. Approval of faculty advisor required.

### **MFG 562 - Adv Materials Science & Tech**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced engineering materials. Recent advances in development and applications of metals, polymers, ceramics, and composites. Emphasis on the relationship between structure and properties. Manufacturing processes explored. Application of established standards for materials properties determination.

### **MFG 563 - Inventory/Supply Train Mgt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction of concepts, principles, techniques, strategies and applications related to demand forecasting, production planning, performance measurements, quality control, inventory control and continuous improvement for manufacturing systems.

### **MFG 564 - Quality Concepts/Philosophies**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Understanding quality, Models and Framework for TQM, Leadership & Commitment, Planning, Strategy & Goal deployment, Partnerships & Resources, Performance measurement, Self-assessment, Audits & Reviews, Benchmarking, Process Management, Continuous Improvement; Culture change through teamwork, Communication, Implementing TQM, and Case studies.

### **MFG 595 - Selected Grad Topics in Manf**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Manufacturing related topics in engineering science and design.

Manufacturing related topics in software and computer integration. Manufacturing related topics in business and management. Course may be repeated for credit.

### **MFG 596 - Selected Topics/Eng Sci & Design**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

Manufacturing related topics in engineering science and design. Course may be repeated for credit.

### **MFG 597 - Selected Topics/Comp Integrat**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

Manufacturing related topics in software and computer integration. Course may be repeated for credit.

### **MFG 598 - Selected Topics/Mat & Process**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

Manufacturing related topics in materials and processing technology. Course may be repeated for credit.

### **MFG 599 - Selected Topics/Finance & Mngt**

Lecture Hours: 6

Lab Hours: 6

Credit Hours: 6

Manufacturing related topics in business and management. Course may be repeated for credit.

## **Marriage and Family Therapy**

### **MFT 502 - Lifespan Development**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores biological, psychosocial, cultural, environmental and family factors affecting human growth and development from

conception through late adulthood. Specific attention is paid to attachment, attachment styles, and early traumatic experiences on the young brain.

### **MFT 510 - Introduction to MFT**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the history and philosophy of family therapy, including foundational theories, professional roles and functions, and integrated behavioral health care systems, including intra-agency and inter-organizational collaboration and professional consultation.

### **MFT 511 - Family Therapy Theory & Practice I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course covers the foundational principles of family systems theory and practice and begins a study of the classic models of family therapy. Students will embrace cultural humility as they explore the influences of their own families of origin; as well as family therapy practice issues with marginalized populations and cultural groups, particularly those of rural Oregon. Prerequisite: MFT 502 , MFT 510 , and MFT 520 , all with a grade of B or higher.

### **MFT 512 - MFT Theory and Practice II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course is a continuation of MFT Theory and Practice I. A comprehensive survey of the models of family therapy continues in the course with an exploration of the role of language, meaning, and process in relationships.

Prerequisite: MFT 511 , MFT 560 , MFT 567 , all with a grade of B or higher.

### **MFT 513 - Advanced Family Therapy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course prepares student for Clinical Practicum. It includes review of integration of family therapy theory and practice from first contact through assessment, diagnosis, consultation, treatment planning, interventions, referrals, evaluation and termination. Stages of therapist development and stages of

development in clinical supervisory relationships are addressed, with emphasis on demonstration of person and professional competencies expected of MFT's and MFT students.

Prerequisite:MFT 523 , MFT 568 , MFT 531 , all with a grade of B or higher.

### **MFT 520 - Counseling: Theory & Skills**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to theories and essential skills in therapy, including characteristics of effective counselors and therapists, essential interviewing and case conceptualization skills, evidenced-based strategies, and processes for aiding students in developing personal models of therapy.

### **MFT 521 - Child & Adolescent Therapy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course presents a variety of psycho-therapeutic modalities, offering the student an opportunity to develop basic child and adolescent therapy skills, assessments, and treatment strategies, including Play Therapy and Sandtray Therapy.

Pre-requisites:MFT 582, with a grade of B or higher

### **MFT 522 - Couples Therapy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course examines the psychotherapeutic theories and processes for the assessment and treatment of a wide range of relational issues.

Prerequisite: MFT 521, MFT 592, MFT 599, all with a grade of B or higher.

### **MFT 523 - Group Therapy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course provides a broad understanding of group development, dynamics, and therapy. Major theoretical approaches and group leadership styles are discussed.

Prerequisite: MFT 530 , MFT 560 , MFT 566 , all with a grade of B or higher.

**MFT 525 - Trauma and Recovery**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of contemporary understanding of trauma and trauma recovery, traumatic stress, resiliency and healing both in individual and systemic contexts, including sociopolitical processes and perspectives.

Prerequisite: MFT 523 , MFT 531 , MFT 568 , all with a grade of B or higher.

**MFT 530 - Adult Psychopathology & Diagnosis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the etiology, assessment, diagnosis, prognosis, and treatment of mental health and behavioral disorders in adulthood, including assessment and diagnosis using the DSM.

Prerequisite: MFT 540 , MFT 569 , all with a grade of B or higher.

**MFT 531 - Child & Adolescent Psychopathology & Diagnosis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course provides an understanding of the broad range of childhood and adolescent problems and disorders and explores the major psychopathologies of childhood and adolescence. Emphasis is on the assessment and diagnosis of disorders using the current edition of the DSM from a relational perspective.

Prerequisite: MFT 530, MFT 564 , MFT 566 , all with a grade of B or higher.

**MFT 540 - Research Methods**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Course provides a survey of key concepts in social science research including sampling, measurement, research ethics, and design. Additional topics include the evidence base for clinical research, the evaluation of interventions, and pseudoscientific concerns in clinical research. Emphasis is placed on the review, evaluation, and application of professional literature to clinical practice in marriage and family therapy.

Prerequisite: MFT 512 , MFT 550 , MFT 562 , all with a grade of B or higher.

**MFT 550 - Professional Studies: Ethics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of legal, ethical, and moral issues, and professional codes of conduct directing the ethical practice of marriage and family therapy in the state of Oregon.

Prerequisite: MFT 511 , MFT 560 , MFT 567 , all with a grade of B or higher.

**MFT 560 - Dev. Cultural Competencies**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Increases students' awareness of multiple cultural values, assumptions, and family dynamics, with particular attention to power and control as experienced by members of majority and minority groups. Multicultural competence as a requirement of ethical practice of MFT is emphasized.

Prerequisite: MFT 502 , MFT 510 , and MFT 520 , all with a grade of B or higher.

**MFT 561 - Sexuality and Therapy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Exploration of contemporary professional understandings of sexuality including the overview of models of sex therapy, treatment strategies utilized in treating sexual dysfunctions, and relational and familial dynamics influencing sexual development and sexual experiences.

Prerequisite: MFT 522, MFT 593, all with a grade of B or higher.

**MFT 562 - Rural Considerations in MH and SUD Treatment and Prevention**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A course designed to understand the unique obstacles to treatment and resources available to individuals and families engaged in the treatment and recovery process in the context of rural communities. Telehealth best practices are highlighted. Special attention is given to treatment and prevention considerations specific to rural Southern Oregon.

Prerequisite: MFT 511, MFT 560, MFT 567, all with a grade of B or higher.

**MFT 564 - Substance Use & Co-Occurring Disorders**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the assessment, diagnosis, and treatment of substance use and co-occurring disorders. Assessment procedures using ASAM criteria is emphasized. Infectious disease risk assessment and reduction procedures are highlighted. Special attention is given to the process of recovery orientated treatment planning, emphasizing the importance of using assessment and diagnosing to create effective treatment goals. Treatment issues are studied with a strong focus on contemporary evidence-based treatment.

Prerequisite: MFT 540 , MFT 569 , all with a grade of B or higher.

**MFT 565 - Telemental Health Practices in MFT**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of contemporary telemental health practices in providing ethical mental health services. Specific attention given to the indications and contra-indications for offering telemental health to clients.

**MFT 566 - MedFT: Illness, Families, and Professionals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of the knowledge and skills required to work in the rapidly developing multidisciplinary field of medical family therapy. Includes emphasis on addressing rural mental health care needs with integrated health care teams that address biomedical and psychosocial needs of the whole person and family system.

Prerequisite: MFT 540 , MFT 569 , all with a grade of B or higher.

**MFT 567 - Introduction to SUDs and Addiction**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the core concepts related to substance use disorders, addiction, and recovery. This foundational course includes topics related to the history and culture of substance use and addiction, pathways to addiction and recovery, sociopolitical influences and legal and ethical considerations in addiction and recovery, the effects of substance use and addiction on couples and families, and rural considerations to addiction and recovery. Professional identity and self of the therapist related topics are emphasized.

Prerequisite: MFT 502, MFT 510, MFT 520, all with a grade of B or higher.

**MFT 568 - MedFT in Action: Community-based Integration & Collaboration**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Continuation of MFT 566, emphasizing advanced study of the knowledge and skills required to work in the rapidly developing multidisciplinary field of medical family therapy.

Includes emphasis on addressing rural mental health care needs with integrated healthcare teams that address biomedical and psycho-social needs of the whole person and family systems.

Prerequisite: MFT 530 , MFT 566 , MFT 564, all with a grade of B or higher.

**MFT 569 - Families, Substance Use and Addiction**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A course about the etiology, conceptualization, and treatment of substance use and co-occurring disorders within the context of family systems. Special consideration is given to the impact of substance abuse and addiction on couple and family systems. Systemic treatment options are discussed with an emphasis on the importance of including family systems and positive supports in the recovery healing process.

Prerequisite: MFT 512, MFT 550, MFT 567 all with a grade of B or higher.

**MFT 581 - Pharmacology of Substance Use Disorders**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the psychopharmacology of alcohol and other drugs. An emphasis is given to the behavioral, psychological, physiological, and social effects of alcohol and other drugs on the brain, the body, and relationships. Symptoms of withdrawal from psychoactive substances are highlighted. Collaboration between mental health practitioners, addictions counselors, and medication providers is addressed.

Prerequisite: MFT 523 , MFT 531 , MFT 568, all with a grade of B or higher.

**MFT 582 - Contemporary Issues in MFT and Addiction**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A research-focused course examining contemporary treatment and prevention at the intersection of Marriage and Family Therapy and substance abuse and addiction treatment. Topics include contemporary evidenced-based relationally focused substance abuse and therapy approaches, sociopolitical influences on family health and addictions treatment, current drug trends in America, gambling and process addictions, and health policy and prevention strategies. Students will develop a final research project based on a contemporary topic of interest.

Prerequisite: MFT 513, MFT 525, MFT 581, all with a grade of B or higher.

**MFT 592 - Self of the Therapist**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

A course designed to address personal and professional development related to the ability to actively and purposefully choose how to use self therapeutically in a therapist-client relationship. Focus is on identifying one's own background, culture, beliefs and values, strengths and woundedness, and addressing how these factors influence therapeutic relationships. An articulation of therapist world views is highlighted.

Prerequisite: MFT 582 with a grade of B or higher.

Corequisite: MFT 599

**MFT 593 - Theories of Change in MFT**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

A course designed to facilitate the development and articulation of an integrated theory of change. Focus is on connecting therapist worldviews and identifies to overarching systemic MFT theories and interventions. The culmination of this course is the development of an integrated theory of change grounded in systemic theory and interventions. Students create a written and oral presentation of their integrated theory.

Prerequisite: MFT 521, MFT 592, all with a grade of B or higher.

Corequisite: MFT 599.

**MFT 594 – Capstone**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

A culmination of student learning and development in an integrated portfolio project. Students will compile key assignments from previous courses and articulate their growth and development in each of the identified student learning outcomes for the program. Students will defend their portfolio project to MFT faculty prior to graduation.

Prerequisite: MFT 522, MFT 593, all with a grade of B or higher.

Corequisite: MFT 599.

**MFT 599 - Supervised Clinical Practicum in MFT**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Supervised experience in MFT. Designed to meet practicum experience standards and supervisory requirements of the Oregon Board of Licensed Professional Counselors and Therapists (OBLPCT) and the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE). Students receive video and case consultation supervision while developing and evolving practical skills in MFT through a weekly seminar course. May be repeated for credit as students continue accruing hours. Student must enroll in this course at least four terms.

Prerequisite: Approval of MFT Clinical Director.

# Management

## **MGT 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **MGT 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **MGT 212 - Fund of Renewable Energy Mgt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores primary energy sources available for power generation. Includes cost comparisons of traditional sources (gas, coal, nuclear, hydro) and renewable sources (solar, geothermal, wind, biofuels, wave and tidal). Evaluates and benchmarks benefits of traditional versus renewable energy sources, long-term vs. short-term feasibility and strategic decision-making in energy generation and utilization.

Prerequisites: ACC 201 and REE 201

## **MGT 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **MGT 321 - Operations Management I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Functions of the operations division within the organizational structure.

Manufacturing and service organizations reviewed. Capacity planning with forecasting and material requirements planning. Introduction to Just-In-Time concepts.

Prerequisite: BUS 215 or BUS 304 or BUS 317

## **MGT 322 - Operations Management II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Supply chain management for service and manufacturing companies. Covers flow of goods and services through relationships with business customers, suppliers and

partners. Students learn how to manage strategic, operational and tactical planning using best known practices and efficient use of information systems. Evaluate and design effective supply chains.

Prerequisite: MGT 321

## **MGT 323 - Operations Management III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Effective budgeting methods for industrial environments. Budget planning, formation and cost controls. Flexible budgets and expense management. Manufacturing/non-manufacturing costs, and cost/contribution analysis.

Prerequisite: ACC 203 with grade "C" or better

## **MGT 335 - Project Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced application of the Critical Path Method to organization and control of project implementation. Applications software will be used to create and evaluate project networks and to develop management reports.

Prerequisite: BUS 215 or BUS 304 or BUS 314 or BUS 317

## **MGT 345 - Engineering Economy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Capital expenditure, economic life and replacement analysis based on net present value, periodic costs, internal and incremental rates of return. Coverage of compound interest, value flows, economic equivalencies, depreciation, taxes and inflation.

Prerequisite: MATH 105 or MATH 111

## **MGT 391 - Co-op Field Practice**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

Credit will be give for an approved work program related to the student's field of specialization for a continuous 10 week period. The employer and the type, level and difficulty of the particular job must be approved by the Management Department prior to employment.

## **MGT 392 - Co-op Field Practice**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

Credit will be give for an approved work program related to the student's field of specialization for a continuous 10 week period. The employer and the type, level and difficulty of the particular job must be approved by the Management Department prior to employment.

## **MGT 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

## **MGT 421 - Quality Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Qualitative and quantitative methods of quality assurance in manufacturing and service industries. Assessing quality systems using the ISO 9000 series of standards. Application of basic statistical techniques including control charts, sampling procedures, and graphical analysis to assess quality performance. Use of computing systems in establishing quality assurance.

Prerequisite: MATH 361

## **MGT 422 - Materials Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Approaches to materials management common to production and service industries. Demand forecasting, inventory management, scheduling, requirements planning and capacity planning using qualitative and quantitative methods. Application of computing systems in materials management processes.

Prerequisite: MGT 321

**MGT 423 - Logistics Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Approach to warehousing practices and distribution of goods and services across the supply chain. Warehouse justification and decisions. Procurement, packaging, handling, transport and ownership arrangements. Relationship management, sustainability and risk assessment.

Prerequisite: MGT 322

**MGT 461 - Lean/Six Sigma Management I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Lean thinking as applied to production and service operations. Kaizen, kailaku, pull production and systems, value stream mapping and analysis. Standardized work charts and combination tables to streamline work content and achieve flow. Identifying sources of muda and its elimination.

Prerequisite: BUS 215 or BUS 304 or BUS 317

**MGT 462 - Lean/Six Sigma Management II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Overview course of Six Sigma management roles, responsibilities and terminology. Students will understand the tools and the phases of the DMAIC model and explore business cases to understand how Six Sigma techniques are applied to business.

Prerequisite: MATH 361

**MGT 463 - Lean/Six Sigma Management III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Deployment and management of Lean Six Sigma within the enterprise. Planning and assessment of deployment sustainability, infrastructure, success factors and metrics that describe the value proposition associated with institutionalizing large strategic initiatives such as Lean Six Sigma.

Prerequisite: MGT 462

**Management Information Systems****MIS 101 - Word Processing Software Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Word processing lab using Microsoft Word software. Includes creating and editing documents, letters, Web pages, forms, labels, newsletters, research papers, an index and table of contents.

**MIS 102 - Spreadsheet Software Lab**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Spreadsheet lab using Microsoft Excel software. Includes creating worksheets, charts, formulas, functions, what-if analysis, sorting, multiple worksheets, workbooks, templates, pivot tables and importing of data.

**MIS 103 - Presentation/Graphics Sftwr Lb**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Presentation graphics lab using Microsoft PowerPoint software. Creation of presentations for use on paper, overhead transparencies, on a projection device, and Internet virtual presentations. Includes use of text, graphics, charts and multimedia applications to create professional-looking presentations.

**MIS 107 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: (Hours to be arranged each term.)

(Hours to be arranged each term.)

**MIS 113 - Intro to Database Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduces concepts of desktop computer-based database systems. Topics include database management issues, database design, creating and maintaining a database, normalization, table structures, and creating user queries, reports, and forms. Basic database security is discussed.

**MIS 115 - Visual BASIC Programming**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Computer concepts and problem solving methods in the Windows environment using Visual BASIC. Topics include algorithms, simple data types, condition and iterative structures, functions and procedures, and the program documentation.

Prerequisite: MATH 100 or instructor consent

**MIS 116 - C++ Programming I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Computer concepts and problem solving methods using C++ programming language. Topics include: algorithms, simple data types, conditional and iterative structures, function definition, structured programming and documentation. Cannot be taken for graduation credit if student has completed CST 116.

Pre- or Corequisite: MATH 111

**MIS 118 - Intro to Programming in C#**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to basic computer programming concepts in the C# programming language. Topics include algorithms, simple data types, conditional and iterative structures, functions and procedures, and code documentation. Prerequisite: MATH 111 or instructor consent

**MIS 126 - C++ Programming II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Solving complex problems using advanced features of the C++ language. Topics include function usage, pointer data type, dynamic memory allocation, string manipulation, and structure and union data types. Emphasis is on structured program design techniques. Cannot be taken for graduation credit if student has completed CST 126.

Prerequisite: MIS 116 with grade "C" or better, or instructor consent

**MIS 130 - Computer Organization**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces number systems, Boolean algebra, computer arithmetic and basic computer structures. Control unit functions. Laboratory exercises on gates, sequential elements and counters, and completion of a project. Cannot be taken for graduation credit if student has completed CST 130.

Corequisite: MATH 100

**MIS 136 - OOP with C++**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A study of object oriented programming with C++. Beginning and intermediate concepts are covered including classes, objects, member functions, overloading, inheritance, polymorphism, templates, and virtual functions. This course prepares students with a strong C background for upper division course work using C++. Cannot be taken for graduation credit if student has completed CST 136.

Prerequisite: MIS 126 with grade "C" or better

**MIS 145 - Intro to PC****Hardware/Software**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to PC hardware and software that prepares students as an entry-level PC technician. The course covers topics including: PC system components, peripheral devices, data storage, networking, printing, mobile devices, operating system installation and management, file management, basic data security, and the troubleshooting process.

**MIS 206 - Intro to Mgmt Info Sys**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to key components in information systems. Identification of major hardware components and primary categories of software applications. Data resource management concepts; elements of how information systems work to support problem solving and business opportunities. Ethics of information systems usage.

**MIS 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MIS 215 - Bus Appl Programming**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Object-oriented and/or procedural languages employed with an emphasis on structured design, user interface design and error processing. Utilizing advanced language elements and program structures to integrated software development with data management.

Prerequisites: MIS 115 and MIS 275 with grade "C" or better, or instructor consent

**MIS 218 - Intermediate Programming in C#**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Intermediate level object-oriented programming in the C# language with an emphasis on structured design, user interface design and error processing. Introduction to advanced language elements and program structures to integrate data stored in database systems into simple business applications.

Prerequisites: MIS 275 and MIS 118 with grade "C" or better

**MIS 225 - Business on the Internet**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The role of the Internet and related technologies in modern business and electronic commerce. Hands on course for creating dynamic Web pages. Emphasizes Internet marketing and web page editor with hypertext markup language (HTML) with some exposure to Java Script.

**MIS 240 - Intro to Linux OS**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces the fundamental concepts of Linux operating systems. Topics include components and functions of an operating system, installing and configuring Linux operating systems, file systems, permissions, process and thread management, commands, utilities, text

editing, shell programming and text processing utilities.

Prerequisite: MIS 145 with grade "C" or better

**MIS 251 - Networking I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to voice and data networking concepts and technologies, including network types, common network standards, network interface cards, wired and wireless network components, IP addressing and subnetting, network protocols, basic network security, and troubleshooting basic network issues.

Prerequisite: MIS 145 with grade "C" or better

**MIS 255 - Health Informatics Cpts & Pract**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The discipline of health informatics is introduced, including history, knowledge of health informatics, data management, vocabularies, standards and tools as applied in the support of health care delivery. The course provides foundation knowledge and understanding of the impact of information technology in the health care industry and vice versa. Particular attention is paid to the design, usage and acceptance of information technology applications. This course introduces students to the concepts and practices of health informatics.

**MIS 273 - Systems Administration I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces the fundamental skills required to install and manage a Windows Server. Topics covered include installing and configuring Active Directory, domain controllers, DNS, users and group definition, print ques, network roles and services and application servers.

Prerequisite: MIS 145 with grade "C" or better

**MIS 275 - Intro to Relational Databases**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The relational model, DBMS functions, administration, design methodology, modeling and normalization. Hands-on design, development and use of an enterprise database system using SQL Server. SQL fundamentals will be introduced, covering select statements, data manipulation, sub-queries, multi-table queries, functions and data types.

**MIS 280 - Web Development****Fundamentals**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces Hypertext Markup Language (HTML5) and Cascading Style Sheets (CSS) as the principle coding formats used in creating web pages. Students will learn code syntax, commenting, writing, testing, and maintenance of HTML and CSS. Also introduces basic dynamic web page development using simple JavaScript. Students will be able to create a multi-page web site using these technologies.  
Prerequisite: MATH 100

**MIS 285 - Python Programming**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to the fundamentals of programming with the Python programming language. Topics covered include basic data types, control structures, regular expressions, input/output, and textual analysis. Focus on creating simple programs and scripts.  
Prerequisite: MATH 100

**MIS 307 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**MIS 311 - Intro to Systems Analysis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to state-of-the-art business information systems. Acquiring, processing and distributing information in a technological environment. The MIS organization, its place in business, key

trends and implications. Introduction to computer hardware. Introduction to System Development Life Cycle.  
Prerequisite: WRI 121

**MIS 312 - Systems Analysis I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Planning and Analysis phases of Systems Development Life Cycle. Focuses on software development life cycles; entity relationships, data flow diagrams. prototyping and other forms of data or system modeling. Designing, selecting and installing new systems for end users. Includes cost/benefit and value added evaluations.  
Prerequisites: CST 324 or MIS 275 and MIS 311

**MIS 315 - Computer Software Techniques**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Lectures are divided between data structures and operating systems. Data structures section involves data representation, B-trees, graphs, and files. Operating systems section involves process, memory, and file management as related to UNIX. Cannot be taken for graduation credit if student has completed CST 313.  
Prerequisite: MIS 126 with grade "C" or better

**MIS 318 - Advanced Programming in C#**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to advanced programming techniques using the C# programming language. Emphasis on the design and development of business applications.  
Prerequisite: MIS 218 with grade "C" or better

**MIS 322 - Systems Analysis II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Design, implementation and maintenance phases of Systems Development Life Cycle. Designing, selecting and installing new systems for end users. Includes cost/benefit and value-added evaluations. Define and perform data modeling, process

modeling, network modeling and their importance.

Prerequisites: MIS 218, MIS 312, and MIS 341, all with grade "C" or better

**MIS 334 - Business Analytics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Understanding of Descriptive, Predictive and Prescriptive Analytics. Regression, Forecasting, Simulation, Sampling and Optimization in relation to business application. Introduction to Data Mining Algorithms are also covered.  
Prerequisites: MATH 361; and CST 324 or MIS 113 or MIS 275, all with grade "C" or better

**MIS 341 - Relational Database Design I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

A comprehensive study of SQL and TSQL using the SQL Server relational database management system. Hands-on training will include the use of TSQL, SQL Server Management Studio, database creation, CLR, data queries, view definitions and use operators and functions, triggers, calculations, indexing, cursors and data manipulation.  
Prerequisites: MIS 118 and MIS 275, both with grade "C" or better

**MIS 343 - Relational Database Design III**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Install, create, and maintain an Oracle database. Oracle database architecture and component interactions. Implement, configure, and monitor an operational database in an effective manner including performance monitoring, database security, user management, and backup/recovery techniques.  
Prerequisite: MIS 342



**MIS 344 - Business Intelligence**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Develop analytic solutions to gain functional understanding of Business Intelligence to solve business problems. Covers the development of Crystal Reports and Dash-boarding tools to develop Reporting and interface solutions for business.

Prerequisite: MIS 341 with grade "C" or better

**MIS 345 - Health Care Info Systems Mgmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Information Systems within healthcare organizations are examined. Business, clinical, and healthcare delivery processes are identified as they relate to data acquisition and information systems. Key issues confronting design, organization and management of healthcare systems are identified, examined, and solutions are explored and developed.

Prerequisites: BUS 313 and BUS 317

**MIS 351 - Enterprise Networking**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Covers intermediate- to advanced-level network design and implementation topics utilizing enterprise network technologies. Students will interface with enterprise services including virtual local area networks (VLANs), link aggregation, route redistribution, multi-layer switching, wide area network (WAN) connection types, multi-protocol label switching (MPLS), software-defined networking (SDN/SD-WAN), optics and transport, and network design with high availability.

Prerequisite: MIS 251 with grade "C" or better

**MIS 357 - Info & Comm Sys in Hlth Care**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Addresses the role of computer-based information and communications systems in patient care and health care administration, including hands-on experience with the acquisition, storage and use of information in the electronic

medical record systems such as PACS, lab and pharmacy systems and computerized provider order entry (CPOE).

Prerequisite: MIS 255

**MIS 365 - Cloud Computing**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduces the technologies and services that enable cloud computing, different types of cloud computing services (SaaS, PaaS, DaaS, and IaaS), deployment models (Public, Private, and Hybrid) and the security and legal issues associated with cloud computing.

Prerequisites: MIS 251 and MIS 273, both with grade "C" or better

**MIS 375 - Decision Support Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Use of personal computer application programs for analysis and reporting, problem solving, and decision assistance.

Prerequisites: Junior standing, MATH 111, and MIS 102

**MIS 385 - NoSQL**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Develop concepts and a fundamental skill set of NoSQL and document-oriented data models. Students will gain a broader DBA techniques used in managing database systems through replication and sharding approaches.

Prerequisite: MIS 341 with grade "C" or better

**MIS 390 - Co-op Field Experience**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 21

An approved work program related to the student's field of specialization for a continuous three-month or six-month period. The employer type, level, and difficulty of the particular job must be approved by the student's advisor prior to the employment period. A written comprehensive report of activities must be submitted during the following term of residence.

Prerequisites: All MIS 100 and 200 level courses

**MIS 405 - Reading and Conference**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MIS 407 - Seminar**

Lecture Hours: 13

Lab Hours: 0

Credit Hours: 13

(Hours to be arranged each term.)

**MIS 408 - Workshop**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MIS 414 - Infor Systems Development**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Review of systems analysis. Tools, techniques, and reference sources used to research, configure and justify the hardware, software, staff, and facilities required for a computer system.

Changeover, file conversion and testing. Post-installation audit, backup, security and privacy.

Prerequisites: MIS 312 and a programming language

**MIS 441 - Big Data**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced application of data best practices. Evaluating the big data ecosystem and when big data systems are best utilized in comparison to relational data models. Develop an understanding of big data concepts, model design and implementation and sustainability through a big data platform. Emphasis will be on utilizing the big data platform to provide information to solve business problems.

**MIS 442 - Adv Database App Programming**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4

Construct graphical end-user interfaces for scalable, high performance Internet applications. Building, testing, debugging and deploying interactive Internet applications that use an enterprise level Database Management System. Develops experience with the Systems Development Life Cycle (SDLC) for web/database integration for application development. Develop understand and application of Software as a Service (SaaS). For graduate credit, students will participate in a field placement project working with companies such as the BLM to create a working application demonstrating mastery of the subject material.

Prerequisites: MIS 218 and MIS 341, both with grade "C" or better

**MIS 445 - Legal/Eth/Soc Iss in HC Tech**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Legal, ethical, and social issues in health care, especially as they impact system design, development, use and management will be examined.

Prerequisite: BUS 313

**MIS 446 - Data Mining**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

Defining the project cycle of data mining through data collection, analysis and assessment. Classification, Clustering, Association, Regression, Forecasting, Sequence Analysis and Deviation Analysis are applied to the project life cycle of data mining applications.

Prerequisites: MIS 334 and MIS 344, both with grade "C" or better

**MIS 451 - Networking III**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4

Focus on technologies and tools used in advanced enterprise networks. Includes project labs using network infrastructure to implement design goals and team projects. Prerequisite: MIS 351 with grade "C" or better

**MIS 490 - Co-op Field Experience**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 21

An approved work program related to the student's field of specialization for a continuous three-month or six-month period. The employer type, level, and difficulty of the particular job must be approved by the student's advisor prior to the employment period. A written comprehensive report of activities must be submitted during the following term of residence. Prerequisite: All MIS 100 and 200 level courses.

Prerequisites: All MIS 100 and 200 level courses

**MIS 495 - Senior Project Selection**

Lecture Hours: 1  
Lab Hours: 0  
Credit Hours: 1

Selection of the senior project capstone project concept that meets industry demands and stakeholders requirement. Prerequisite: MIS 312 and MGT 335 with grade "C" or better or instructor consent

**MIS 496 - Senior Project Management**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

Focuses on project management. Includes best known industry practices, as well as planning, organizing and managing resources to bring about successful completion of specific project goals and objectives. Produces formal proposal for Senior Project.

Prerequisites: MIS 322 and MIS 495, both with grade "C" or better, or instructor consent

**MIS 497 - Senior Project II**

Lecture Hours: 1  
Lab Hours: 6  
Credit Hours: 3

Senior project students will plan, develop, and carry through to completion a management information systems project for a client they select. Formal proposal, progress reports and project demonstration/presentation. The instructor serves as the student's consultant. Prerequisite: MIS 496 with grade "C" or better

**MIS 498 - Senior Project III**

Lecture Hours: 1  
Lab Hours: 6  
Credit Hours: 3

Senior project students plan, develop, and complete a project for a client or an independent research project. Periodic progress reports and presentations required. Instructor functions as a consultant. Deliver final project.

Prerequisite: MIS 497 with grade "C" or better

**MIS 542 - Adv Database App Programming**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4

Construct graphical end-user Interfaces for scalable, high performance Internet applications. Building, testing, debugging and deploying interactive Internet applications that use an enterprise level Database management System. Develops experience with the Systems Development Life Cycle (SDLC) for web/database integration for application development. Develop understand and application of Software as a Service (SaaS). For graduate credit, students will participate in a field placement project working with companies such as the BLM to create a working application demonstrating mastery of the subject material.

Prerequisites: MIS 218 and MIS 341, both with grade "C" or better

## Medical Imaging Technology

**MIT 103 - Intro to Med Imaging**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Orientation to the art and science of medical imaging. History and development of radiologic science, diagnostic medical sonography, vascular technology, nuclear medicine technology, medical ethics, health care industry, related professional organizations and regulatory agencies.

**MIT 107 - Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**MIT 205 - Medical Imaging Tech Practicum**

Lecture Hours: 1  
Lab Hours: 0  
Credit Hours: 1

The MIT Lab Paracticum is a remedial section designed for imaging learners who plan to retake a sophomore year programmatic course or are returning to a program after brief haitus. To be successful in Medical Imaging it is necessary to review essential didactic information and clinical skills in preparation for advancing in that program. Curriculum for this course is customized to each learner's needs and will be outline in their objectives.Prerequisite: Sophomore standing in a Medical Imaging program. Prerequisite: Sophomore standing in a Medical Imaging program

**MIT 207 – Seminar**

Lecture Hours: 12  
Lab Hours: 12  
Credit Hours: 12

(Hours to be arranged each term.)

**MIT 209 - PACS I: Intro to PACS**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

An introduction to Picture Archiving Communications System (PACS). PACS Workflow within the department and interdepartmentally, PARCA and CIIP certification, procurement, and PACS system administration.

**MIT 219 - PACS II: Comm and Admin**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Study of policies and procedures for PACS. Observation of the healthcare organization and PACS role within the organization. Overview of PACS components, image acquisition viewing of images, and image archiving.

**MIT 225 - Patient Care in Sonography**

Lecture Hours: 2  
Lab Hours: 3  
Credit Hours: 3

Basic concepts of patient care, infection control procedures, transport of critically ill patients, and recognition of emergency situations. Sonographers responsibility to the patient, the patient's family, ad the sonography profession.

Prerequisite: MIT 103 with grade "C" or better

**MIT 229 - PACS III: Tech Req & Imag Qual**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Overview of computer basics, technical requirements, and Operating System basics. An introduction to HIPAA and PACS image quality.

**MIT 231 - Sonographic Princ & Instru I**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4

Properties of sound waves, propagation and interaction of ultrasound in tissue, basic ultrasound instrumentation, static, and real-time ultrasound imaging principles and artifacts are covered. Laboratory includes demonstration of wave characteristics and introduction to basic instrumentation of real-time ultrasound imaging.

Prerequisite: PHY 217 with grade "C" or better

**MIT 232 - Sonographic Princ & Instru II**

Lecture Hours: 3  
Lab Hours: 3  
Credit Hours: 4

Advanced physical principles. Hemodynamics, Doppler physics, color imaging, and artifacts associated with them are covered. Digital signal and image processing and bioeffects are also discussed. Laboratory develops instrumentation skills.

Prerequisite: MIT 231 with grade "C" or better

**MIT 239 - PACS IV: Implem & Sys Mgmt**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Overview of implementing PACS. Starting from procurement to the Return of Investment (ROI). This will include the proposal, approval process, integration, a post install. Class will include the study of DICOM and HL7.

**MIT 249 - PACS V: DICOM**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Study of the DICOM standard and how it allows for modalities to commuunicate inside and outside of a facility.

**MIT 259 - PACS VI: PACS Security**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Overview of Information Technology, IHE, security, structured reporting and networking fundamentals.

**MIT 305 - Medical Imaging Tech Practicum**

Lecture Hours: 1  
Lab Hours: 0  
Credit Hours: 1

The MIT Lab Paracticum is a remedial section designed for imaging learners who plan to retake a sophomore year programmatic course or are returning to a program after brief haitus. To be successful in Medical Imaging it is necessary to review essential didactic information and clinical skills in preparation for advancing in that program. Curriculum for this course is customized to each learner's needs and will be outline in their objectives.Prerequisite: Junior standing in a Medical Imaging program Prerequisite: Junior standing in a Medical Imaging program

**MIT 307 – Seminar**

Lecture Hours: 12  
Lab Hours: 12  
Credit Hours: 12

(Hours to be arranged each term.)

**MIT 310 - Cadaver Imaging Problems**

Lecture Hours: 2  
Lab Hours: 0  
Credit Hours: 2

Cadaver imaging is a group centered project that allows imaging student to advance their technical, professional, and leadership skills. The process of imaging a human cadaver presents unique opportunities to identify and solve an infinite variety of complex problems. Prerequisite: Junior standing in MIT programs

**MIT 341 - Magnetic Resonance Imaging**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Physics and principles used in the production used in the production of magnetic resonance images and spectroscopy, including: safety issues, static and gradient magnetic fields, coils, resonance, frequencies, relaxation, and computer applications. Basic pulse sequences are examined in detail.

Prerequisites: BIO 335, and PHY 201 or PHY 217, all with grade "C" or better

**MIT 342 - Mag. Resonance Imaging II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced principles used in the production of magnetic resonance images. MRI safety, coil function and selection, advanced pulse sequences, magnetic resonance angiography (MRA), motion control techniques, pathology, artifacts, functional magnetic resonance imaging (fMRI).

Prerequisite: MIT 341

**MIT 356 - Computed Tomography II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

CT patient care, radiation dose reduction, and adverse effects of contrast media. Sectional anatomy and pathology of the abdomen, pelvis, chest, head, and spine. Laboratory simulation of imaging protocols and scan post processing. Preparation for ARRT CT registry examination.

Prerequisite: NMT 355 or RDSC 355

**MIT 365 - Mag. Resonance Imaging Review**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Review of MR principles of image production for practicing and training MR technologists who intend to sit for the American Registry of Radiologic Technologists MRI examination.

Prerequisite: MIT 341

**MIT 405 - Medical Imaging Tech Practicum**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

The MIT Lab Paracticum is a remedial section designed for imaging learners who plan to retake a sophomore year programmatic course or are returning to a program after brief hiatus. To be successful in Medical Imaging it is necessary to review essential didactic information and clinical skills in preparation for advancing in that program. Curriculum for this course is customized to each learner's needs and will be outline in their objectives. Prerequisite: Senior standing in a Medical Imaging program or working toward an advanced level certification.

Prerequisite: Senior standing in a Medical Imaging program or working toward an advanced level certification

**MIT 407 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: (Hours to be arranged each term.)

(Hours to be arranged each term.)

**MIT 411 - Magnetic Resonance Externship**

Lecture Hours: 0

Lab Hours: 13

Credit Hours: 5

This one-term (3-month) practicum is designed to develop the skills of the student in the special imaging modalities, i.e., computed tomography, magnetic resonance imaging, ultrasound, nuclear medicine and special radiographic procedures. The student is sent to an affiliated hospital that has the required specail imaging equipment to give the hands-on experience to develop competency in each of three areas chosen by the student. The student will spend one month in each selected area.

Prerequisite: MIT 341 with grade "C" or better

**Medical Laboratory Science****MLS 100 - Introduction to MLS**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Orientation to the theory and practice of all aspects of the Medical Laboratory Science profession. The history of Medical Laboratory Science, professional organizations and career opportunities are discussed.

**MLS 107 - Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**MLS 207 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MLS 307 - Seminar**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MLS 407 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 10

(Hours to be arranged each term.)

**MLS 415 - Clinical Chemistry I**

Lecture Hours: 5

Lab Hours: 3

Credit Hours: 6

Fundamentals of chemical analysis of body fluids. Laboratory practice in chemical formats, data evaluation, laboratory utilization, and quality control theory. Laboratory exercises linked to lectures: amino acids, proteins, carbohydrates, lipids, blood gases, enzymes, trace elements, electrochemistry, osmometry, electrophoresis, and spectroscopy.

**MLS 416 - Clinical Chemistry II**

Lecture Hours: 5

Lab Hours: 3

Credit Hours: 6

Fundamentals of chemical analysis of body fluids. Laboratory practice in chemical formats, data evaluation, laboratory utilization, and quality control theory. Laboratory exercises linked to lectures: renal and liver function, porphyrins, hormones, pregnancy, fetal development, bone metabolism, nutrition, and geriatrics.

Prerequisite: MLS 415

**MLS 417 - Clinical Chemistry III**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

The theory, practical application and technical performance of chemical analysis. Emphasis on theory of therapeutic drug monitoring, toxicology, proteomics, individualized screening, and method validation.

Prerequisite: MLS 415

**MLS 420 - Clinic Immun & Infect Serology**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Lecture/laboratory coverage of human immunity, including innate and adaptive immunity, immune system organs, tissues, and activation. Immunological methods used in the clinical lab to assess human immune response in health and in various disease states are studied.

**MLS 422 - Molecular Diagnostics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Coverage of molecular techniques used in the clinical laboratory to diagnose disease associated with bacteria, viruses and genetic deficiencies. Topics covered include principles of molecular biology, nucleic acid isolation, purification, amplification, quantitation, and discrimination. Specimen collection/handling, viral culturing and molecular lab operations are also covered.

**MLS 424 - Hemostasis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Lecture and laboratory coverage of the mechanisms of hemostasis and basic pathophysiology of hemostatic disorders. Student perform laboratory procedures pertaining to hemostasis, interpret results and correlate with other laboratory data to identify disease states.

**MLS 432 - Foundations of MLS I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The first of three courses covering essential professional practice issues.

Subjects covered include: quality control/quality assurance, laboratory safety, laboratory mathematics, ethics, educational methods and phlebotomy.

**MLS 442 - Hematology I**

Lecture Hours: 4

Lab Hours: 6

Credit Hours: 6

Lecture and lab coverage of normal development and function of blood cells. Students learn to evaluate normal and abnormal blood cell morphology through microscopic examination of blood smears. Students perform laboratory procedures pertaining to hematology.

**MLS 443 - Immunohematology I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Lecture and lab coverage of immunohematology with practical application in the contemporary blood bank laboratory. Topics covered include blood groups biochemistry, genetics, and immunology, test methods and transfusion practices including donor selection, component preparation, quality management and compliance issues.

Prerequisite: MLS 420

**MLS 444 - Microbiology I**

Lecture Hours: 4

Lab Hours: 6

Credit Hours: 6

Lecture/lab coverage of human bacterial pathogens seen in the clinical laboratory including gram positive and gram negative bacilli. Principles and methods of clinical microbiology laboratory diagnosis of bacterial diseases are studied.

**MLS 445 - Microbiology II**

Lecture Hours: 2

Lab Hours: 6

Credit Hours: 4

Lecture/lab coverage of diseases caused by, and clinical laboratory identification of, human microbial organisms including anaerobes, spirochetes, mycobacteria, chlamydia, and rickettsia. Interpretation of clinical specimens, identification of pathogens, and the recognition of normal flora is also studied.

Prerequisites: MLS 444

**MLS 449 - Principles of Urinalysis**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Lecture and laboratory coverage of renal function, urine formation, and methods used to analyze urine in the medical laboratory. Students perform physical, chemical, and microscopic analyses on clinical samples and correlate results with states of health and disease in man.

**MLS 452 - Hematology II**

Lecture Hours: 4

Lab Hours: 3

Credit Hours: 5

Comprehensive study of the pathophysiology of hematological disorders. Students perform microscopic examination of blood films, interpret results and correlate with other laboratory data to identify disease states.

Prerequisite: MLS 442

**MLS 453 - Immunohematology II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Continued study of immunohematology emphasizing clinical decision-making and problem-solving related to blood banking and transfusion therapy practices.

Prerequisite: MLS 443

**MLS 462 - Foundations of MLS II**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

The second of three courses covering essential professional practice issues. Subjects covered include: educational methods, clinical laboratory management, and research.

Prerequisite: MLS 432

**MLS 463 - Foundations of MLS III**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Third of three courses covering essential professional practice issues. Emphasis on practical experience through the application of theories and concepts of professional development, laboratory operations and supervision at an approved off campus clinical site.

Prerequisites: MLS 432, MLS 462

**MLS 464 - Medical Mycology and Parasitology**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Lecture and laboratory coverage of medically important fungi and parasites with emphasis on those seen in the clinical laboratory. Principles and methods of clinical laboratory diagnosis of infections and diseases caused by these organisms are studied.

**MLS 470 - Chemistry & Immunology Extern**

Lecture Hours: 0

Lab Hours: 12

Credit Hours: 4

Four weeks full-time practical experience at an approved off-campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary clinical chemistry/immunology laboratory and further develop discipline-specific competency.

Prerequisite: Successful completion of all didactic, pre-clinical coursework in the MLS program

**MLS 471 - Hematology Externship**

Lecture Hours: 0

Lab Hours: 12

Credit Hours: 4

Four weeks full-time practical experience at an approved off campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary clinical hematology laboratory and further develop discipline-specific competency.

Prerequisite: Successful completion of all didactic, pre-clinical coursework in the MLS program

**MLS 472 - Microbiology Externship**

Lecture Hours: 0

Lab Hours: 12

Credit Hours: 4

Four weeks full-time practical experience at an approved off-campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary clinical Microbiology laboratory and further develop discipline-specific competency.

Prerequisite: Successful completion of all didactic, pre-clinical coursework in the MLS program

**MLS 473 - Immunohematology Extern**

Lecture Hours: 0

Lab Hours: 9

Credit Hours: 3

Practical experience at an approved off-campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary blood bank laboratory and further develop discipline-specific bank laboratory and further develop discipline-specific competency.

Prerequisite: Successful completion of all didactic, pre-clinical coursework in the MLS program

**MLS 474 - Medical Parasitology**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Lecture and laboratory coverage of normal and pathogenic parasitic organisms of humans with emphasis on organisms seen in a clinical laboratory. Principles and methods of clinical laboratory diagnosis of infections and diseases caused by these organisms are studied.

Prerequisite: Admission to the MLS program

**Music****MUS 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MUS 195 – Band**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

One hour each term.

**MUS 197 – Chorus**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

One hour each term.

**MUS 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**MUS 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**MUS 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**Nuclear Medicine Technology****NMT 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**NMT 205 - Nuclear Med Admin**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Orientation to the principles of management, marketing nuclear medicine services, and administrative procedures.

Prerequisite: MIT 103 with grade "C" or better

**NMT 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**NMT 212 - Nuc Med Phy/Radiation Biophy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Interactions of radiation with matter. Introduction to the cellular and systemic responses to radiation. Early and late somatic and genetic effects described. Critical organ dose calculations risks versus benefits. Overview of film processors, associated chemistry.

**NMT 215 - Radiochem/Radiopharmacy**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

The design and function of radionuclide generators, labeling procedures, sterility and pyrogenicity considerations, radionuclide and radiochemical quality control procedures. Prerequisite: CHE 350 with grade "C" or better

**NMT 217 - Patient Care**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Basic concepts of patient care, including consideration of physical and psychological needs of the patient and family. Routine and emergency patient care procedures. Infection control procedures utilizing Universal Precautions. Role of the nuclear medicine technologist in patient education. Prerequisite: MIT 103

**NMT 225 - Nuclear Phy/Instrumtn**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An in-depth examination of the physics in nuclear medicine, principles of detection, considerations of counting and imaging, collimators, planar imaging and associated quality assurance and control. Use of all major instrumentation in nuclear medicine departments. Prerequisite: NMT 215 with grade "C" or better

**NMT 256 - Cardiovascular Imaging**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to Cardiovascular Imaging techniques in Nuclear Medicine including

planar, SPECT, and PET imaging acquisition and processing protocols, radiopharmaceuticals, cardiac anatomy and physiology, exercise and pharmacological stress testing, and EKG principles. Prerequisites: NMT 205, NMT 215, and NMT 217

**NMT 307 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**NMT 311 - Imaging Procedures I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Proper patient care before, during, and after the procedure, identification and administration of prescribed radio pharmaceuticals. The use of imaging devices and external detectors for body organ imaging. Prerequisite: NMT 225 with grade "C" or better

**NMT 312 - Imaging Procedures II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Proper patient care before, during and after the procedure, identification and administration of prescribed radio pharmaceuticals. The use of imaging devices and external detectors for body organ imaging. Prerequisite: NMT 225 with grade "C" or better

**NMT 313 - Therapeutic Procedures**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Common Therapeutic applications of radionuclides, dose ranges for each application, and proper techniques for calculating quantities of administered radiopharmaceuticals. Includes patient care, follow-up procedures and disposal of excreta. Prerequisite: NMT 312 with grade "C" or better

**NMT 315 - Breast Imaging**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

An in-depth analysis of breast anatomy

and physiology, positioning, and interventional methods. Patient education and breast cancer statics will also be discussed at great lengths. Prerequisite: Junior standing in Nuclear Medicine

**NMT 325 - SPECT Imaging/Comp Appl**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Single photon emission computed tomography (SPECT) imaging and computer applications as applied to nuclear medicine imaging. Demonstration of computer techniques and ECG monitoring and interpretation. Theoretic basis of computer operations and medical applications in nuclear medicine. Lab experience with computerized systems, including hospital sites. Prerequisites: BIO 335 and NMT 312, both with grade "C" or better

**NMT 355 - Computed Tomography**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

X-ray physics, scanner components, and data acquisition of computed tomography. Image reconstruction, manipulation, and artifacts. CT patient care and imaging procedures of the head, neck, spine, chest, abdomen, pelvis and musculoskeletal system. Laboratory simulator practice on image manipulation, scan post processing and reconstruction. Prerequisite: NMT 311 with grade "C" or better  
Corequisites: BIO 335 and NMT 367

**NMT 367 - PET Imaging**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to Position Emission Tomography (PET) imaging techniques including acquisition protocols, processing protocols, quality control procedures, radiation protection, patient screening, radiopharmaceuticals, image fusion, and imaging procedures. Prerequisite: NMT 225 with grade "C" or better  
Corequisites: NMT 311 and NMT 346

### **NMT 388 - Externship Preparation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Review and summarize key concepts in Nuclear Medicine. Focus is on patient care and interpersonal scenarios the externship student will likely face while in the hospital environment. Review and discussion of the NMT Externship Handbook and Procedures Log.

Prerequisite: Third quarter Junior standing

### **NMT 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

### **NMT 410 - Nuclear Med Tech Extern**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

All students must complete four consecutive terms (12 months) of clinical experience in nuclear medicine technology at an OIT approved site. Students will work under the direct supervision of a registered Nuclear Medicine Technologist. Prerequisite: All NMT courses with grade "C" or better

### **NMT 445 - Computed Tomography Clinical**

Lecture Hours: 0

Lab Hours: 15

Credit Hours: 5

All students must complete (3) consecutive terms (9 months) of clinical experience in computed tomography at a hospital or clinic of their choosing. Students will work under the direct supervision of an ARRT (CT) board registered technologist. Prerequisites: ARRT and/or NMTCB registry in Nuclear Medicine Technology. Successful completion and faculty approval of Computed Tomography and Cross Sectional anatomy course.

## **Physical Education**

### **PHED 100 - Belly Dance: Beginning**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Experience an unique dance form.

Students will learn basic hip, rib, and shoulder isolations and of course shimmys.

All of this and more are done in

combinations, and finally a choreographed dance.

### **PHED 101 - Belly Dance: Intermediate**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A continuation of the beginning class.

More complex moves are introduced and more technical expertise is expected.

Dancing with veils will be introduced.

There will be more complex choreography and music. Dance experience is helpful.

### **PHED 102 – Zumba**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Zumba is an exhilarating, effective, easy to follow, Latin inspired, calorie burning dance fitness party. Zumba classes feature exotic rhythms set to high energy Latin and international beats.

### **PHED 107 – Seminar**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

(Hours to be arranged each term.)

### **PHED 110 - Boot Camp/Kick Boxing**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

This is a high-low workout with an emphasis on kickboxing (both Taebo and Turbo kickboxing), also included is body pump workouts, core ball as well as Winsor Pilates stretching.

### **PHED 111 - Core Strength and Balance**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

BOSU ball training to improve balance and core strength and alleviate back pain and instability. This class includes full body training, using floor work, cardio circuits, and isometric exercises.

### **PHED 112 - Intro to Cardio and Core**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A survey participation of cardiovascular group exercise using cardio kickboxing (including both Taebo and Turbo kickboxing), dance aerobics, and step aerobics.

### **PHED 113 - Super Circuit/Cardio Training**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

This course is designed to use a combination of free weights and/or the universal machines, along with cardiovascular fitness to provide a comprehensive program to increase muscle strength and endurance.

### **PHED 120 - Pilates and Body Pump**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Focus is the floor techniques developed by Joseph Pilates as well as ball Pilates/core strength training. Use of a core ball and body pump bar for anaerobic workout and tone.

### **PHED 121 - Total Fitness Conditioning I**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Opportunity to do an independent study of a selected aspect of physical education. Class designed to develop and encourage healthy attitudes and habits with regard to cardiovascular efficiency, body composition, muscular strength and endurance, and flexibility.

### **PHED 122 - Total Fitness Conditioning II**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Opportunity to do an independent study of a selected aspect of physical education. Class designed to develop and encourage healthy attitudes and habits with regard to body composition, muscular strength and endurance. Geared toward weight training workouts.

### **PHED 123 - Dancercise/Step Aerobics**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A combination of step aerobics and dance moves to provide a fat burning/cardiovascular workout.



**PHED 124 - Weight Loss**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Introduction to weight loss and the wellness model. Develop a fitness program for basic nutrition and weight control. Lecture portion spent in the field and in the weight room/cardio room learning techniques and skills related to weight control.

**PHED 125 - Weight Management Fitness**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Continuation of the Weight Loss class. Made to reinforce commitment to fitness for participants. Includes 40-45 minutes cardio, 15 minutes of intense cardiovascular training and 20-30 minutes low cardiovascular training. No lecture on weight loss with this class.

**PHED 126 - Body Pump & Core Ball Pilates**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A strength and endurance training workout involving intermittent cycles of cardio and weight training. Workouts intended to increase a person's metabolic rate as well as anaerobic fitness level.

**PHED 130 – Rowing**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Learn the fundamentals of rowing in a multi-person racing shell with racing oars and sliding seats. Also covered will be rowing and race terminology, marine safety, and improving fitness. Good swimming skills required.

**PHED 131 - Scuba: Beginning**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Entry-level course. 1 hour lecture and 2 pool sessions per week. Post-course students are eligible for NAUI certification dives. Consists of 5 dives over two day period off-campus. No additional charge. Prerequisite: Must pass swim test

**PHED 132 - Scuba: Advanced**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Learn diving in challenging environments. Six dives include night, navigation, and deep dives and three others (your choice). Dives on weekends off-campus. Dive gear furnished. Included is certificate to dive Oxygen enriched mixtures (Nitrox). Prerequisite: PHED 131

**PHED 141 - Tai Chi for Circulation**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Learn ancient Chinese techniques to reduce stress, improve balance, and facilitate health. Practice includes various forms utilizing acupressure points and energy meridians that additionally will help facilitate health of heart and lungs, normalize blood pressure, and control blood sugar.

**PHED 142 - Tai Chi for Internal Organs**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Learn ancient Chinese techniques to reduce stress, improve balance, and facilitate health. In a relaxed atmosphere, practice of various forms will additionally utilize acupressure points and energy meridians to facilitate health of internal organs.

**PHED 143 - Tai Chi & Qigong: Hlth, Bns, Mu**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Learn ancient Chinese techniques to reduce stress, improve balance, and facilitate health. In a relaxed atmosphere, practice of various forms that additionally will help maintain bone density, ward of arthritis, maximize joint flexibility, and strengthen muscles supporting joints.

**PHED 144 - Tai Chi & Qigong: Neck/Back St**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Learn ancient Chinese techniques to reduce stress, improve balance, and facilitate health. In a relaxed atmosphere, practice of various forms that additionally

will strengthen neck and back, and help to prevent injury or heal from previous injuries.

**PHED 145 - Relaxation and Flexibility**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Explore Tai Chi and Qigong methods for stress reduction and facilitation of balance and flexibility. Other stress reduction methods include autogenic training, progressive muscle relaxation, and self-hypnosis. Explore the impact of cardiorespiratory exercise and diet on stress management.

**PHED 146 – Yoga**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Class is generally Hatha Yoga, along with basic Ashitanga, and Kundalini Yoga techniques. In yoga a participant can hope to improve their flexibility, strength and balance.

**PHED 150 – Aikido**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

A Japanese martial art reflecting the circular movements and energy transference found throughout the universe. Provides the necessary skills to train for practical and tough self-defense while building self-confidence, character, self-respect, and respect for others.

**PHED 151 – Karate**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Dive into the very heart and soul of Karate! Teachings in traditional forms, self-defense, and competitive style point sparring. Great for new and experienced students. Promotes physical activity, increased mobility, and awareness while learning a valuable life skill.

**PHED 160 - Cross Country Skiing: Begin**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Explore clothing, equipment and learn to travel on cross country skis while avoiding winter hazards. Learn basic map and compass skills to avoid getting lost. Two field trips provide experience to use for a lifetime.

**PHED 161 - Snowshoeing: Beginning**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Explore clothing, equipment and learn to snowshoe while avoiding winter hazards. Learn basic map and compass skills to avoid getting lost. Two field trips provide an enjoyable and learning recreational experience to use for a lifetime.

**PHED 162 - Ice Skating**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Covers basic figure skating technique using U.S. Figure Skating adult teaching guidelines, levels 1 through 4. Skills include proper use of forward and backward edges, basic curves and turns, simple spins and integrated use of upper body and arm movements.

**PHED 163 - Wilderness Navigation**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Learn to read a map and utilize a compass. Gain skill to find precise wilderness locations. Learn the dangers of wilderness travel, and deal with those situations. Two field trips polish skills using map and compass to navigate.

**PHED 170 – Golf**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Lecture covers terminology, rules and etiquette. Practical covers driving, chipping and putting. Also includes 1 nine hole round per week (10 total). Collared shirt required.

**PHED 171 - Archery: Beginning**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Students learn basics of shooting a bow & arrow. Safety, form, mechanics, and practical basic skills. Classes meet off-campus. No prior experience required.

**PHED 172 - Archery: Intermediate**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Build upon basic skills learned in Beginning Archery. Advanced instruction in shooting, mechanics, and basic repairs offered. Classes meet off-campus.

Prerequisite: PHED 171

**PHED 174 - Recreational Basketball**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Basketball game played in a recreational environment. Emphasis on free play and team skill development. Most suitable for players with basic basketball skills.

**PHED 175 – Rugby**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Basic rugby skill, practice, and game play. Players of any skill level welcome. Participants should be able to engage in physical contact, strength development, endurance training, team practice, and game play.

**PHED 180 - Varsity Cross Country**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Cross Country for multi-level distance runners. Trail running, conditioning, strength training, psychological peak performance, nutrition, race tactics, running physiology and injury prevention is included. Participation in intercollegiate competition is included. Varsity athletes only or coaches approval.

**PHED 181 - Varsity Soccer**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Soccer at the intercollegiate level, including coaching strategies, offensive and defensive strategies,

training, conditioning and team organization. Varsity athletes only or coach's approval.

**PHED 182 - Varsity Track/Field**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Track and Field techniques are covered including training, conditioning and team organization. Competition at the intercollegiate level. Varsity athletes only or coach's approval.

**PHED 183 - Varsity Men's Baseball**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Baseball on the intercollegiate level, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization. Varsity athletes only or coach's approval.

**PHED 184 - Varsity Men's Basketball**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Basketball, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization, including intercollegiate competition. Varsity athletes only or coach's approval.

**PHED 185 - Varsity Women's Basketball**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Basketball, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization, including intercollegiate competition. Varsity athletes only or coach's approval.

**PHED 186 - Varsity Women's Softball**

Lecture Hours: 0

Lab Hours: 3

Credit Hours: 1

Competitive Softball including coaching strategies, offensive and defensive strategies, training, conditioning and team organization, including intercollegiate competition. Varsity athletes only or coach's approval.

**PHED 187 - Varsity Women's Volleyball**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1

Competitive Volleyball at the intercollegiate level including advanced technique analysis, offensive and defensive strategies, training, conditioning, and team organization. Varsity athletes only or coach's approval.

**PHED 188 - Varsity Sport/Strength Cond**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1

This course provides instruction for sports specific conditioning for varsity athletes. This includes strength training, power training, speed and agility training, core training, dynamic flexibility, and specific energy system training. Varsity athletes only or instructor consent.

**PHED 189 - Varsity Golf**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1

Competitive golf techniques are covered including training, conditioning, team organization advanced technique analysis. Competition at the intercollegiate level. Varsity athletes only or coach's approval.

**PHED 190 - Physical Education**

Lecture Hours: 0  
Lab Hours: 3  
Credit Hours: 1

Service course. General participation in physical activities to promote sound health.

**PHED 201 - Sports Seminar: Officiating**

Lecture Hours: 1  
Lab Hours: 3  
Credit Hours: 2

This course includes rules, mechanics and officiating procedures in sports found in intercollegiate, interscholastic, and intramural programs. Practical experience in officiating will be provided.

**PHED 207 - Major Sports Seminar**

Lecture Hours: 1  
Lab Hours: 2  
Credit Hours: 2

Development of professional competencies in fundamentals of training methods and

objectives of major sports. Development of professional competencies in fundamentals of training methods and objectives of major sports.

**PHED 255 - Intro to Coaching Theory**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

An introduction to the central principles of coaching. Exploration of coaching as a practice including theories of coaching, motivation, and organization.

**PHED 291 - Lifeguard Training**

Lecture Hours: 1  
Lab Hours: 2  
Credit Hours: 2

Basic skills of lifesaving in aquatic programs; American Red Cross Advanced Lifesaving Authorization.

**PHED 292 - Water Safety Instructor**

Lecture Hours: 1  
Lab Hours: 2  
Credit Hours: 2

Analysis, methods of instruction, and teaching of aquatic skills; American Red Cross Authorization in Water Safety Instruction.

**PHED 307 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15

(Hours to be arranged each term.)

**PHED 355 - Coaching in Application**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Application of the principles of coaching. Application of the theories of coaching across contexts and in various different sports.

Prerequisite: PHED 255

**PHED 407 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15

(Hours to be arranged each term.)

**PHED 455 - Coaching Practicum**

Lecture Hours: 0  
Lab Hours: 6  
Credit Hours: 3

Practical application of coaching theories and methods in context. 60 hours of

directed coaching experience.  
Prerequisite: PHED 355

## Philosophy

**PHIL 105 - Introduction to Ethics**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Students will become familiar with Kant's moral theory and Utilitarianism and use them to examine the morality of abortion, factory farming, and famine relief, among others. Students will learn how to make rational moral judgments.

Prerequisite: WRI 122 or WRI 227

**PHIL 107 – Seminar**

Lecture Hours: 0  
Lab Hours: 0  
Credit Hours: 15

(Hours to be arranged each term.)

**PHIL 205 - Introduction to Logic**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

This course prepares students to critique and assess arguments according to the rules of logic. Students will learn formal and informal methods for assessing deductive, inductive, abductive arguments. Logic is useful for all majors because everything you learn at OIT is based on arguments.

**PHIL 207 – Seminar**

Lecture Hours: 6  
Lab Hours: 0  
Credit Hours: 6

(Hours to be arranged each term.)

**PHIL 215 - Ethical Theory**

Lecture Hours: 3  
Lab Hours: 0  
Credit Hours: 3

Students will become familiar with some plausible moral theories: Kant's moral theory, Aristotle's moral theory, Utilitarianism, The Social Contract, Feminist Ethics and with some more controversial moral theories: Cultural Relativism, Divine Command Theory, Natural Law Theory, Emotivism.

Prerequisite: WRI 122 or WRI 227

**PHIL 305 - Medical Ethics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students will become familiar with Kant's moral theory and Utilitarianism and use them to examine the morality of abortion, paternalism, allocation of medical resources, and the right to die, among others. Students will learn how to make rational moral judgments.

Prerequisites: WRI 122 and Junior standing

**PHIL 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**PHIL 315 - The Ethics of Emerging Tech**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In this course we will become familiar with genetic engineering, geoengineering and cognitive enhancement and examine the moral status of each. This course will provide you with the critical thinking skills to make rational ethical decisions concerning emerging technologies.

Prerequisite: WRI 122 or WRI 227

**PHIL 325 - Environmental Ethics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students will become familiar with influential moral theories, including those of Kant and Aristotle and Utilitarianism. Possible topics include: What is nature? Do we have a moral obligation to restore ecosystems? If we have moral obligations to nature, on what grounds?

Prerequisite: WRI 122 or WRI 227

**PHIL 331 - Ethics in the Professions**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applied ethics course that focuses on examining ethical issues common to the professions, such as privacy, confidentiality, social responsibility, and whistleblowing. Emphasizes critical thinking and ethical decision-making skills.

Prerequisite: WRI 123 or WRI 227

**PHIL 335 - Philosophy of Science**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

What is the difference between science and pseudoscience? What is a scientific explanation? What is a law of nature? Is science objective or value-laden? In this course, students will engage with these and other fundamental topics in philosophy of science.

Prerequisite: WRI 122 or WRI 227

**PHIL 342 - Business Ethics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Business ethics course that focuses on ethical issues commonly found in business, such as whistle-blowing, discrimination, finance, and international manufacturing. Emphasizes critical thinking, critical reading, and the importance of personal ethics.

Prerequisites: One previous Humanities course and WRI 122

**PHIL 405 - Advanced Logic**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course will build off the foundation of PHIL 205. Students will deepen their understanding of sentential logic and will learn about predicate logic. We will also prove that both formal systems are sound and complete.

Prerequisite: PHIL 205

**PHIL 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**Physics****PHY 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**PHY 201 - General Physics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An introduction to physics with study of Newtonian mechanics, including

kinematics, dynamics, work, energy, power and hydraulics. All general physics students must register for a laboratory section.

Prerequisite: MATH 112 with grade "C" or better

**PHY 202 - General Physics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Temperature systems, heat, kinetic theory of gasses, introductory thermodynamics, and the fundamentals of electricity and magnetism. All general physics students must register for a laboratory section.

Prerequisite: PHY 201

**PHY 203 - General Physics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Wave motion, sound, introduction to geometrical and physical optics, and topics from modern physics. All general physics students must register for a laboratory section.

Prerequisite: PHY 202

**PHY 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**PHY 215 - Topics in Astronomy**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Astronomy including a survey of the solar system, constellations, star characteristics, star groupings, galactic and extragalactic objects, stellar evolution, and instrumentation with emphasis on topics of maximum interest to the students.

Prerequisite: MATH 111

**PHY 217 - Physics of Med Imaging**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to physics for MIT majors. Topics include: basic mechanics, basic electrostatics, fundamentals of electronics, magnetism, sources and types of radiation, and image formation.

Prerequisite: MATH 112 with grade "C" or better

**PHY 221 - General Physics w/Calculus**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Basic principles of physics with emphasis on applications of calculus. Newtonian mechanics, including kinematics, dynamics, work, energy, power, and hydraulics. All general physics students must register for a laboratory section.

Prerequisite: MATH 251 with grade "C" or better

Corequisite: MATH 252

**PHY 222 - General Physics w/Calculus**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Temperature systems, heat, kinetic theory of gasses, thermodynamics and the fundamentals of electricity and magnetism. All general physics students must register for a laboratory section.

Prerequisites: MATH 252 and PHY 221

**PHY 223 - General Physics w/Calculus**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Wave motion, sound, introduction to geometrical and physical optics, and selected topics from modern physics. All general physics students must register for a laboratory section.

Prerequisite: PHY 221, MATH 254, and instructor consent, or PHY 222

**PHY 305 - Nanoscience & Nanotech**

Lecture Hours: 5

Lab Hours: 0

Credit Hours: 4

Survey of chemical and physical phenomena as applied to nanoscale materials, including metal and semiconductor nanoparticles and carbon nanostructures. Discussion of major synthesis and characterization techniques. Biological and engineering applications of nanoscale materials.

Prerequisites: PHY 222 or PHY 223, and CHE 202 or CHE 222

**PHY 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**PHY 311 - Intro to Modern Physics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to physics of the 20th century, including selected topics from atomic and nuclear physics and quantum theory with applications in science and industry.

Prerequisite: PHY 203 or PHY 223

**PHY 312 - Intro to Modern Physics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to physics of the 20th century, including selected topics from atomic and nuclear physics and quantum theory with applications in science and industry.

Prerequisite: PHY 203 or PHY 223

**PHY 313 - Intro to Modern Physics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to physics of the 20th century, including selected topics from atomic and nuclear physics and quantum theory with applications in science and industry.

Prerequisite: PHY 203 or PHY 223

**PHY 330 - Electricity & Magnetism**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A study of electromagnetic phenomena leading to and using Maxwell's equations. Topics will include static fields in vacuum and in dielectric media, electric and magnetic potentials, and the energy density of electromagnetic fields.

Prerequisites: MATH 254 and PHY 222

Corequisite: MATH 253

**PHY 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**PHY 410 - Math Meth: Fourier Optics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Linear systems, Fourier transforms, and their use in optics. Topics will include special functions, orthogonal expansions,

Fourier series and transforms and spectra of functions, mathematical operators, convolution, autocorrelation, cross correlation, linear systems as filters, and signal processing.

Prerequisite: MATH 254

**PHY 448 - Geometric Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Reflection and refraction at plane and curved surfaces; imaging properties of lenses; first-order Gaussian optics and thin-lens system layout; matrix optics; ray-tracing software; spherical and chromatic aberrations.

Prerequisite: PHY 223

**PHY 449 - Radiometry & Optical Detect**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamentals of radiometry and photometry; detection of light using thermal and photon (photoemissive, photoconductive, and photovoltaic) methods; noise processes; blackbodies; charge transfer devices; spectroradiometry.

Prerequisites: EE 223 and PHY 223

**PHY 450 - Physical Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Spherical and planar waves; scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; interference and interferometers; optical transfer functions; coherent optical systems and holography.

Prerequisite: PHY 223

**PHY 451 – Lasers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Laser radiation properties, laser cavities, coherence, atomic spectra, pumping rate, power gain, threshold conditions, beam shape, mode structure; ion, molecular, solid-state, dye, semiconductor, and fiber lasers.

Prerequisite: EE 450 or PHY 450

### **PHY 452 - Waveguides and Fiber Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Light propagation in fibers and waveguides; termination, coupling, and splicing of fibers; fiber optic communication; optical time domain reflectometry, fiber amplifiers, and fiber sensors.

Prerequisite: EE 450 or PHY 450

### **PHY 453 - Optical Metrology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Modern optical metrology with emphasis on non-destructive testing; Fourier optics; Moire and polarization methods; classic and holographic interferometry; speckle techniques; fringe analysis.

Prerequisite: EE 450 or PHY 450

### **PHY 548 - Geometric Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Reflection and refraction at plane and curved surfaces; imaging properties of lenses; first-order Gaussian optics and thin-lens system layout; matrix optics; ray-tracing software; spherical and chromatic aberrations.

Prerequisite: PHY 223

### **PHY 549 - Radiometry & Optical Detection**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamentals of radiometry and photometry; detection of light using thermal and photon (photoemissive, photoconductive, and photovoltaic) methods; noise processes; blackbodies; charge transfer devices; spectroradiometry.

Prerequisite: PHY 223

### **PHY 550 - Physical Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Spherical and planar waves; scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; interference and interferometers; optical transfer functions; coherent optical systems and holography.

Prerequisite: PHY 223

### **PHY 551 - Lasers**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Laser radiation properties, laser cavities, coherence, atomic spectra, pumping rate, power gain, threshold conditions, beam shape, mode structure; ion, molecular, solid-state, dye, semiconductor, and fiber lasers.

Prerequisites: EE 450/PHY 450 or EE 550/PHY 550

### **PHY 552 - Waveguides & Fiber Optics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Light propagation in fibers and waveguides; termination, coupling, and splicing of fibers; fiber optic communication; optical time domain reflectometry, fiber amplifiers, and fiber sensors.

Prerequisites: EE 450/PHY 450 or EE 550/PHY 550

### **PHY 553 - Optical Metrology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Modern optical metrology with emphasis on non-destructive testing; Fourier optics; Moire and polarization methods; classic and holographic interferometry; speckle techniques; fringe analysis.

Prerequisites: EE 450/PHY 450 or EE 550/PHY 550

## **Political Science**

### **PSCI 107 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **PSCI 201 - United States Government**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic concepts and principles of the America political system.

### **PSCI 207 - Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **PSCI 250 - Intro to World Politics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to international relations and global issues. The rise and demise of the Cold War, international efforts towards arms control, and global environmental and economic problems.

Prerequisite: WRI 122

### **PSCI 307 - Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

### **PSCI 407 - Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **PSCI 497 - US Foreign Policy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The American foreign policy process, recurring themes in U.S. foreign policy, and the content of U.S. policy in such areas as Europe, Latin America, and the Middle East.

Prerequisite: PSCI 250

## **Polysomnographic Technology**

### **PSG 107 - Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **PSG 207 - Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**PSG 211 - Fund of PSG & Patient Care**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic concepts of patient care, including consideration of physical and psychological needs of the patient and family. Routine and emergency patient care procedures. Infection control procedures utilizing universal precautions. Role of the polysomnographic technologist in patient education. Ethical and legal issues.

**PSG 221 - Physiology of Sleep**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to sleep architecture and the function of changes in electroencephalograms, electrocardiograms, and electromyograms. Physiology of sleep-induced alterations in pharyngeal muscle tone, autonomic control and polysomnographic staging.

**PSG 231 - Sleep Disorders Pathology**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Normal and abnormal sleep disorders integrating the physiological functions of the nervous, respiratory, and cardiovascular systems. Emphasis on basic sleep sciences, physiology, diagnosis and treatment of sleep disorders.

Prerequisite: PSG 221

**PSG 246 - Sleep Disorders in Women**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In-depth study of sleep disorders in women exploring: the menstrual cycle; rhythms and shiftworking women; polycystic ovary syndrome; endometriosis, fibromyalgia; breast cancer and fatigue; pregnancy and sleep-disordered breathing; insomnia and other medically related sleep disturbances.

**PSG 264 - Pediatric/Neonatal Psg**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Presentation of theory and its practical applications in pediatric and neonatal respiratory diseases and other sleep disorders. Includes pathophysiology, etiology, patient testing, scoring and

treatment.

Prerequisite: PSG 221 or RPSGT licensed

**PSG 271A - Clinical Polysom Tech A**

Lecture Hours: 2

Lab Hours: 12

Credit Hours: 6

Medical terminology, instrumentation setup and calibration, 10/20 system, patient hook-ups, recording and monitoring techniques, documentation, event recognition, monitoring, therapeutic intervention, professional issues, and patient-technologist interactions related to polysomnographic technology. Part-time students only, requires 18 night-time clinical hours weekly.

Pre- or Corequisite: PSG 211

**PSG 271B - Clinical Polysom Tech B**

Lecture Hours: 2

Lab Hours: 12

Credit Hours: 6

Medical terminology, instrumentation setup and calibration, 10/20 system, patient hook-ups, recording and monitoring techniques, documentation, event recognition, monitoring, therapeutic intervention. professional issues, and patient-technologist interactions related to polysomnographic technology. Part-time students only, requires 18 night-time clinical hours weekly.

Prerequisite: PSG 271A

**PSG 271C - Clinical Polysom Tech C**

Lecture Hours: 2

Lab Hours: 12

Credit Hours: 6

Advanced aspects of polysomnographic technology including recognition of sleep disorders, recording and monitoring, therapeutic interventions, scoring, MSLT, RTWS, and neurophysiology interpretation of sleep. Part-time students only, requires 18 daytime clinical hours weekly.

Prerequisite: PSG 271B

**PSG 272 - Clinical Polysomnography Tech I**

Lecture Hours: 2

Lab Hours: 27

Credit Hours: 9

Medical Terminology, instrumentation setup and calibration, 10/20 system, patient hook-ups, recording and monitoring techniques, documentation, event recognition, monitoring, therapeutic intervention, professional issues, and

patient technologist interactions related to polysomnographic technology. Requires 27 clinical hours weekly at night in the lab. Pre- or Corequisite: PSG 211

**PSG 273 - Clinical Polysomnography Tech II**

Lecture Hours: 2

Lab Hours: 27

Credit Hours: 9

Advanced aspects of polysomnographic technology including recognition of sleep disorders, recording and monitoring, therapeutic interventions, scoring, Multiple Sleep Latency Test, Repeated Test of Sustained Wakefulness, and neurophysiology interpretation of sleep. Requires 27 clinical hours weekly during the day and night.

Prerequisite: PSG 272

**PSG 291 - Clinical Sleep Educator**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of the sleep technologist's increasing involvement in the identification, treatment and long-term monitoring of patients presenting with insomnia, sleep apnea, and poor sleep hygiene. Review of the Clinical Sleep Educator certificate offered by the BRPT.

Prerequisite: PSG 221

## Population Health Management

**PHM 105 - Intro to Population Health Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course introduces students to the field of population health management, including the various careers, initiatives, and skills related to population health practice.

### **PHM 215 - Public Health Policy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course explores public health issues throughout the lifespan and corresponding health policy initiatives designed to reduce prevalence of the preventable diseases. Particular attention will be paid to the collective impact framework for health policy.

### **PHM 321 - Community Program Planning**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course prepares student to identify, develop, and coordinate interventions in a community health setting to target chronic disease risk reduction. Students will gain an understanding of chronic disease epidemiology and best practices in public health programming and gain skills in program planning methods.

Prerequisites: SOC 225 and WRI 227

### **PHM 345 - Community Health Grant Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course prepares students to develop grant proposals to secure funding for health promotion initiatives in a community health setting. Students develop skills to assess the health of target populations, identify pressing health needs, select appropriate evidence-based programs that address these needs, and prepare information in a grant proposal format.

By the end of this course students will be able to:

- Identify contemporary public health issues and explain the diverse approaches used to address them in a community health setting
- Develop community health assessment skills and identify data collection strategies
- Develop program planning and evaluation skills for specific community health needs
- Identify funding resources for community-based health promotion programs
- Develop grant writing skills

Prerequisites: SOC 225 and WRI 227

### **PHM 420 - Population Health Management Externship**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: (Variable Credit 1-16)

This course prepares students for work in the field of Population Health Management. Students will gain professional experience and apply the knowledge and skills learned in Population Health Management courses to real-world population health issues.

### **PHM 435 - Research Center**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The research center course places students as professionals in training at the Population Health Management Research Center. The mission of the Oregon Tech Population Health Management Research Center is to provide students rigorous training in applied social science and community-based research through professional work experience in population health, supporting organizations that promote the education and overall well-being of the region.

## **Professional Writing**

### **PWR 101 - Introduction to Professional Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the skills and tools necessary for a career in writing. Collaborative writing, editing, common genres, giving and receiving professional feedback. Exploration of scientific and technical, digital, and organizational writing to prepare students to choose a major track.

Pre or Corequisite: WRI 121

### **PWR 102 - Introduction to Web Authoring**

Lecture Hours: 2

Lab Hours: 1

Credit Hours: 3

Rhetorically-grounded introduction to web technologies and the history and current state of the internet. Introduction to HTML and CSS. Genres of web content. Managing content on a web server. Introduction to content-management systems. Students will build a personal

web page.

Pre or Corequisite: WRI 121

### **PWR 206 - Social Media**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Strategies for integrating social media and digital marketing as part of professional writing. Practical steps, techniques, and best practices geared toward integrating social media and digital programs into business, personal, and artistic communication.

Prerequisite: WRI 121

### **PWR 215 - Writing in the Public Interest**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Emphasizes professional writing needs of nonprofit and community stakeholders. Focuses on analyzing particular rhetorical situations and using appropriate rhetorical strategies to produce multiple issue-focused documents in various genres. Culminates in professional portfolio prospective client.

Pre or Corequisite: WRI 121

### **PWR 220 - Writing for Interactive Media**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores writing and editing for visual, audio, and interactive media. Workshops focus on choosing appropriate format and delivery mechanisms for news, Web sites, gaming, etc. Topics include accessibility, copyright law, information ethics, linear and non-linear media, including game writing.

Prerequisite: WRI 122 or WRI 227



### **PWR 306 - Writing for the Health Professions**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Emphasizes professional writing needs of health professionals. Focuses on analyzing particular rhetorical situation and using appropriate rhetorical strategies to produce multiple issue-focused documents in various genres. Culminates in simulated outreach project requiring translation of expert medical content for non-expert audiences.

Prerequisite: WRI 122 or WRI 227

### **PWR 310 - Professional Writing for International Audiences**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Emphasizes professional writing needs of international audiences. Focuses on analyzing and understanding particular international contexts, revising documents according to rhetorical needs, and implementing strategies for creating original documents to address international audiences. Culminates in case study portfolio of professional documents.

Prerequisite: WRI 122 or WRI 227

### **PWR 315 - Advanced Web Authoring**

Lecture Hours: 2

Lab Hours: 1

Credit Hours: 3

Advanced use of HTML and CSS.

Introduction to database-driven content development including JavaScript, PHP, and MySQL. Choosing and implementing content management systems, content models, and deploying site architecture. Usability testing a website and performing user analytics.

Prerequisites: WRI 122 or WRI 227

### **PWR 320 - Structured Authoring**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced practice in documentation writing, information architecture and modular writing. Students will learn industry-standard writing practices such as Markdown, XML, and DITA. Students will also gain proficiency in content management and writing for re-use.

Prerequisite: WRI 122 or WRI 227

### **PWR 330 - User Research**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applied research methods for developing interfaces, documents, and applications. Planning, testing, and revising a user experience. User analytics, field methods, interviewing, focus groups, usability testing, and other workplace practices for inquiry into users and audiences.

Prerequisite: WRI 122 or WRI 227

### **PWR 355 - Project Management for Writers**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on project planning, management, and assessment for large-scale communication (print and electronic) projects. Introduces the theory and practice of audience-, organization-, and process-based approaches to content strategy.

Prerequisites: WRI 122 or WRI 227

### **PWR 490 - Portfolio Development**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: (Variable Credit 2-3)

Focuses on the development of a professional senior portfolio that provides evidence of all writing experience and skill level.

Prerequisite: Any upper division writing course

### **PWR 499 - Internship in Professional Writing**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: (Variable Credit to 9 credits)

Students work in applied setting in their emphasis and under the supervision of an on-site mentor. Regular contact with extern advisor required. Written externship reports required. Writing proficiency exam must be passed before starting internship. Senior standing required.

Prerequisites: PWR 355 and upper division course in emphasis area

## **Psychology**

### **PSY 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

### **PSY 110 - Human Serv Careers**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Presentation and discussion of career options of psychology majors.

### **PSY 201 – Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the principles and applications of psychology. Topics include scientific methodology, learning, memory, cognition, and intelligence.

### **PSY 202 – Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the principles and applications of psychology. Topics include the brain and behavior, consciousness, sensation and perception, health psychology, motivation, and emotion.

### **PSY 203 – Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the principles and applications of psychology. Topics include social psychology, personality, abnormal psychology, psychotherapy, and development.

### **PSY 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

### **PSY 215 - Abnormal Psychology I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Overview of biological, psychological and social causes of abnormal behavior. Specific topics include models, classification and assessment of abnormal behavior, as well as anxiety, somatoform, dissociative, personality, impulse, alcohol and substance abuse disorders.

Prerequisite: PSY 203 or instructor consent

**PSY 216 - Abnormal Psychology II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Overview of legal and ethical issues related to abnormal psychology.

Techniques of group and individual therapy. Specific disorders include: sexual and gender identity, mood, schizophrenia, cognitive, and childhood and adolescence.

Prerequisite: PSY 203

**PSY 220 - Community Psych**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides a comprehensive understanding of community mental health, social ecology, and program planning/evaluation at the community level. Focuses on understanding community-based research and practice. Critical thinking regarding community and environmental factors and application of theory to solve community problems.

Prerequisite: PSY 203

**PSY 225 - Applied Stats for Social Sci**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Provides an overview of basic statistical techniques in social sciences, including t-test, chi-square, ANOVA, correlation, and regression. Students will engage in hands-on experience analyzing, interpreting, and reporting data. Students will develop skills applying basic statistical tests to answer research questions.

Prerequisite: MATH 100 or instructor consent

**PSY 301 - Basic Counseling Techniques**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Basic counseling and interpersonal skills, including reflective listening, expressing empathy, questioning, and confrontation are taught. Complex skills such as goal setting, documentation, suicide/homicide crisis intervention, and handling client noncompliance. Laboratory employs CD-ROM and role playing formats.

Prerequisite: PSY 216

**PSY 307 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**PSY 308 - Psychology of Eating**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Exploration of eating behavior.

Psychological, social, and physiological factors will be examined. Application of empirical data to real world experiences. Typical, healthy, and disordered eating behaviors will be considered.

**PSY 311 - Human Growth & Dev I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A biopsychosocial study of human development from pre-conception through middle childhood. Discusses the biological, psychological, and social processes affecting the developing child.

Applications to health care, family, community, and education are discussed.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 312 - Human Growth & Dev II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A biopsychosocial study of the continuing development of the human being from adolescence through old age and death. Discusses the biological, psychological, and social processes relevant to this developmental time span. Applications to health care, family, community, and education are discussed.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 313 - Psych Research Methods I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Overview of the techniques of research in psychology. Emphasis is placed on techniques of quantitative research, including experimental, quasi-experimental, field, and survey research methods. Students are engaged in developing an APA research proposal based on current psychological literature.

Prerequisites: PSY 203 and one of the

following: MATH 243 or MATH

361 or PSY 225, all with grade "C" or

better

**PSY 314 - Psych Research Methods II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An in-depth look at advanced research methodology, including complex research design. Students gain experience with research projects by collecting data, analyzing, writing an APA style manuscript, and presenting a conference-style poster.

Prerequisite: PSY 313

**PSY 317 - Field & Career Preparation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Exploration of careers related to the field of psychology. Processes and skills needed for career search and placement. Externship process and opportunities will be discussed.

**PSY 321 - Theories of Personality I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In-depth coverage of personality theorists/theories, such as Freud, Adler, Horney, Erikson, and the Five Factor Theory. Applications of various theoretical concepts to case studies and to people in their personal lives.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 322 - Theories of Personality II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In-depth coverage of personality theorists/theories, such as Maslow, Skinner, Rogers, Bandura, Sociological, and Cultural. Applications of various theoretical concepts to case studies and to people in their personal lives.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 330 - Social Psychology I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Surveys behavior and experience in a social context. Topics include the self in the social world, attribution, social cognition, affiliation, and romantic relationships. Theory, research, and application discussed.

Prerequisite: PSY 201 or PSY 203

**PSY 331 - Social Psychology II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Surveys behavior and experience in a social context. Topics include social influence, attitudes and persuasion, aggression, group dynamics, altruism, and stereotyping/prejudice/discrimination. Theory, research, and application discussed.

Prerequisite: PSY 201 or PSY 203

**PSY 334 - Behavior Modification I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Measurement of behavior and key concepts of operant learning are covered, e.g., reinforcement, extinction, punishment, stimulus control and shaping, among others. Laboratory exercises are interactive computer simulations of these concepts.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 335 - Behavior Modification II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Key concepts of operant and respondent behavior, includes motivating operations, verbal behavior, differential reinforcement; applications to behavior change.

Prerequisite: PSY 334

**PSY 336 - Health Psychology I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The application of psychological theories to the understanding of the relationship between health, the environment, and behavior. This course focuses on the mind-body connection, stress, realities of healthcare delivery, health behavior

change models, and research methods in health psychology.

Prerequisite: PSY 202 or instructor consent

**PSY 337 - Health Psychology II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The application of psychological theories to understand relationships between health, the environment, and behavior. Focuses on prevention of disease/negative health behaviors, and promotion of health and well-being. Topics include substance abuse, nutrition, exercise, chronic illness, sex, and the built environment.

Prerequisite: PSY 336

**PSY 339 - Biopsychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Anatomical and physiological basis of behavior patterns presented from genetic, developmental, evolutionary and functional evidence. Discussions of mind-body relationships, senses, sleep, motor activity, emotions, and reproduction.

Prerequisite: BIO 232 or PSY 202 or instructor consent

**PSY 341 - Psychoactive Drugs I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students will investigate the physiological, behavioral, social, and societal aspects of psychiatric drugs, including anti-anxiety, anti-depressant, and anti-psychotic drugs.

Prerequisite: PSY 202

Pre- or Corequisite: PSY 216

**PSY 342 - Psychoactive DrugsII:  
Abused**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Students will investigate the physiological, behavioral, social, and societal effects of abused drugs including alcohol, hallucinogens, marijuana, opiates, and stimulants.

Prerequisites: PSY 202 or PSY 341, and instructor consent

**PSY 345 - Educational Psychology I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to psychological concepts, theories, and methodologies as applied to education. Focus will be on the major psychological views of learning and how these can be applied to create effective strategies and environments for teaching and learning.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 346 - Educational Psychology II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Exploration of psychological principles and theories of teaching and learning. Focus will be on learner motivation, differences, needs, culture, and diversity. How to shape supportive learning environments and form comprehensive teaching will be considered, as will assessment of learning.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 347 - Organizational Behavior**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Psychology applied to business organization and operations as they affect employees, customers, and the community with particular interest on group processes. Prerequisites: Junior standing or instructor consent.

Prerequisite: Junior standing or instructor consent

**PSY 351 - Cognitive Restructuring I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Philosophy behind criminal thinking errors, which influence their thought patterns. Laboratory component includes participation in client groups and casework.

Prerequisite: PSY 301 or PSY 334

**PSY 355 - Evolutionary Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of biological determinants underlying human behavior. Discusses family relations, aggression, crime, mating and other social aspects with regard to adaptation and fitness.

Prerequisite: BIO 103 or BIO 213 or PSY 203 or instructor consent

**PSY 356 - Military Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examination of the mental health and environmental issues facing current and former service members and their families by exploring military culture, theory, assessment, and evidence-based interventions.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 358 - Psychology of Gender**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Psychological examination of the functioning, specialization, self-concept, and roles of women and men. Issues that women and men face in the gendered world are critically analyzed scientifically and experientially.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 360 - Organizational Psych**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Psychology applied to human relations problems in the work world. Specific topics include job satisfaction, motivation, leadership, attitudes and effects of stress on employees and job performance.

Prerequisite: PSY 201

**PSY 361 - Industrial Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Application of psychological principles, theories, and behavioral techniques applied to human relations, problems in industrial situations.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 364 - Environmental Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An interdisciplinary look into the human-environment interaction in regards to sustainability, conservation, and the natural and built environments. Students will apply psychological theory to understand the role of human behavior, attitudes, policy, and ethics in sustainability and conservation efforts.

Prerequisite: PSY 201

**PSY 371 - Human Sexuality I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Social, cultural, psychological and physiological influences on human sexuality are examined. Topics include: theory and research, gender, anatomy and functioning, and human relationship components, including love and communication.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 372 - Human Sexuality II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Social, cultural, psychological, and physiological influences on human sexuality are examined. Topics include: sexual orientation, pregnancy, contraceptive practices, sexual dysfunctions, sexually transmitted infections, paraphilias, sexual assault, media images, the sale of sex.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 375 - Organizational Behavior Mgmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to research and practice in Organizational Behavior Management (OBM). Topics include performance management, behavioral systems analysis, process mapping, scientific research in organizational change, and career options for organizational consultants.

Prerequisite: PSY 201

**PSY 376 - Foundations of Sports Psych**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the foundations of psychology in the sport and physical activity domain. Focus will be on current theories, empirical research, and practices in the field of sport and exercise psychology.

Prerequisite: PSY 201 or PSY 202 or PSY 203

**PSY 385 - Peer Mentorship**

Lecture Hours: 1

Lab Hours: 3

Credit Hours: 2

Applied learning experience working with college and college bound populations. Enrolled students are engaged as mentors for peers, utilizing and technology to guide successful academic and social college experiences. May be repeated for credit. Not open to first year freshman or first term transfer students.

Prerequisites: 90 credit hours and at least one term at Oregon Tech

**PSY 401 - Adv Counseling Techniques**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Major schools of psychotherapy are discussed. Students practice related techniques in the laboratory following demonstration and instruction. Group therapy techniques are emphasized with associated laboratory work using interactive CD-ROM, group therapy videotapes, and a Web site corresponding to readings.

Prerequisite: PSY 301

**PSY 407 - Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**PSY 410 - Organiz Change/Develop**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Theories and processes necessary to understand and implement change within organizations. Focuses on impact of technological change in organizations and on skill development in planning, implementing, and evaluating change.

**PSY 416 - Abnorm Behav Children & Adol**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Highlights differences between children and adults in their expression of emotional and interpersonal problems.

Language/learning disabilities, problems of attention deficit, school refusal and separation anxiety, depression, and eating. Description of symptoms and treatments are emphasized.

Prerequisites: PSY 215, PSY 216, PSY 311, and PSY 312

**PSY 420 - Applied Psych Extern**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 16

Opportunities to work under supervision in applied settings related to students' career interests. Students apply the knowledge they acquired in their classes and gain experience working in the field.

Prerequisites: PSY 317 with grade "B" or better, approval of the externship coordinator, and completion of at least 120 hours of college credit

**PSY 421 - Senior Project I**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

First term of a three-term comprehensive project in applied psychology. Focus on refining a research project, literature review, and formulation of research question.

Prerequisite: PSY 313

**PSY 422 - Sr Project II**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Second term of a three-term comprehensive project in applied psychology. Focus on development of research methodology and pilot testing of project.

Prerequisite: PSY 421

**PSY 423 - Sr Project III**

Lecture Hours: 1

Lab Hours: 6

Credit Hours: 3

Third term of a three-term comprehensive project in applied psychology. Focus on data collection, writing of research report

and oral presentation of project.

Prerequisite: PSY 422

**PSY 425 - Motivational Interviewing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Motivational interviewing is a highly effective (evidenced based) approach to enhance behavior change in psychotherapy, substance abuse counseling, dentistry, education, various medical professions and business. This course will overview the theory, process, skills and implementation of motivational interviewing.

Prerequisite: PSY 301 or instructor consent

**PSY 428 - Animal Behavior**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The biological foundations of animal behavior are presented from an ethological and comparative psychology perspective. Emphasizes the evolution, development, and physiological basis of behavior patterns and presents topics on learning, perception, orientation, communication, and social behavior. (Cannot be taken for graduation credit by students who have taken BIO 428.)

Prerequisite: BIO 213 or PSY 202

**PSY 431 - Family Therapy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic differences between functional and dysfunctional families. Theoretical underpinnings of family therapy, an emphasis on particular theoretical models, different family populations including single parent families, blended families and culturally diverse families.

Prerequisite: PSY 301

**PSY 432 - Group Therapy**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Theory and application of group therapy techniques. Historical and current applications of group treatment, special populations and multicultural considerations.

Prerequisite: PSY 301

**PSY 434 - Adv Behavior Modification I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Behavioral assessment including identifying and selecting target behaviors; methods of assessment including preference assessments, skills-based assessments and functional analysis, data collection and interpretation; assessment-based selection of intervention; ethical and practical issues associated with assessment.

Pre- or Corequisite: PSY 335

**PSY 435 - Adv Behavior Modification II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Applications of principles and techniques of applied behavioral analysis to behavior change, behavioral interventions, behavior change systems, and specific behavior change procedures.

Prerequisite: PSY 434

**PSY 436 - Ethics for Applied Behavior Analysis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Ethical and professional issues in applied behavior analysis with emphasis on Ethics Code and applications in human services.

Prerequisite: PSY 335

**PSY 445 - OR Tech Relationship Bldg Prog**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course will provide an orientation to and ongoing training for family mentors in the Oregon Tech Relationship Building Program. Program related projects will be assigned based on number of credits (1-3) selected. This course can be repeated for credit.

Prerequisite: PSY 301 or instructor consent

**PSY 446 - Psychological Trauma**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Explores and introduces student to psychologically traumatic experiences in terms of definition, impact and reactions, including assessment and treatment of trauma-related psychological problems. Special focus on post-traumatic stress disorder.

Prerequisite: PSY 301

**PSY 455 - Cognitive Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The scientific study of mental process and how the mind works (or fails to work). Topics include memory, knowing, decision-making, attention, morality, and theories of mind. Students will debate current topics in the field and learn practical applications for cognitive research.

Prerequisite: PSY 201

**PSY 456 - Performance Management**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Application of principles and techniques applied behavior analysis to change behavior, focus on implementation, management, and supervision of behavior change programs and systems in business, industry, and human services; methods of behavior analytic personnel supervision and management.

Prerequisite: PSY 434

**PSY 475 - Capstone in Applied Psychology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides students the opportunity to synthesize material learned throughout the degree program, create innovative projects, and evaluate new ideas related to higher level topics in applied psychology. Topics vary by term. May be repeated for credit. Prerequisite: Senior standing or instructor consent

**PSY 480 - Theories of Learning**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

The basics of the major learning theories as they apply to operant and respondent conditioning, social learning, and memory. Prerequisite: PSY 335

**PSY 485 - Education Assistantship**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Hands on exploration of educational functions with a wide range of possible ages and abilities; will involve tutoring and mentoring with additional specific duties dependent on the goals of each student. May be repeated for credit.

Prerequisite: Instructor consent

**PSY 497 - Special Projects/Training**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 6

Students may enroll for credit in special programs, leading to the development of specialized skills. Programs may include training to work with special populations. May be repeated for credit.

Prerequisite: Instructor consent

**PSY 499 - Independent Study**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 6

Intensive self-study of a topic in psychology of the student's choosing. Study guided by any professor in the Applied Psychology program. May be repeated, with different topics, up to three times.

Prerequisites: Senior standing in Applied Psychology and HSS department chair consent

## Respiratory Care Program

**RCP 100 – Matriculation**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

A study into the evidence-based and political pressures driving new developments in respiratory care. Considerations and planning for the students emerging role in health care. Online version tailored to degree completion students.

**RCP 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**RCP 120 - Interventions in Gas Exchange**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

An Introduction to the effects of ineffective breathing on carbon dioxide removal and oxygen delivery. Basic pulmonary mechanics are described. The vascular effects of hypoxemia are fully explored. Oxygen therapy and Continuous Positive Airway Pressure are introduced.

**RCP 207 – Seminar**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**RCP 223 - Emergent Chest Radio Interpret**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

The evaluation of the chest radiograph in the intensive care setting. Students learn to identify structures and fissures as well as the significance of silhouette sign, blunted costophrenic angles, air bronchograms and hyperlucency. The identification of pneumothorax, infiltrates and the correct placement of tubes is required.

Prerequisite: RCP 236

**RCP 231 - Pulmonary Physiology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Pulmonary physiology including the mechanics of ventilation, gas diffusion, acid-base regulation, oxygenation, and the physiologic advantage of structure. Gas laws and surface tension as applied to the understanding of clinical problems.

Prerequisite: BIO 233

**RCP 235 - Arterial Blood Gases**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Chemistry and classification of acid-base balance including determination of compensation and pathophysiologic causes. Assessment of partial pressures of oxygen saturation, and total oxygen delivery.

Prerequisite: Admission to the Respiratory Care program or instructor consent

**RCP 236 - Cardiopulmonary Dynamics**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Exploration of pulmonary mechanics as measured by spirometry. Cardiovascular hemodynamics including cardiac electrophysiology, rhythm recognition and the measurement and interpretation of Systemic Vascular Resistance and Pulmonary Vascular Resistance, Central Venous Pressures, Pulmonary Artery and Pulmonary Capillary Wedge Pressures.

Prerequisite: Admission to the Respiratory Care program or instructor consent

**RCP 241 - Respiratory Gas Therapeutics**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Physical and chemical applications of medical gases and humidity therapy to patient care. The transportation, regulation and dissemination of compressed gases. Clinical decision making strategies for oxygen titration.

Prerequisite: Admission to the Respiratory Care program

**RCP 252 - Cardiopulmonary Pharmacology**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A study of the administration, pharmacokinetics, administration and actions of medications. Emphasis is placed on bronchodilators, steroids, mukolytics and antileukotriene agents. Vasoactive, antiarrhythmic, diuretics, sedatives, antimicrobials and neuromuscular blocking agents are introduced.

Prerequisite: CHE 360

**RCP 307 – Seminar**

Lecture Hours: 15

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**RCP 326 - Preparedness, Ethics, and Leadership**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Preparation for extreme natural and medical disasters, including the impact on facilities, patients, and staff during these events. Ethics in the profession including privacy and social responsibility. Exploration of leadership theory and practice, along with the impact in the healthcare environment. Students will be able to discuss ethical decision making, leadership practice, and managing through difficult situations.

Prerequisite: RCP 235

**RCP 335 - Exercise Physiol and Education**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Introduction to the physiology of exercise, exercise in disease and health and stress testing. Concepts of age appropriate pulmonary rehabilitation and asthma education are described.

Prerequisite: RCP 235

**RCP 336 - Hyperinflation Therapies**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Study and evidence-based application of PEEP, CPAP, bi-level ventilation, IPPB, and incentive spirometry. Flutter valve, PEP, high frequency chest wall oscillation and other methods of improving bronchial hygiene and lung volume. Acquisition and interpretation of the patient history, physical examination, auscultation, vital signs, laboratory data including arterial blood gases and dysrhythmia recognition. Collaborative activities include the acquisition, analysis and communication of findings.

Prerequisite: RCP 236 and RCP 241

**RCP 337 - Pulmonary Pathology**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Case-based approach to the understanding, evaluation and treatment of pulmonary disease. Recognition of obstructive and restrictive disease patterns as well as the classification of acid-base and oxygenation disorders. Classification, application and pharmacodynamics of common pulmonary medications are discussed.

Prerequisite: RCP 235

**RCP 345 - Cardiopulmonary Diag & Monitor**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Collaborative investigation, practicum calibration and interpretation of spirometry, body plethysmography, diffusion capacity helium dilution, seven minute nitrogen washout, cardiopulmonary stress testing, 12 lead ECG acquisition, dysrhythmia recognition, arterial blood gas instrumentation.

Prerequisite: RCP 337

**RCP 350 - Introduction to Clinical**

Lecture Hours: 1

Lab Hours: 24

Credit Hours: 9

Orientation to clinical practice in hospitals. Requires successful criminal background check, drug screening, completion of training in computer charting, and compliance with Health Insurance Portability and Accountability (HIPAA). Competence developed in the area of basic patient assessment, oxygen therapy, aerosol therapy and mechanical ventilation.

Prerequisite: RCP 241

**RCP 351 - Mechanical Ventilation I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Study of an array of artificial airways. Includes laboratory practice in intubation, endotracheal suctioning and bag-mask-valve ventilation. Study and practice of mechanical ventilation circuits, classes of mechanical ventilators and modes.

Prerequisite: RCP 235

**RCP 352 - Mechanical Ventilation II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Description and analysis of adult patient mechanical ventilator system including the initiation, assessment, management and discontinuance.

Prerequisite: RCP 351

**RCP 353 - Mechanical Ventilation III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced topics in mechanical ventilation including transport, dual modes, neonatal and pediatric mechanical ventilation.

Prerequisite: RCP 352

**RCP 366 - Clinical Simulation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The practice and measurement of critical thinking in the context of computer branching logic simulations. Students used organized sequential topical examinations to review and measure retention of respiratory care content. Passage of secure national review examination required.

Prerequisite: RCP 337

**RCP 375 - Pediatric Care**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamental care of pediatric patients with an emphasis in acute care medicine. A review of common diagnosis, conditions affecting respiratory status, and treatments seen in the pediatric population. Special procedures along with Trauma and Emergency room care will be reviewed.

**RCP 386 - Critical Care I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Analysis and application of critical care techniques with an emphasis in cardiovascular management and assessment. Cardiovascular catheters and hemodynamics, advanced rhythm recognition, and the essentials of advanced cardiac life support.

Prerequisite: RCP 337

**RCP 387 - Critical Care II**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Advanced techniques during intubation. Assessment of the difficult airway including Mallampatti classification and thyromental distance. Continued practice and an extension of hemodynamic, pharmacology and imaging knowledge. Students practice anticipating care based on nutritional status.

Prerequisite: RCP 241

**RCP 388 - Adv Neonatal Respiratory Care**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Survey of perinatal physiology with an emphasis on mechanical ventilation, the application of oxygen, medications, positive pressure, resuscitative efforts and evaluations as applied to the neonatal and pediatric patients. Instruction in neonatal resuscitation meets the standards established by the American Academy of Pediatrics.

Prerequisite: RCP 241

**RCP 389 - International Neonatology**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Advanced topics in neonatal and pediatric respiratory care including transport, stabilization and care in resource limited international settings.

Prerequisite: RCP 241

**RCP 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**RCP 440 - Case Management I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Current clinical cases used as the basis for scholarly research and discussion. Students design a research-based senior project in the field of respiratory care, including interviews, research, literature review and formal presentation.

Prerequisite: Completion of all academic coursework in the Respiratory Care Program prior to the Senior year

**RCP 441 - Case Management II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Current clinical cases used as the basis for scholarly research and discussion. Students continue to work on senior project in the field of respiratory care, including interviews, research, literature review and formal presentation.

Prerequisite: RCP 440

**RCP 442 - Case Management III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Current clinical cases used as the basis for scholarly research and discussion. Students continue work on senior project in the field of respiratory care, including interviews, research, literature review and formal presentation.

Prerequisite: RCP 441

**RCP 450 - Clinical Care I**

Lecture Hours: 1

Lab Hours: 24

Credit Hours: 9

Continued development of respiratory care skills, mechanical ventilation and neonatal intensive care, expanded functions and observations in specialty areas.

**RCP 451 - Clinical Care II**

Lecture Hours: 1

Lab Hours: 24

Credit Hours: 9

Continued development of respiratory care skills, mechanical ventilation and neonatal intensive care, expanded functions and observations in specialty areas.

Prerequisite: RCP 450

**RCP 452 - Clinical Care III**

Lecture Hours: 0

Lab Hours: 36

Credit Hours: 12

Continued development of respiratory care skills, mechanical ventilation and neonatal intensive care, expanded functions and observations in specialty areas.

Prerequisite: RCP 451



**RCP 460 - Advanced Life Support**

Lecture Hours: 0

Lab Hours: 6

Credit Hours: 2

Students become certified or recertified in professional life support classes such as Basic Life Support, Advanced Cardiac Life Support, Neonatal Life Support, Pediatric Life Support. Clinical simulations and other credentialing exam preparation included.

Prerequisite: RCP 252

**RCP 486 - Extreme Physiology**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Physiologic adaptations to gas exchange and transport which occurs during the challenges of neonatal transition, exercise, high altitude and high-pressure environments.

Prerequisites: RRT credential and admission to the degree completion program

**RCP 487 - Expert Mechanical Ventilation**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Recognition of levels of quality in mechanical ventilation. Practicing clinicians balance experience with current evidence-based recommendations for mechanical ventilation in order to develop a hierarchy of quality care. Includes selection of new modes, patient-ventilator synchrony, the reduction of medical errors and ventilator associated pneumonia.

Prerequisites: RRT credential and admission to the degree completion program

**RCP 488 - Respiratory Care Innovations**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Exploration of new opportunities to improve access to respiratory care. Reduction of disease through the expansion of respiratory care. Student projects focused on networking among students and faculty and across institutional, professional and nonprofit lines to implement improvements in health education.

Prerequisites: RRT credential and

admission to the degree completion program

**RCP 561 - Individual Development Plan**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Collaboration, negotiation and the development of priorities for program planning. Systematic planning required for the development and documentation of four professional competencies.

Prerequisites: State license, current respiratory care employment and the National Board for Respiratory Care (RRT) credential

**RCP 565 - Clinical Preceptorship**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Clinical practice beyond that of an advanced graduate as described in the OIT approved IDP. Areas for development of advanced clinical practice include the intensive care units, pulmonary rehabilitation, research, home care, education and management. Course completion is required for the fulfillment of the IDP.

Prerequisite: RCP 561

**RCP 575 - Accreditation Practicum**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Respiratory Care leaders are proactive in the validation of their programs through accreditation. This practicum provides the emerging leader with a practical familiarity with program data collection and the assessment of that data in comparison to accreditation standards. Methods of improving the outcomes of individual programs are studied. Course completion requires fulfillment of IDP.

Prerequisite: RCP 561

**Radiologic Science****RDSC 105 - Rad Protection & Q C**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of radiation protection and radiographic quality control for veterinary x-ray operators in accordance with Oregon Administrative Rules. Students majoring in Radiologic Science are not eligible.

**RDSC 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**RDSC 201 - Imaging Techniques I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Demonstration and practice with the phenomena and causes of image formation and visualization. The context includes studies of effects of technique-factor changes, effects of the use of various accessories and effects of chemicals in film processing. Causes of radiographic artifacts are discussed and explored. Includes the study of interactions of radiation and matter.

Prerequisite: MIT 103 with grade "C" or better

**RDSC 202 - Imaging Techniques II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Radiographic principles and principles of radiographic quality. Study of theory and practice in methods of protection against ionizing radiation.

Prerequisite: RDSC 201 with grade "C" or better

**RDSC 205 - Patient Care**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Basic concepts of patient care, including consideration of physical and psychological needs of the patient and family. Routine and emergency patient care procedures. Infection control procedures utilizing Universal Precautions. Role of the radiographer in patient education.

Prerequisite: MIT 103

**RDSC 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**RDSC 210 - Radiograph Position I**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Demonstration and practice of the routine and special radiographic positions of bones of the upper and lower extremities excluding the shoulder and pelvic girdles. Prerequisites: RDSC 201 and RDSC 235, both with grade "C" or better

**RDSC 211 - Radiograph Position II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Demonstration and practice of routine and special radiographic positions of the axial skeleton, shoulder, and pelvic girdles. Prerequisites: RDSC 202, RDSC 210, and RDSC 235, all with grade "C" or better

**RDSC 233 - Contrast Media Proc**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Routine radiographic examinations of the urinary system, gastrointestinal biliary system, respiratory system, and nervous system, using various contrast medias and filming techniques. All radiographically significant anatomy, physiology, pathology, terminology, and topography, including all contrast studies of these systems.

Prerequisites: RDSC 202, RDSC 210, RDSC 235, all with grade "C" or better

**RDSC 235 - Equipment Operation & Maint**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic components and operation of radiographic, fluoroscopic, and mobile units. Evaluation, calibration, and maintenance of radiographic equipment and accessories.

**RDSC 272 - Radiation Protection**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic properties, sources, units of measurement, dosimetry and biological effects of radiation. Methods of personnel protection and minimizing patient exposure. NCRP recommendations for protective devices and personnel monitoring.

Prerequisites: RDSC 201 and RDSC 235, both with grade "C" or better

**RDSC 301 - Radiograph Position III**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Demonstration and practice of routine and special radiographic positions of the skull, facial bones, and paranasal sinuses. Prerequisites: RDSC 211 and RDSC 233, both with grade "C" or better

**RDSC 307 – Seminar**

Lecture Hours: 15

Lab Hours: 15

Credit Hours: 15

(Hours to be arranged each term.)

**RDSC 320 - Surg/Trauma/Mobl Rdgrph**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Routine radiographic examinations of the reproductive, muscular, nervous, skeletal and circulatory systems. Also including emergency and surgical procedures, using various contrast media and filming techniques. The comprehensive study of all radiographically significant anatomy, physiology, pathology, terminology, and topography including all contrast studies of these systems. Control of microorganism by physical and chemical means is incorporated as necessary.

**RDSC 326 - Crdvsclr/Interv Tech**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Demonstration and practice of special radiographic examinations of nervous and vascular systems including use of serial film changers and pressure injectors, and other necessary equipment. Also includes related nursing procedures.

Prerequisites: RDSC 211, RDSC 233, and RDSC 320, all with grade "C" or better

**RDSC 350 - Bones: Interact. Anat & Pos'n**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

A sequential review of osteology and positioning designed for the medical imaging student who has completed the positioning sequence, or the graduate seeking continuing education credit.

Prerequisites: RDSC 210, RDSC 211, and RDSC 301, or Registered Radiologic Technologist

**RDSC 354 – Mammography**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

An in-depth analysis of mammographic positioning, exposure techniques, quality control, film critiquing, and radiation safety. Includes mock registry exam. Prerequisite: RDSC 301

**RDSC 355 - Computed Tomography**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

X-ray physics, scanner components and data acquisition of computed tomography. Image reconstruction, manipulation and artifacts. CT patient care and imaging procedures of the head, neck, spine, chest, abdomen, pelvis and musculoskeletal system.

Prerequisite: BIO 335

**RDSC 366 - Radiographic Pathology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An overview of common pathological conditions encountered in the clinical setting, for RDSC students. Pathology is categorized by body systems. The students will learn the pathology as they relate to: signs and symptoms, etiology, imaging diagnosis and prognosis and treatment.

**RDSC 388 - Externship Preparation**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Presentation of key concepts related to Radiologic Science externship and required in-services. Focus is on patient care and interpersonal scenarios the externship student will likely face while in the clinical environment. Review and discussion of the RDSC Externship Handbook. This course is a mandatory course that must be completed prior to externship.

Prerequisite: RDSC 356

**RDSC 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term)

**RDSC 410 - Rad Science Externship**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

Students must complete four terms (12 months) of clinical experience in both general radiography and special imaging modalities to include computerized tomography, ultrasound, nuclear medicine and/or special radiographic procedures in an affiliated hospital. The student will complete all phases of general radiography and one month in each of three of the special imaging modalities. Affiliated hospitals are approved by the Joint Review Committee on Education in Radiologic Technology. The students are under the direct supervision of qualified radiographers and radiologists.

Prerequisite: All academic coursework in the Radiologic Science curriculum

**RDSC 411 - Special Rad Sci Extern**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

This one-term (3-month) practicum is designed to develop the skills of the student in the special imaging modalities, i.e., computed tomography, magnetic resonance imaging, ultrasound, nuclear medicine and special radiographic procedures. The student is sent to an affiliated hospital that has the required special imaging equipment to give the hands-on experience to develop competency in each of three areas chosen by the student. The student will spend one month in each selected area.

Prerequisites: All academic coursework in the Medical Imaging program with grade "C" or better and be a Registered Technologist

**RDSC 411A - Special Rad Sci Extern**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 7

This two term practicum is designed to develop skills of the degree completion student in special imaging modalities of computed tomography, magnetic resonance imaging, cardiovascular/interventional technology,

mammography, quality assurance, nuclear medicine technology, or sonography. The student selects a local hospital or medical center that has the necessary equipment. Upon approval of the facility, the student begins a supervised experience to develop competencies in each of three chosen areas.

Prerequisites: All academic coursework in the Medical Imaging program with grade "C" or better and an ARRT registered technologist in good standing

**RDSC 411B - Special Rad Sci Extern**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 8

This two term practicum is designed to develop skills of the degree completion student in special imaging modalities of computed tomography, magnetic resonance imaging, cardiovascular/interventional technology, mammography, quality assurance, nuclear medicine technology, or sonography. The student selects a local hospital or medical center that has the necessary equipment. Upon approval of the facility, the student begins a supervised experience to develop competencies in each of three chosen areas.

Prerequisites: All academic coursework in the Medical Imaging program with grade "C" or better and an ARRT registered technologist in good standing

**RDSC 471 - Clinical Imaging Ed I**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Development and application of clinical education objectives relating to medical imaging technology. Instruments used to evaluate student clinical performance and competence.

Prerequisite: RT(R) (ARRT)

## Renewable Energy Engineering

**REE 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**REE 201 - Intro to Renewable Energy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to renewable energy. Topics include photovoltaics, solar thermal systems, green building, fuel cells, hydrogen, wind power, waste heat, biofuels, wave power, tidal power and hydroelectric. Discussions of economic, environment, politics and social policy are integral components of the course.

Prerequisite: MATH 111

**REE 207 – Seminar**

Lecture Hours: 10

Lab Hours: 0

Credit Hours: 10

(Hours to be arranged each term.)

**REE 243 - Electrical Power**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Fundamentals of electrical power. Power systems components and equipment. Fundamental analysis and design of electrical power systems.

Prerequisites: EE 223, MATH 252, and PHY 222

**REE 253 - Electromech Energy Conversion**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Motoring and generating principles for direct current, synchronous, and induction machines. Analysis and design of motor and generator power and control circuits.

Prerequisites: EE 223, MATH 252, and PHY 222

**REE 307 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**REE 331 - Fuel Cells**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to fuel cell technologies: PEM, PAFC, AFC, SOFC, MCFC and DMFC systems. Fuel cell components and systems; field flow plates, electrolytes, electrode materials, electrode catalysts, on-board reformers. Portable devices, utility-scale power production, transportation systems. Fuel types and fuel storage. Prerequisites: CHE 260 with grade "C" or better and PHY 222

**REE 333 – Batteries**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course covers fundamentals of the most important battery types including alkaline, zinc-air, lead-acid, nickel-cadmium, nickel-metal hydride, lithium ion, and lithium polymer. Applications include stationary, transportation, and portable batteries. The lab deals with battery system design, testing, and prototype assembly. Prerequisite: CHE 260 with grade "C" or better

**REE 335 – Hydrogen**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

This course will cover hydrogen production, storage, distribution, and use. Specific energy scenarios such as renewable hydrogen cycles will be explored focusing on transportation applications. The concept of hydrogen economy will be discussed in the context of global energy crisis. Prerequisite: CHE 260 with grade "C" or better

**REE 337 - Materials for RE****Applications**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Electrical, mechanical, thermal, chemical, optical and processing properties of material in renewable energy systems; solid state device characteristics and their material properties. Engineering applications. Prerequisites: CHE 202 and CHE 205 or CHE 222, and PHY 223

**REE 344 - Nuclear Energy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to nuclear energy. Atomic and nuclear physics; the interaction of radiation and matter. Nuclear reactor operation; reactor components, nuclear cycles, neutron diffusion and moderation. Reactor shielding. Fuel reprocessing and waste disposal. Reactor licensing and safety. Economics and environmental concerns. Prerequisites: CHE 202 and CHE 205 or CHE 222, and PHY 223

**REE 345 - Wind Power**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to power production from wind resources. Historical uses of wind resources. The Earth's wind systems. Physics of wind power. Vertical and horizontal axis turbines. Aerodynamics of wind turbines. Large scale turbine farms and siting. Commercial development, economics and environmental impacts. Prerequisites: MECH 326 or REE 253, and PHY 222

**REE 346 - Biofuels and Biomass**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Introduction to power production from biomass resources. Historical uses of biomass resources. Biomass as a solar energy store; forestry and agricultural sources, crop wastes. Recycled sources; municipal solid wastes, landfill gas. Gaseous fuels, anaerobic digestion, gasification, liquid fuels, fermentation, hydrolysis, transesterification. Prerequisites: CHE 202 and CHE 205, or CHE 222, and PHY 222

**REE 347 - Hydroelectric Power**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to hydro-resource power production. Hydro power in history. Physics of hydrology. Power, head, flowrate. Turbine hydrodynamics; Francis, Kaplan, Pelton, Turgo, cross-flow. System components: generators, governors, penstocks, spillways, valves, gates, trashracks. Large-scale and microhydroelectric systems. Pumped

storage. Economic, environmental considerations.

Prerequisite: MECH 318

**REE 348 - Solar Thermal Energy Systems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to solar thermal energy systems for residential, commercial and industrial applications. Solar radiation; topics in heat transfer; flat plate and concentrating collectors; non-imaging optics; applications including water heating, building heating, cooling, industrial process heat, distillation solar thermal power systems. Prerequisite: ENGR 355

**REE 407 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**REE 412 - Photovoltaic Systems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The solar resource, sun charts, site assessments. Grid-connected and stand-alone systems. Module and array performance, PV systems components including batteries, modules, charge controllers, maximum power point trackers, inverters. Economic considerations including investment tax credits, present-value analysis, IRR. Advanced PV materials. Prerequisite: EE 321 and PHY 223

**REE 413 - Electric Power Conv Systems**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Power electronics devices in energy applications. DC-DC MPPT and charge controllers. Advanced inverter controls and applications. FACTS and HVDC systems and equipment. Prerequisite: EE 419

**REE 425 - Electricity Markets & Modeling**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to restructured electricity markets. Students gain knowledge of theory, structures, successes and failures of markets, market participant behavior, risk, and uncertainty, and basic simulation and optimization modeling for market analyses.

Prerequisites: ECO 201 or ECO 202, and EE 221, all with grade "C" or better

**REE 427 - Greenhouse Gas****Acct/Footprints**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Course topics include US and international greenhouse gas (GHG) management policies. GHG assessment methods and tools, emissions trading programs, climate risk and tools, emissions trading programs, climate risk and management, data and information sources, measurement standards and protocols, and related sustainability concepts and policies. Cross-listed as ENV 427. Cannot be used for graduation credit by students who have taken ENV 427.

Prerequisites: Junior or Senior standing, MATH 361 or MATH 465 with grade "C" or better, and WRI 227 with grade "C" or better, or instructor consent

**REE 431 - Geotherm Heat Pump Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Theory/design of geothermal heat pump applications, emphasis ground heat exchanger simulation and design. Closed-loop, open-loop, and hybrid geothermal heat pump systems will be examined. Exposure to the development and use of geothermal design and simulation tools.

Prerequisite: MECH 323

**REE 439 - Energy Systems Auditing and Management**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Evaluating building thermal/electric/process loads, including lighting, hot water, HVAC and central plant systems, industrial refrigeration and motors. Opportunities for managing

energy use through controls and operations/maintenance strategies. Roles of commissioning, energy auditing, renewables, and economic analysis in reducing use.

Prerequisite: MECH 323

**REE 451 - Geo Energy & direct use app**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to basic geothermal energy sources and generation. Basic geothermal energy applications including direct use, heat pumps and power generation.

Geothermal reservoir, site analysis, exploration and drilling. Direct use application system design (HVAC) and equipment.

Prerequisite: ENGR 355

**REE 453 - Power System Analysis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Faults: symmetric, unsymmetric. Modeling system components using positive, negative, zero sequence networks. System admittance matrixes. Load flow computational methods such as Gauss-Seidel, Newton-Raphson. Power system stabilization. Power system analysis using software, emphasizing renewable resources.

Prerequisite: REE 243

**REE 454 - Power Syst Protection & Ctnrl**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Protection systems overview; protective devices; coordination and sequencing of relays; grounding practices; impedance protection. Methods of power systems operation and control; load-frequency control, automatic generation control. Modeling power systems protection and control using power system analysis software, emphasizing renewable resources.

Prerequisite: REE 453

**REE 455 - Energy Efficient Building Dsgn**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of integrated, energy-efficient

building design. Interpretation/application of codes, standards. Use of software tools for modeling, simulation of building energy systems. Daylighting, natural ventilation, architectural features of passive solar buildings. Inclusion of renewable resources, and net-zero designs. Life-cycle economic analysis.

Prerequisite: MECH 323

**REE 463 - Energy Systems Instrumentation**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

Application of electrical and mechanical sensors, data acquisition, logic controllers as applied to energy systems.

Determination of physical parameters necessary for control and data-logging.

Methods of calibration and correction.

Prerequisite: EE 321

**REE 465 - Renewable Energy Transport Sys**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Renewable energy transportation systems including fuel cells, hybrid gasoline-electric engines, electric vehicles, bio-diesel, flex-fuel vehicles, high efficiency diesel engines, gas turbine prime-mover systems. Topics include fuel air mixing, fuel storage, fuel delivery, cooling, fuel leak detection, chemical safety, and electrical power control systems.

Prerequisites: MECH 326 or REE 253

**REE 469 - Grid Integration of Renewables**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Issues unique to connecting renewable energy generation to the grid. Microgrids. Stability, transient and harmonic effects. Interconnect agreements and requirements. Standard development. SCADA and smart grid concepts. Systems optimization.

Prerequisite: REE 453

**REE 471 - Geothermal Power Plant Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to geothermal reservoir pressure, temperature and flow models, and analysis. Basic geothermal power plant equipment and design for dry steam, single/double flash and binary cycle power plants. Plant thermodynamic analysis/efficiency using Rankine/Kalina cycles. Plant environmental, economic and social impacts.

Prerequisite: ENGR 355

**REE 511 - Research Methods/Innovation I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Fundamental concepts of scientific research. An introduction to the concepts underlying peer-reviewed research, evaluating the relevance and impact of sources, conducting literature reviews, evaluating published findings, using statistical methods, designing research studies, and writing scholarly articles.

**REE 512 - Research Methods/Innovation II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Intellectual property (IP) development, evaluation, and strategy. IP fundamentals, patent fundamentals, conducting patentability searches, evaluating the patentability potential of an invention, drafting invention disclosures for patent applications, assessing the value of a patent or patent portfolio, and IP licensing fundamentals.

**REE 513 - Research Methods/Innovation III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Strategy and innovation concepts with a focus on technology commercialization. Business strategy frameworks, financial analysis, strategic marketing, operations management, business models, project management, business law, and entrepreneurship.

**REE 515 - Energy Engineering I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Three-term sequence in energy engineering. For a variety of renewable and conventional means of energy production, storage, and distribution, students gain a robust understanding of resources, energy conversion technology, integration with existing systems, regulatory contexts, business environment, and future trends.

**REE 516 - Energy Engineering II**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Three-term sequence in energy engineering. For a variety of renewable and conventional means of energy production, storage, and distribution, students gain a robust understanding of resources, energy conversion technology, integration with existing systems, regulatory contexts, business environment, and future trends.

**REE 517 - Energy Engineering III**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Three-term sequence in energy engineering. For a variety of renewable and conventional means of energy production, storage, and distribution, students gain a robust understanding of resources, energy conversion technology, integration with existing systems, regulatory contexts, business environment, and future trends.

**REE 521 - Production of Biomass/Biofuels**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The use of recently living plant or animal materials as sources of fuels, chemicals or industrial products. Sourcing and production. Biomass chemistry; lignocellulosics, fats, oils, saccharides, polysaccharides, proteins, and extractables. Chemical modification of biomass to produce fuels, polymers, industrial chemicals.

**REE 523 - Hydrogen Production and Storage**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An overview of primary technologies, economic aspects, and social policy issues related to development of hydrogen systems and hydrogen economy, including water electrolysis, reformer technologies, and hydrogen storage.

**REE 525 - Solid-State Physics/Photovoltaic Mat**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of PV; electrons and holes in semiconductors; junction analysis. Survey of available semiconductors and materials choices for photovoltaic design. Principles of important photovoltaic devices. Monocrystalline, polycrystalline, and thin film solar cells. Strategies for high efficiency. Photovoltaic materials and phenomena.

**REE 527 - Wind Power Generators**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

AC machines, particularly three-phase induction and synchronous generators for wind power generation. Equivalent circuit models. Wound-rotor, permanent magnet, multi-pole, and switched-reluctance generators. Power and torque control.

**REE 529 - Power System Analysis**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Faults: symmetric, unsymmetric. Modeling system components using positive, negative, zero sequence networks. System admittance matrices. Load flow computational methods such as Gauss-Seidel, Newton-Raphson. Power system stabilization. Power system analysis using software, emphasizing renewable resources. Requires background in power systems.

**REE 531 - Ground-Source Heat Pumps**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Heat pump design and operation. Heat pump cycles. Refrigerant selection. Ground-loop design. Heat transfer issues pertaining to geothermal energy. System design and integration. Temperature and materials issues unique to geothermal heat pumps.

**REE 533 - Heating, Ventilation/Air Condi**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Heating, ventilating, and air conditioning. Application of laws and principles of thermodynamics to analysis, design, and control of mechanically-controlled environments for human comfort, animal health, and food preservation. Teaches computation of heating and cooling loads, humidity control, heating, and refrigeration.

**REE 535 - Fuel Cell Fundamentals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Basic science and technology of fuel cells, electrode processes, electrolyte types, catalysts, and balance of plant components.

**REE 537 - Sustainability/Energy Systems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Comprehensive examination and classification of the local, regional, and global environmental and social aspects of energy use including lifecycle assessments. Impacts of global and national politics on energy use decisions.

**REE 539 - Hydraulics/Fluid Mech/Hydropow**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Open-channel hydraulics, including watershed hydrology, sediment transport and bed load movement, reservoirs, hydrostatics, dredging, spillways, silling basins, and hydraulic jumps. Advanced fluid mechanics. Types of turbines

Modeling and unit optimization.

Background in fluid mechanics required.

**REE 541 - Utiliztn Strategies/Bioenergy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Stategies for sustainable energy production from biomass. Direct combustion. Fermentation processes. Anaerobic digestion systems. Thermochemical processes; gasification, liquiefaction. Chemical synthesis pathways.

**REE 543 - Materials f/Electrochemical Proc**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Materials used for batteries, fuel cells, elctrolyzers, and supercapacitors; their classification, selection and properties, including nanocatalysts, polymer electrolytes, ceramic and plastic packaging materials, and metals.

**REE 545 - Applied Photovoltaics**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The characteristics of sunlight. Solar cell behavior, properties, and design. Cell interconnection and module fabrication. Designing stand-alone and grid-connected photovoltaic systems. Special-purpose photovoltaic applications. Concentrator and hybrid solar thermal and photovoltaic systems. Advanced photovoltaic systems.

**REE 547 - Electric Power Conversion**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Electric power conversion for wind generators. Review of power switching devices. Rectifiers, DC-DC converters, inverters. Pulse-width modulation. Converter topologies. Doubly-fed induction generators. Reactive power compensation

**REE 549 - Power System Protection/Control**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Protection systems overviwe; protective devices; coordination and sequencing of relays; grounding practices; impedance

protection. Methods of power systems operation and control; load-frequency control, automatic generation control. Modeling power systems protection and control using power system analysis software, emphasizing renewable resources.

Prerequisite: REE 529

**REE 551 - Advanced Geothermal Energy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Classification of geothermal resources. Basics of geothermal wells and drilling. Resource capacity estimation and measurement. System design and integration. Application such as aquaculture, greenhouses, and district heating.

**REE 553 - Energy Systems Mgmt/Auditing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Evaluating building thermal/electric/process loads, including lighting, hot water, HVAC and central plant systems, industrial refrigeration and motors. Opportunities for managing energy use through controls and operations/maintenance strategies. Roles of commissioning, energy auditing, renewables and economic analysis in reducing energy use.

**REE 555 - Stationary Fuel Cells**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced treatise of fuel cell systems for large, stationary applications with detailed examination of polymer electrolyte membrane, alkaline, phosphoric acid, molten carbonate, and solid-oxide systems, their design, performance, lifetime and reliability, modeling, and economics.

**REE 557 - Costing Renewable Energy**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Renewable energy in micro-and macroeconomic contexts. Review and discussion of current energy market structures, prices, effects of inflation and incentives, affordability, costs of supply reliability, investment criteria, and modeling market trends.

**REE 559 - Develop of Hydropower Proj**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Mechanical and electrical equipment, including flow control elements, generators, transformers, protection and control equipment, and governors. Transient responses and stability. The engineering, procurement and construction process for hydropower projects. Commissioning and documentation.

**REE 561 - Process Desgn/Econ Eval f/BES**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Process engineering methods, including development of process and instrumentation diagrams (P&ID); equipment selection and sizing; cost estimation, economic evaluation, and fundamentals of chemical process safety.

**REE 563 – Batteries**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Comprehensive overview, integration characteristics, and performance comparison of battery systems for transportation and stationary applications, including lead-acid, nickel metal hydride, nickel cadmium, sodium-sulfur, lithium polymer, and lithium ion.

**REE 565 - Semiconductor Process Enginrng**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Semiconductor process technology; crystal growth, silicon oxidation, photolithography, etching, diffusions, ion implantation, film deposition. Process

integration, manufacturing, and metrology. Future trends and challenges.

**REE 567 - Wind Energy Systems Integratn**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Wind system electric power integration, protection, and control. System components, including generators, transformers, and switching stations. Network stability. Energy sector regulation and markets. Forecasting and integration of wind power systems.

**REE 569 - Grid Integration of Renewables**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Issues unique to connecting renewable energy generation to the grid. Microgrids. Stability, transient, and harmonic effects. Interconnect agreements and requirements. SCADA and smart grid concepts. System optimization.

Prerequisite: REE 549

**REE 571 - Geothermal Power Generation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

High-enthalpy resources suitable for electric power generation. Energy transfer and conversion. Plant design and integration. Advanced design such as absorption power cycles.

**REE 573 - Energy-Efficient Bldg Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Principles of integrated, energy-efficient building design. Interpretation/application of codes, standards. Use of software tools for modeling, simulation of building energy systems. Daylighting, natural ventilation, architectural features of passive solar buildings. Inclusion of renewable resources and net-zero designs. Life-cycle economic analysis.

**REE 575 - Transporation Fuel Cells**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Detailed assessment of advances,

prospects, and economics of polymer electrolyte membrane fuel cell, operational characteristics, durability, manufacturing, and fuel storage options in the automotive applications.

**REE 577 - Renewable Energy Integration**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Discussion based-class on the integration of renewable energy into the established electric grid, focusing on energy availability, reliability, options for integration, matching demand, and balancing economic options on global, regional, and local scales.

**REE 579 - Econ/Reg/Envir Aspects Hydrop**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Duration curves and generation studies. FERC permitting and licensing, including compliance. Power sales contracts and bundled services. Environmental impact assessments. Project financing, management, and operations requirements. Optimization of integrated hydropower systems.

**REE 581 - Energy Storage Fundamentals**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The survey course will examine energy storage fundamentals; applications and trends for pumped hydro, compressed air, flywheels, superconducting magnetic energy storage, gravitational mass, supercapacitors, batteries, fuel cells, and thermal systems.

**REE 582 - Introduction to Batteries**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The course provides introduction to field of batteries and discusses electrochemical fundamentals and general properties of batteries such as energy density, specific power, charging and discharging, temperature effects, aging, and self-discharge.



**REE 583 - Intro to Fuel Cells**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This overview course will introduce students to fundamental fuel cell principles, history, classification, thermodynamics, efficiency and causes of voltage losses, reaction kinetics, electrode performance and catalyst design, and fuel cell components and their impact on performance.

**REE 591 - Hydrogen Prod & Storage**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

The course will discuss the basics of hydrogen production and storage, the concept of hydrogen economy, conventional hydrogen generation, electrochemical and photochemical technologies, principles of hydrogen storage and novel storage materials.

**REE 592 - Advanced Batteries**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course will examine technology and trends in battery chemistry, manufacturing, pack assembly, characterization, safety, economics and applications for battery systems including lead acid, nickel-based, lithium ion, lithium polymer, metal air and flow batteries.

**REE 593 - Advanced Fuel Cells**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course provides in an in-depth analysis of the current trends, fuel processing, novel materials, applications, safety, and characterization for polymer electrolyte membrane, alkaline, phosphoric acid, molten carbonate, solid oxide, and direct methanol fuel cells.

**REE 599 - Graduate Research or Project**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Graduate research leading to the completion of a master's thesis or project. Minimum of three terms required. Prerequisite: Advisor consent

**System Engineering and Technology Management****SEM 421 - Systems Engineering**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Foundations of Systems Engineering: Structure of Complex Systems; System Development Processes and Frameworks; System Engineering Validation, Reliability, Availability, Maintainability and Deployment; Human Factors Engineering.

Prerequisites: MATH 253 (or MATH 253N), or MATH 254 (or MATH 254N), or MATH 341, and WRI 227

**SEM 422 - Advanced Systems Engineering**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Advanced concepts in systems science and systems engineering; modeling and mathematical methods for systems engineering; system simulation tools; optimization and decision analysis; case studies involving practical systems engineering integration of hardware, software, information, and human factor systems.

Prerequisites: MATH 243 or MATH 361 or MATH 465; and MGT 345 and WRI 227, or SEM 421

**SEM 425 - Advanced Engineering Mgmt**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Competitive Strategic Frameworks (Porter, RBV, Delta); Strategic Execution Framework; Project Management (PMBOOK); Financial Management; New Product Development; Case Studies. Prerequisite: MGT 345 or SEM 421

**SEM 521 - Systems Engineering**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Foundations of Systems Engineering: Structure of Complex Systems; System Development Processes and Frameworks; System Engineering Validation, Reliability, Availability, Maintainability and Deployment; Human Factors

Engineering.

Prerequisite: Graduate standing

**SEM 522 - Advanced Systems Engineering**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Advanced concepts in systems science and systems engineering; modeling and mathematical methods for systems engineering; system simulation tools; optimization and decision analysis; case studies involving practical systems engineering integration of hardware, software, information, and human factor systems.

Prerequisite: Graduate standing

**SEM 525 - Advanced Engineering Mgmt**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Competitive Strategic Frameworks (Porter, RBV, Delta); Strategic Execution Framework; Project Management (PMBOOK); Financial Management; New Product Development; Case Studies. Prerequisite: Graduate standing

**SEM 526 - Case Studies in Systems Engr.**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Much of modern civilization is defined by technical products and services. Case Studies in Systems Engineering examines challenges firms face in creating these highly complex products and services rapidly, accurately, and cost-effectively. Selected cases represent examples of failed, successful, and prototype systems that all defined the state of the art. Through analysis and group discussions, students will critically examine issues and approached presented in numerous case studies. Students will link their own critical analysis to Systems Engineering best practices.

Prerequisite: SEM 521

**SEM 527 - Engineering Data Analytics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Engineering Data Analytics introduces students to the technologies and methodologies needed for data-driven decision-making during all stages of product development. Students will learn how to analyze, process, and establish correlations using data from various engineering processes during the design phase, prototyping phase, and production & operation phase. Students will examine large data-sets from smart homes, large-scale IoT (Internet of Things) applications, and IC design & manufacturing.

Correlations will be established using Linear regression, Anova, and other data relationship techniques. Students will use advanced software tools such as Tibco Spotfire and R to analyze 'Big Data?', establish correlations, and determine if processes are capable and in control. An introduction to machine learning and real-time streaming analysis techniques will also be discussed.

Prerequisite: Graduate standing or MATH 465

**Sociology****SOC 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**SOC 201 - Classical Sociol Theory**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to the early development of sociological theory. Works by Marx, Weber, Durkheim, Parsons and Goffman will be discussed in terms of their contribution to the discipline of sociology.

**SOC 202 - Contemporary Soc Theory**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Theories on the social construction of self, social and population structures, gender inequality, global capitalism and deviance are explored in the context of contemporary social issues.

Prerequisite: SOC 201

**SOC 204 - Intro to Sociology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Survey of human relationships and interaction of organized groups and institutions in modern society. Emphasis on attitudes, values, beliefs, customs and change within our complex social structure.

**SOC 205 - Current Health Issues**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the most pressing health issues in contemporary society, including aging, healthcare reform, cost of healthcare, and amenable mortality.

**SOC 206 - Social Problems**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A sociological exploration of contemporary social problems, including crime, illness, poverty, unemployment, immigration, gender inequality, LGBT issues, and the environment.

**SOC 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**SOC 210 - Marriage & Family Living**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Personal problems of the married couple in everyday living with an emphasis on adult lifestyles, relationships, sexual roles, and attitudes, family planning, family finances, and divorce and remarriage.

**SOC 225 - Medical Sociology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to medical sociology and social-epidemiological research, covering social causes and consequences of health and illness, the practitioner-patient relationship, health behavior, and health care organization.

**SOC 235 - Intro to Sustainability**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

An introduction to the history, theory and practice of sustainability. The focus is on human-environment interactions, highlighting how human agency can jeopardize our collective future, and how harm can be avoided through appropriate social, political, and legal action.

**SOC 301 - Soc Science Research Methods**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Introduction to theory and methods of research in the social sciences, and interpretation of social science research.

Prerequisites: SOC 204 and SOC 225

**SOC 302 - Soc Science Resrch Methods II**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Continuation of SOC 301 Social Science Research Methods: data collection, analysis, and development of social science research papers.

Prerequisite: SOC 301

**SOC 304 – Criminology**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Analysis of criminal behavior from theft to homicide. Discussion of the definition of criminal behavior, varieties of crime and the criminal justice system.

Prerequisite: SOC 204

**SOC 305 - Rural Health**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced introduction to rural population health and health care. Topics include rural population health and health behavior, economic and social/structural issues, and health care delivery and reform.

Prerequisite: SOC 225

**SOC 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**SOC 315 - Juvenile Delinquency**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to trends and sociological theories of juvenile delinquency.

Prerequisite: SOC 204

**SOC 325 - Global Population Health**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduces demographic methods and theories of population health, in addition to trends in fertility, mortality, morbidity, and aging both in the U.S. and internationally.

Prerequisite: MATH 111 or SOC 204 or SOC 225

**SOC 335 - Hlth Inequal & Cult****Competency**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Introduction to health inequality based on systematic social research. Provision of basic training on cultural competency and underrepresented populations' engagement with the health care system.

Prerequisite: SOC 225

**SOC 345 - Aging and Society**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Aging and Society examines the aging process from a sociological perspective. The course explores socialization and development in health, education, economics, and families. Students will critically examine how aging is shaped by society's influence on individuals, groups, and cohorts.

Prerequisite: SOC 204 or SOC 225

**SOC 405 - Program Planning & Eval**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

In this course, health behavior and behavior change theories are introduced, critiqued, and utilized to provide theory-based examples of population health interventions.

Prerequisites: SOC 204 and SOC 225

**SOC 407 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**SOC 421 - Senior Project Preparation**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Selection of senior capstone research project and/or selection of externship site and goals for externship experience that meets industry needs.

Prerequisite: Population Health Management majors with Senior standing only

**Spanish****SPAN 101 - First Year Spanish**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

An introduction to elementary Spanish. A three-quarter sequence for beginners. Emphasis on vocabulary building, listening comprehension, phonetics, oral practice, and elements of grammar. Elementary readings and writings will be required.

Prerequisite: Taken in sequence or instructor consent

**SPAN 102 - First Year Spanish**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

An introduction to elementary Spanish. A three-quarter sequence for beginners. Emphasis on vocabulary building, listening comprehension, phonetics, oral practice, and elements of grammar. Elementary readings and writings will be required.

Prerequisite: Taken in sequence or instructor consent

**SPAN 103 - First Year Spanish**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

An introduction to elementary Spanish. A three-quarter sequence for beginners. Emphasis on vocabulary building, listening comprehension, phonetics, oral practice, and elements of grammar. Elementary readings and writings will be required.

Prerequisite: Taken in sequence or instructor consent

**SPAN 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**SPAN 201 - Second Year Spanish**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Intensive introduction to the language. Course aims at progressive development of fluency through extensive exposure to the language in real situations.

Comprehension-based approach.

Prerequisite: SPAN 103 or instructor consent; SPAN 201, SPAN 202, SPAN 203 taken in sequence or instructor consent

**SPAN 202 - Second Year Spanish**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Intensive introduction to the language. Course aims at progressive development of fluency through extensive exposure to the language in real situations.

Comprehension-based approach.

Prerequisite: SPAN 201 or instructor consent; SPAN 201, SPAN 202, SPAN 203 taken in sequence or instructor consent

**SPAN 203 - Second Year Spanish**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Intensive introduction to the language. Course aims at progressive development of fluency through extensive exposure to the language in real situations.

Comprehension-based approach.

Prerequisite: SPAN 202 or instructor consent; SPAN 201, SPAN 202, SPAN 203 taken in sequence or instructor consent

**SPAN 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**SPAN 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**SPAN 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**Speech****SPE 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**SPE 111 - Public Speaking**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Public speaking with emphasis on content, organization, and speaker adjustments to various situations; dynamics of the speaker/listener interaction; and appropriate language usage. Includes informative, demonstrative, and persuasive speeches.

**SPE 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**SPE 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**SPE 314 – Argumentation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Examines argumentation as part of human interaction and inquiry. Explores arguing to gain adherence as a way of reasoning. Practice in public speaking, debate, ethics and critical thinking.

Prerequisite: SPE 111

**SPE 321 - Small Group/Team Comm**

Lecture Hours: 2

Lab Hours: 2

Credit Hours: 3

Provides instruction and experience in decision making through group processes designed to develop competent team leaders and participants. Participation in and evaluation of a variety of group

communication exercises.

Prerequisite: SPE 111

**SPE 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**Statistics****STAT 201 - Intro to Data Science**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A general overview of the field of data science. An introduction to data storage, data types, descriptive statistics, and visualization. Basic relational database structure and data retrieval. Report generation. An introduction to programming logic for data scientists.

**STAT 211 - Data Science Methods**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Retrieval, cleaning, transformation, and preparation of data for analysis. An introduction to Bayesian statistics and maximum likelihood estimation with an emphasis on computational efficiency for big datasets. Ethics.

Prerequisites: CST 126, MATH 252, and (MATH 243 or MATH 361)

**STAT 395 - Junior Project I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Team-based applications of data science with an emphasis on workflow and reproducible results.

Prerequisite: STAT 211

Corequisite: MATH 362

**STAT 396 - Junior Project II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Team-based applications of data science with an emphasis on workflow and reproducible results.

Prerequisites: MIS 275 and MATH 362

Corequisite: STAT 441

**STAT 397 - Junior Project III**

Lecture Hours: 1

Lab Hours: 0

Credit Hours: 1

Selection of a senior project that incorporates techniques from computer science, mathematics, statistics, and management. The project may be in one of the following three categories: application to another discipline, algorithmic/computational or theoretical.

Prerequisites: STAT 395 and STAT 396

**STAT 405 - Advanced Methods in Data Science**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

A selection of topics from modern data science techniques with a focus on relevant applied problems.

Prerequisites: CST 211 and STAT 442

Corequisite: STAT 467

**STAT 412 - Regression & Times Series**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Examines an introduction to regression analysis with a focus on multiple linear regression. Topics include statistical inference, goodness of fit, diagnostics, criteria for choosing covariates, categorical predictors, and an introduction to analysis of time series data.

Prerequisite: MATH 362

**STAT 413 - Categorical Data Analysis**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduces analysis techniques for categorical data. Measures of stochastic superiority, odds ratios, techniques for Likert data, Models for frequency arrays, goodness-of-fit tests, two-, three-, and higher-way tables, latent and logistic models will be presented.

Prerequisite: MATH 362

**STAT 414 - Stat Methods in Epidemiology**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Examines the methods used in epidemiologic research, including the design of epidemiologic studies and the collecting and analysis of epidemiological data.

Prerequisite: MATH 361

**STAT 415 - Dsgn & Analysis of Experiments**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Examines the principles of experimental design; construction and analysis of completely randomized design, randomized block design and Latin square designs; covariates; factorial treatments, split plotting; random effects and variance components.

Prerequisite: MATH 362

**STAT 431 - Sampling Methods**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Construction of sampling frames; estimation of means, total and proportions; sampling designs including simple random, stratified, cluster, systematic, multistage and double sampling; ratio and regression estimators; source of errors in surveys; capture and recapture methods.

Prerequisites: MATH 361 and MATH 362

**STAT 441 - Statistical Machine Learning I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

An introduction to machine learning with an emphasis on statistical theory. Supervised (discriminative and generative models) and unsupervised learning for categorical and numerical outcomes. Model selection and assessment.

Prerequisites: (MATH 361 or MATH 465) and (MATH 254 or MATH 261 or MATH 341)

**STAT 442 - Statistical Machine Learning II**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Deep learning including designing and fitting neural networks for a variety of datasets, including independent, sequential, text, image, and big. Reinforcement learning.

Prerequisites: MATH 451 and STAT 441

Corequisite: MATH 342

**STAT 467 - Spatial Statistics**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Sampling, descriptive, estimation, and prediction methods for spatially correlated data.

Prerequisites: GIS 332 and MATH 362

**STAT 495 - Senior Project I**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Research and write a statistical analysis plan for the senior project. This project incorporates techniques from computer science, mathematics, statistics, and management and may be in one of the following three categories: application to another discipline, algorithmic/computational or theoretical.

Prerequisite: STAT 397

**STAT 496 - Senior Project II**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Implementation of a statistical analysis plan for the senior project. This project incorporates techniques from computer science, mathematics, statistics, and management and may be in one of the following three categories: application to another discipline, algorithmic/computational or theoretical.

Prerequisite: STAT 495

**STAT 497 - Senior Project III**

Lecture Hours: 2

Lab Hours: 0

Credit Hours: 2

Presentation and results from senior project. This project incorporates techniques from computer science, mathematics, statistics, and management and may be in one of the following three categories: application to another discipline, algorithmic/computational or theoretical.

Prerequisite: STAT 496

**STAT 505 - Biostatistics I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course focuses on the introduction of statistics and application of statistical methods to data most often seen by medical practitioners and researchers.

This course provides an introduction to the collection and analysis of public health and health care data. Elements of statistical inference, probability distributions, sampling, confidence intervals, and estimation of means and rates are reviewed with emphasis on application and critical interpretation of the results.

**STAT 515 - Epidemiology I**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This course will serve as an introduction to the basic principles of epidemiology and the measures used in epidemiology, epidemiologic study design and analysis, and other topics that are important to an introductory understanding of epidemiology.

**Vascular Technology****VAS 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**VAS 207 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 13

(Hours to be arranged each term.)

**VAS 214 - Vascular Anatomy**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Detailed consideration of the gross and microscopic anatomy of arteries and veins throughout the human body. Laboratory includes cadaver dissection, anatomical models, and an introduction to instrumentation and basic ultrasound scanning techniques.

Prerequisite: MIT 103 with grade "C" or better

**VAS 245 - Periphrl Venous Disease**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Investigation to the pathophysiology of venous disease with emphasis on theoretical and practical considerations of diagnostic methods of venous testing.

These include clinical assessment, plethysmograph, and Duplex Imaging of lower extremity veins.

Prerequisite: VAS 246

**VAS 246 - Perphrl Arterial Disease**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Investigation of the pathophysiology of arterial occlusive disease with emphasis on the theoretical and practical considerations of diagnosis methods of arterial testing.

These include clinical assessment, physiological evaluation, and Duplex imaging of lower extremity arteries.

Prerequisite: VAS 214

**VAS 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**VAS 335 - Radiogrpch Vasclr Anat**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Survey of medical imaging modalities ancillary to vascular sonography including angiography, digital subtraction angiography, computerized tomography and magnetic resonance angiography.

Student teams will prepare case studies comparing the efficacy of these imaging modalities.

Prerequisite: VAS 214 with grade "C" or better

**VAS 337 - Survey of Echocardiography**

Lecture Hours: 2

Lab Hours: 3

Credit Hours: 3

A survey of basic echocardiography with emphasis on normal cardiac anatomy and abnormal disease states. Standard sonographic imaging techniques of adult echocardiography, including instrumentation and protocols.

Prerequisites: BIO 220

**VAS 365 - Abdominal Vasc Disease**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Diagnostic methods of abdominal and visceral vascular disease testing. Includes aorto-iliac, renal artery and kidney, mesenteric system, liver system and transplantations. Laboratory emphasizes advanced instrumentation and scanning techniques, patient interviews, clinical signs and symptoms, physical assessment and findings.

Prerequisite: VAS 246

**VAS 366 - Spec Circulatory Problms**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Diagnostic methods of testing the efficacy of vascular surgical procedures and interventions. To include arterial bypass grafts, organ transplants, and dialysis access grafts. Venous and arterial mapping, upper extremity venous and arterial disease testing, IVUS, pseudoaneurysm treatment, and compartment syndrome will also be covered.

Prerequisite: VAS 365

**VAS 367 - Cerebrovascular Disease**

Lecture Hours: 3

Lab Hours: 3

Credit Hours: 4

Theoretical and practical considerations of diagnostic methods of testing arterial and venous diseases affecting the vasculature of the head and neck including the intracerebral vessels. Laboratory includes advanced instrumentation and scanning techniques, and instruction on patient interviewing, clinical signs and symptoms, physical assessment and findings.

Prerequisites: VAS 366 and VAS 375

**VAS 375 - Survey Abdom Sonography**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

A survey of basic abdominal sonography with emphasis on normal abdominal anatomy and abnormal disease states. Standard sonographic imaging techniques of general abdomen, instrumentation, and abdominal protocols. Corequisite: VAS 365.

Corequisite: VAS 365

**VAS 385 - Vascular Lab Mgmt**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focus on human resource skills as necessary to manage a vascular laboratory. Includes the interview process, hiring and firing, as well as employee performance evaluation. Other topics will include reimbursement, licensure, accreditation and other management issues.

Corequisite: VAS 388

**VAS 388 - Externship Preparation**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Review and summarization of key concepts in Vascular Technology. Focus is on patient care and interpersonal scenarios the externship student will likely face while in the hospital environment or independent vascular lab. Review and discussion of the Vascular Technology Externship Handbook.

Prerequisites: VAS 366 and VAS 375, both with grade "C" or better

Corequisites: VAS 367 and VAS 385

**VAS 407 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**VAS 420 - Vascular Tech Extern**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

All B.S. students complete four terms (12 months) of clinical experience in Vascular Technology at an affiliated clinical site. Students work under the direct supervision of Registered Vascular Technologists and provide monthly log sheets and evaluation forms. Students prepare clinical case studies each term.

Prerequisite: All academic coursework in the Vascular Technology curriculum

**VAS 420A - Special Vas Tech Extern**

Lecture Hours: 0

Lab Hours: 22

Credit Hours: 8

This two term special externship is designed for the degree completion student. Students working in a clinical vascular setting will prepare clinical case studies as well as rotate through special imaging modalities.

Prerequisites: Be an ARDMS or CCI Registered Vascular Technologist in good standing, and have completed academic course work in the Medical Imaging curriculum with grade "C" or better

**VAS 420B - Special Vas Tech Extern**

Lecture Hours: 0

Lab Hours: 18

Credit Hours: 7

This two term special externship is designed for the degree completion student. Students working in a clinical vascular setting will prepare clinical case studies as well as rotate through special imaging modalities.

Prerequisites: Be an ARDMS or CCI Registered Vascular Technologist in good standing, and have completed academic course work in the Medical Imaging curriculum with grade "C" or better

**Writing****WRI 107 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**WRI 115 - Introduction to Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on sentence structure, paragraph coherence, and essays. Regular writing and feedback develop student competency in college level writing. May not be used to meet general education requirement or graduation credit.

Prerequisite: Writing ability as demonstrated by SAT/ACT score and/or writing sample

**WRI 121 - English Composition**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Introduces critical reasoning and analysis.

Explores connections between thesis, structure, tone and purpose; includes writing process, rhetorical strategies applications. Focuses on academic reading, writing and research skills.

**WRI 122 - Argumentative Writing**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Designed to develop skills in ethical argument, research, and critical thinking. Multi-page papers, including argumentative research paper, required. Focuses on writing process with attention to audience, effective style, writing process with attention to audience, effective style, and overall rhetorical effect.

Prerequisite: WRI 121 with grade "C" or better

Pre- or Corequisite: SPE 111

**WRI 123 - Research Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on the formal research paper, including research techniques and process of developing a longer document.

Prerequisite: WRI 122

Pre- or Corequisite: SPE 111

**WRI 207 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**WRI 214 - Business Correspondence**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on theories and strategies governing written correspondence. Designed to equip the student to perform effectively in a variety of business writing situations; major emphasis on practical applications.

Prerequisite: WRI 121

**WRI 225 - Writing Nonfiction**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Study of strategies for nonfiction composition. Both creation of text and analysis of existing text to apply the principles of effective nonfiction prose.

Practical steps, techniques, and best practices geared toward analyzing, creating, organizing, revising effective nonfiction prose for publication. Significant amount of time spent writing and editing.

Prerequisite: WRI 121 with grade "C" or better

**WRI 227 - Technical Report Writing**

Lecture Hours: 4

Lab Hours: 0

Credit Hours: 4

Focuses on techniques of gathering, organizing, and presenting technical information and graphics. Requires technical reports derived from realistic situations in the student's major.

Prerequisite: WRI 121 with grade "C" or better

Pre- or Corequisite: SPE 111

**WRI 305 - Writ for the Marketplace**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Designed to introduce the basics of professional writing- fiction, personal experience, and technical articles, etc. for publication, including marketing and manuscript preparation. Each student must submit at least one article or story (8 pages or more) for publication during the term.

**WRI 307 – Seminar**

Lecture Hours: 0

Lab Hours: 0

Credit Hours: 15

(Hours to be arranged each term.)

**WRI 325 - Advanced Composition**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Advanced writing in varied topics specific to disciplines and realistic assignments in professional writing. 30 to 40 pages of formal writing required with several long pieces designed for publication. Open to advanced students in a variety of majors.

Prerequisites: WRI 122 or WRI 227

**WRI 327 - Advanced Tech Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Processes involved in technical writing and methods of preparing technical data; offers a variety of writing problems to provide opportunities for the student to develop precision in statement and in graphic presentation.

Prerequisite: WRI 122 or WRI 227

**WRI 328 – Style**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on developing strategies for diagnosing, analyzing, and revising clarity using the technical vocabulary of style.

Approaches style as a rhetorical concern dependent on audience and other aspects of the situation. Applicable to both research and professional/technical writing.

Prerequisite: WRI 122 or WRI 227

**WRI 332 - Academic Writing in the Disciplines**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on research and analytical writing strategies for meeting the rhetorical demands of specialized subjects and diverse audiences in the students' disciplines. The course addresses topics and issues of interest in disciplinary areas of health sciences, engineering, and social sciences.

Prerequisites: WRI 121 or WRI 122, and WRI 227 or WRI 327

**WRI 345 - Science Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Processes and strategies involved in communicating scientific information to professional and lay audiences, including: topic, hypothesis, and experimental method description; literature review

strategies; writing and project management strategies; visual display of quantitative data.

Prerequisite: WRI 122 or WRI 227

**WRI 350 - Documentation Develop**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides students with basic tools for preparing documentation. Focuses on usability of documentation and includes planning and scheduling, audience evaluation, use of appropriate examples and illustrations, style, editing technique, organization and research.

Prerequisite: WRI 122 or WRI 227

**WRI 407 – Seminar**

Lecture Hours: 6

Lab Hours: 0

Credit Hours: 6

(Hours to be arranged each term.)

**WRI 410 - Proposal & Grant Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Provides theory and skills in proposal writing for seeking funding from public and private agencies and for preparing proposals in business and industrial settings. Focuses on the process of preparing proposals, including analyzing audiences, conducting research, organizing, writing, and editing.

Prerequisite: WRI 122 or WRI 227

**WRI 415 - Technical Editing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on the role of the technical editor in business and industry. Examines the publishing process, the dynamics of the editor/writer relationship, and mechanics and techniques of proofreading and copyediting. Provides considerable practice in copyediting and proofreading

manuscripts.

Prerequisite: COM 216 or WRI 328

**WRI 420 - Document Design**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Applies publishing and graphic arts principles to the preparation of professional publications and oral presentation materials. Includes typography, design principles, the use of graphical elements, and integration of text and graphics.

Prerequisites: WRI 122 and WRI 227

**WRI 507 – Seminar**

Lecture Hours: 12

Lab Hours: 0

Credit Hours: 12

(Hours to be arranged each term.)

**WRI 510 - Grant Proposal Writing**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

This Provides theory and skills in proposal writing for seeking funding from public and private agencies and for preparing proposals in business and industrial settings. Focuses on the process of preparing proposals, including analyzing audiences, conducting research, organizing, writing, and editing.

**WRI 521 - Writing at the Grad Level**

Lecture Hours: 3

Lab Hours: 0

Credit Hours: 3

Focuses on developing professional-level writing skills to produce a master's thesis/project documentation. Includes structure, methodology, and emphasizes adherence to OIT manual and appropriate reference style. By the end of term, students will have written a detailed prospectus and literature review.



## Offices and Services

### Administrative Offices (services may vary by campus location)

#### Academic Advising and Retention

LRC 113

(541) 851-5266

[www.oit.edu/students/advising](http://www.oit.edu/students/advising)

The Office of Academic Advising and Retention serves a dual purpose: to provide high-quality academic advising that ensures students have the skills and information to make knowledgeable decisions for educational and personal goals, as well as to identify and improve systemic issues that hinder student advancements.

Academic advising is available to all Oregon Tech students from first-year through graduation; assisting students stay on track, explore interests, meet degree requirements and connect them to resources that promote student success.

In addition to advising services, cross-departmental retention data is collected and assessed to identify trends and coordinate retention efforts campus-wide.

#### Educational Partnerships and Outreach

DOW E202

(541) 885-1844

Room 212 - Portland-Metro

[outreach@oit.edu](mailto:outreach@oit.edu)

[www.oit.edu/academics/educational-partnerships](http://www.oit.edu/academics/educational-partnerships)

Oregon Tech's Office of Educational Partnerships and Outreach cultivates and maintains partnerships with area high schools, community colleges, and universities that result in increased access and smooth transitions for students. The office forges meaningful relationships with educational partners by connecting faculties, coordinating partnerships, participating in pathways and other local and statewide advisory boards and providing internal and external communication and promotion of partnerships. The office develops dual enrollment agreements with college and university partners, coordinates dual credit and other programs with high schools locally and statewide, manages and coordinates articulation agreements, and develops and manages other academic agreements. EPO is committed to promoting access and equity of higher education to students throughout the state via their dual credit programming and post-secondary pathway work.

Information about the work of Educational Partnerships and Outreach, dual enrollment with colleges and universities, dual credit with high schools and specific articulation agreements are available on the web page or by contacting the office.

#### High School Programs for College Credit

(541) 885-1844 Klamath Falls

(503) 821-1297 Portland-Metro

[www.oit.edu/dual-credit](http://www.oit.edu/dual-credit)

[www.oit.edu/hst](http://www.oit.edu/hst)

#### Dual Credit Program

The Dual Credit Program is a partnership between Oregon Institute of Technology and the participating high school to offer qualified high school students the opportunity to receive college credit from Oregon Tech. Oregon Tech is partnered with more than 150 high schools and offers more than 25 introductory college courses. The Dual Credit Program consists of college courses taught in the high schools by college level qualified high school instructors. These courses are offered as part of the regular high school curriculum with the option of registering for college credit from Oregon Tech. Dual Credit provides students with the opportunity to take college level courses, gain valuable skills, and develop study habits for college. Oregon Tech's dual credit programming adheres to the Oregon Standards for Dual Credit and Sponsored Dual Credit.

#### Early OWLS Program

The Early OWLS Program (EPO) at Oregon Institute of Technology gives qualified high school students the opportunity to come to the Klamath Falls or Portland-Metro campus and take a college course for Oregon Tech credit. Students must be 14 years or older and are typically eligible to take 100- and 200-level courses. High school students must register through the Office of Academic Agreements.

The Dual Credit and HST Programs allow Oregon Tech to reduce the normal tuition fee by a considerable amount. Cost to the participating high school student is \$100 per class for Dual Credit, and \$25 per credit for EPO.

## **Affirmative Action, Non-Discrimination and Equal Opportunity**

Office of Human Resources, Snell 108  
(541) 885-1108

The Civil Rights Officer is charged with oversight and enforcement of Oregon Tech's compliance with relevant federal, state and university civil rights statutes, regulations and policies. Complaints and grievances related to unlawful discrimination and harassment under federal and state Civil Rights Acts, the Rehabilitation Act, the Americans with Disabilities Act, and other federal or state anti-discrimination and employment laws are to be directed to the Officer for resolution. The Officer also coordinates Oregon Tech's Equal Opportunity programs and activities which seek to maintain a learning and working environment that fosters diversity, inclusion and personal success. Inquiries, requests for assistance, or grievances pertaining to Oregon Tech policies on discrimination, harassment, equal opportunity or access to programs and services should be directed to this office.

## **Assessment**

(541) 885-1990  
[www.oit.edu/faculty-staff/provost/academic-excellence/GEAC/essential-studies/eslo](http://www.oit.edu/faculty-staff/provost/academic-excellence/GEAC/essential-studies/eslo)

Oregon Tech actively engages in assessment of both degree programs and broad institutional essential student learning outcomes (ESLOs). The Director of Academic Excellence and Executive Assistant, in conjunction with the Executive Committee of the Assessment Commission, leads the campus in these efforts. Assessment plans are developed for each undergraduate and graduate degree program focusing on program learning outcomes created by each academic department. The faculty for the program identify strengths and weaknesses in student learning and recommend plans for improvement through a continuous program improvement process. Information on assessment of student learning outcomes is posted on the Oregon Tech website. Oregon Tech faculty members also assess the ESLOs, which are intended to reflect common themes from departmental and program learning outcome statements. Information on assessment of ESLOS is posted on the Oregon Tech website at [www.oit.edu/faculty-staff/provost/academic-excellence/GEAC/essential-studies/eslo](http://www.oit.edu/faculty-staff/provost/academic-excellence/GEAC/essential-studies/eslo).

## **Campus Safety**

Cornett 231  
(541) 885-1111  
[www.oit.edu/safety](http://www.oit.edu/safety)

The Campus Safety department administers the university's security and parking programs. The department promotes security on the Oregon Tech Klamath Falls campus through emergency and non-emergency response services, problem solving, and enforcement of appropriate laws, rules and regulations. The Campus Safety department also provides service functions such as crime prevention and crime reporting programs. Campus Safety patrol officers are available 24/7 for any concern, including disability issues that need immediate resolution or assistance. Our "Night Ride" assistance program is also available for any person that needs an escort from one area to another on campus 24/7. University parking information and appropriate temporary parking permits are available by contacting Parking Services at (541) 885-1551.

## **Geo-Heat Center**

Boivin Hall, 102  
(541) 885-1750  
[geoheat@oit.edu](mailto:geoheat@oit.edu)  
[www.oit.edu/orec/geo-heat-center](http://www.oit.edu/orec/geo-heat-center)

The Oregon Renewable Energy Center encompasses Oregon Tech's Geo-Heat Center. Established in 1975, Geo-Heat is active in research, technical assistance and information services in geothermal direct-use, small-scale power generation and ground-source heat pumps. Research activities have included hydrology and geochemistry studies, district heating, down hole heat exchangers, heat pumps, agri-business applications, low temperature Rankine cycle power generators and resource assessment.

As funding allows, the Center provides technical assistance for geothermal projects in the area of equipment and materials selection, feasibility studies, design, troubleshooting and economic evaluations. The Center also provides training sessions and information dissemination regarding the direct applications of geothermal energy, small-scale power generation and ground-source heat pumps.

The Center also publishes technical papers, software and monographs on geothermal energy. Most publications are available on the Center's website, and also through the National Geothermal Data System (NGDS). Archival publications are available through Oregon Tech's library system. The staff has made presentations worldwide and gives tours of local geothermal installations. They are active in professional organizations such as the

Geothermal Resources Council, the International Geothermal Association, International Ground-Source Heat Pump Association, and ASHRAE. An extensive Web site on geothermal energy is available at: [www.oit.edu/orec/geo-heat-center](http://www.oit.edu/orec/geo-heat-center).

## **Information Technology Services**

(541) 885-1720

(541) 885-1470 Helpdesk/Service

(503) 821-1289 Portland-Metro Helpdesk

Information Technology Services provides computing and telecommunications resources for the Oregon Tech campuses. Primary service and support areas include e-mail and network storage for all students, faculty and staff; broadband network connectivity between all Oregon Tech buildings; and advanced technology services such as wired and wireless Internet connections, Internet 2 and interactive videoconferencing. In conjunction with Oregon Tech faculty, staff and students, ITS strives to offer the comprehensive and advanced technologies necessary to meet educational needs and to help facilitate instruction and research on the Oregon Tech campus.

Oregon Tech offers more than 500 computers available for student use on the Klamath Falls campus. The Portland-Metro campus is a laptop-required campus with resources like laptop specifications, financial aid, and helpful instructions found at [www.oit.edu/portland-metro/college-costs/bring-your-own-device](http://www.oit.edu/portland-metro/college-costs/bring-your-own-device). ITS supports the computers and projectors in campus laboratories and classrooms to insure proper function and availability for faculty and students.

## **Library Services**

(541) 885-1772

[www.oit.edu/libraries](http://www.oit.edu/libraries)

The University Libraries consist of the main library on the Klamath Falls campus, the Shaw Historical library, and the Portland-Metro campus library. The online catalog provides access to the library collections, while web-based databases offer students access to extensive online information sources. All electronic resources are available on both campuses and via remote access in order to promote student learning regardless of location. Research services include print and electronic reserves, inter-library loans, individual research assistance, and chat reference. Campus librarians offer class-related instruction in the use of the library and information resources, workshops on various topics, classes in research methods, and tours.

### **Klamath Falls Library**

The Klamath Falls library, located on the first and second floors of the Learning Resources Center (LRC), contains print and electronic research materials, including government documents; access to thousands print and electronic journals; and unique digital and special collections. For librarian assistance, call (541) 885-1772 or email [libtech@oit.edu](mailto:libtech@oit.edu).

### **Portland-Metro Library**

The Portland-Metro library, located on the fourth floor of the Portland-Metro campus building, houses a print collection on-site focusing on local programs, and will request any other resources as needed. For assistance call (503) 821-1260 or email [libtech@oit.edu](mailto:libtech@oit.edu).

### **Shaw Historical Library**

The Shaw Historical Library, located on the second floor of the LRC, established in 1983 by Laurence and Dorothy Shaw, houses books, art, maps, manuscripts, photographs, and other materials on the history, cultures and natural history of the Land of the Lakes—South Central Oregon, Northern California, and Northwestern Nevada. The Journal of the Shaw Historical Library is available for purchase at the Oregon Tech bookstore. For more information call (541) 885-1686 or email [Shawlib@oit.edu](mailto:Shawlib@oit.edu).

## **Marketing, Communications & Public Affairs**

Snell Hall (Klamath Falls); and 2nd Floor, Administrative Wing (Portland-Metro)

(503) 821-1303; (541) 851-5480

[marketing@oit.edu](mailto:marketing@oit.edu)

The Marketing, Communications and Public Affairs Department (MarCoPa) at Oregon Tech is responsible for developing and implementing integrated outreach strategies designed to advance the university's reputational capital and standing among a variety of constituents and audiences. This includes providing services to all segments of the university, from supporting academic departments in promoting their programs, to developing ad campaigns for student recruitment, to creating communications strategies that undergird our mission.

The department is responsible for the university's brand position and identity. It works with academic programs and administrative departments throughout the university on marketing and advertising outreach efforts, and manages university-wide publications, video production, the university's website, and social media. The department also serves as the public affairs office for the university, managing media relations, supporting legislative affairs, and providing executive communications and editorial support.

## Oregon Renewable Energy Center

The Oregon Renewable Energy Center (OREC) was established by the Oregon State Legislature in 2001 to promote energy conservation and renewable energy use in Oregon and throughout the Northwest. This is accomplished through applied research, educational programs and workforce development, and technical assistance and information dissemination. The Center also encompasses Oregon Tech's Geo-Heat Center. OREC draws its strong technical expertise from the Oregon Tech faculty, whose engineers and computer scientists have been involved in applied research in renewable energy for decades.

### OREC:

- investigates renewable energy technologies and opportunities for using them
- assesses which technologies are appropriate for particular circumstances
- applies promising technologies with effective instrumentation and controls
- evaluates technologies using testing and economic analysis
- supports Curriculum Development and student learning experiences
- informs the public through classes, educational materials, and technical data

Current OREC applied research and applications engineering projects focus on:

- power conversion and storage – Testing renewable technologies such as solar, fuel cells, and geothermal heat pumps and developing control systems to smoothly integrate renewable technologies into existing facilities and electrical distribution networks
- alternative fuel sources – Investigating electric and biodiesel power options for cars and trucks
- green building technologies – Utilizing green building materials and techniques, and instrumentation, control and testing of buildings that use renewable energy instead of conventional power
- grid integration of renewable energy sources (smart grid with smart buildings)

## Pre-College Programs

[www.oit.edu/academics/pre-college-programs?ad=youthprograms](http://www.oit.edu/academics/pre-college-programs?ad=youthprograms)

Oregon Tech's Youth Programs offers innovative and energizing pre-college educational outreach programs designed to encourage K-12 students to pursue educational and career goals in science, technology, engineering and mathematics (STEM). The goals of our programs are to:

- increase understanding and interest in STEM careers among participants
- build confidence in their technical abilities
- introduce them to role models and mentors

## Pre-College Camps

### SUMMER STEM PROGRAMMING

SUMMER STEM offers day and residential camps each summer designed to be an inclusive learning environment for young scholars to experience STEM education across multiple avenues in a collegiate setting. Curriculum varies each summer with multiple academic departments leading experiences. Young scholars have participated in activities ranging from bridge building simulations (Civil Engineering), to soap making (Chemistry), to coding Arduino systems, and understanding and experimenting with food psychology. Scholars are provided with field trips that highlight STEM in real life and share conversations with industry experts and thought leaders from a variety of STEM fields.

## Registrar's Office

Snell, Lower Level

(541) 885-1300

[registrar@oit.edu](mailto:registrar@oit.edu)

[www.oit.edu/registrar](http://www.oit.edu/registrar)

Major functions of the Registrar's Office are the maintenance of student records, registration, Web services, grade processing, transfer credit evaluation and community college articulation, degree checking, graduation, scheduling, enrollment certification and the catalog.

### Academic Information

The class schedule, introductory pages to the Class Schedule and General Catalog contain information about academic regulations, registration instructions and college procedures and policies. Students should be familiar with this information. These documents can be found on the Oregon Tech Web site at [www.oit.edu/registrar](http://www.oit.edu/registrar).

## **Student Records**

The Registrar's Office maintains information regarding academic progress, including grade reports and permanent academic records (transcripts). Students and alumni may request transcripts at any time.

The Registrar's Office also collects and maintains accurate information about students, such as address, curriculum (major) and advisor's name. Much of this information is required for local and state enrollment reporting and for accurate mailing addresses. Changes to personal data such as address or name should be reported to the office promptly.

## **Privacy Rights**

Under the Family Educational Rights and Privacy Act of 1974, students are entitled to review records, files, documents and other materials that contain information maintained by the university. Students may challenge information considered inaccurate or misleading. A list of university records, the responsible custodians and the university policy on records are available in the Registrar's Office.

## **Directory Information**

The following information is considered Directory Information and may be made available to the public unless you restrict its release by written notice to the University Registrar by the last day to register or add courses for the current term.

Oregon Tech designates the following items as Directory Information: student name, current address, current telephone number, dates of attendance, classification (year in school), major field of study, most recent previous school attended, degrees and awards received (including dates), hometown, past and present participation in officially recognized activities and sports; and for members of athletic teams: age, height and weight.

## **Registration**

The Registrar's Office publishes the class schedule and registration instructions for each term on the Oregon Tech Web site at [www.oit.edu/registrar](http://www.oit.edu/registrar). It also maintains class rosters for instructors and processes grades. Personal information, class schedules and grades, as well as unofficial transcripts, are on Oregon Tech's Web for Student and also available in the office.

## **Strategic Partnerships and Government Relations**

Portland-Metro

(503) 821-1247

[www.oit.edu/strategic-partnerships](http://www.oit.edu/strategic-partnerships)

The Office of Strategic Partnerships (OSP) and Government Relations promotes and oversees industry and government relationships at the Oregon Institute of Technology. The staff is responsible for campus-wide promotion of the University's economic development mission by facilitating the external relationships that enable the University to contribute to the vitality of its campus regions and the state of Oregon.

The OSP has responsibility for:

- building long-term partnerships with businesses and industry associations that are crucial to Oregon Tech's mission
- providing support to secure external funding by leveraging private sector partnerships for grants and sponsored projects
- proactively working with faculty to develop collaborations with industry that lead to sponsored projects, commercialization and entrepreneurial opportunities
- building an alliance of local, state and national support for Oregon Tech's policy and funding priorities
- representing the University on strategic partnerships, industry affairs, and legislative advisory councils

The OSP collaborates with the Office of Sponsored Projects & Grants Administration and the Office of Innovation and Technology Transfer to determine Oregon Tech's research priorities and align faculty research interests with industry, other universities, and economic development and research organizations. Operationally, the Office of Strategic Partnerships reports to the President to advance the University's strategic priorities.

## **Business and Industry Partnerships**

The Office of Strategic Partnerships assists Oregon Tech's faculty at all locations to connect to industry partners and advisors to ensure that Oregon Tech's courses integrate new technologies and are responsive to business needs for skilled professionals. Businesses throughout the Pacific Northwest, such as Intel, Pacific Power, Maxim, PCC Structural, FLIR, Mentor Graphics, JELD-WEN, Kaiser, Providence and the Boeing Company, send their best and brightest to Oregon Tech for professional development so they can advance into engineering, technology, health care and management positions within their companies.

Oregon Tech's business partners participate on Industry Advisory Councils, support students through internships and sponsored student projects, teach as adjunct faculty, recruit graduates for jobs, donate labs and equipment, and sponsor applied research. Oregon Tech could not fully execute its mission without the engagement and support of industry partners.

Oregon Tech is a member or partner with the Smart Grid Oregon, Drive Oregon, Oregon Solar Energy Industry Association, Renewable Northwest Project, Oregon Manufacturing Innovation Center, Oregon BEST (Built Environment & Sustainable Technology), Manufacturing 21 Coalition, Pacific Northwest Defense Coalition, Gorge Technology Alliance, Technology Alliance of Oregon, Oregon Manufacturing Extension Partnership,

Oregon Workforce Investment Board and several local workforce boards, Oregon Transportation Research and Education Consortium, Oregon Health care Workforce Institute, and the Greater Portland, Klamath Falls, Tualatin, and Wilsonville Chambers of Commerce.

### **Government Relations**

Oregon Tech's government relations activities support the university community's vision "Oregon Tech will be a nationally recognized public polytechnic university delivering in-demand, industry-focused degrees and graduates ready to meet workforce needs in Oregon and the Northwest."

Working with local, state and national elected and appointed leaders, Oregon Tech's government relations efforts are focused on enhancing student and graduate success, continuing excellence in applied degree programs, providing statewide educational opportunities, advocating for state funding for educational resources and capital projects, and increasing service to the community.

Oregon Tech provides information to local, state and national legislators and policy makers on:

- increasing access for rural and under-served students to science, technology, engineering and math (STEM) degree programs
- workforce development support for local industries, such as health care, energy, and manufacturing
- education policy and reform including Oregon Tech's initiatives to achieve the state's and nation's educational goals
- financial aid and student access initiatives, with a focus on rural students and first-generation college students
- re-authorization bills that impact Oregon Tech's portfolio of programs
- local, state, and federal competitive grants to enhance Oregon Tech's degree programs and net-zero campus initiatives

### **Title IX**

Title IX Office, Snell 108  
(541) 885-1108  
titleix@oit.edu

The Title IX Coordinator is charged with oversight and enforcement of Oregon Tech's compliance with Title IX of the Education Amendments. Complaints of gender-based or sex-based discrimination, sexual harassment, and sexual assault should be immediately reported to Oregon Tech's designated Title IX Coordinator.

### **Athletics and TechRec**

(541) 885-1634  
oregontechowls.com

The mission of the Oregon Tech Athletic Department and the TechRec Fitness Center is to facilitate growth and development among our students. The department provides a broad-based athletic program that creates educational opportunities through the medium of competition at the collegiate level as well as the opportunity to benefit personal health and fitness to the campus community through our TechRec. Oregon Tech Athletics boasts some of the best facilities in the NAIA, which include Danny Miles Court, John and Lois Stilwell Stadium, OT Soccer Stadium and TechRec. John Moehl Stadium will be getting a brand new track and renovated press box, which will be available fall of 2021. Please visit <https://oregontechowls.com/facilities> to view our first class facilities. Oregon Tech competitive athletics teams include men's and women's basketball, cross-country, soccer, golf, track and field; women's volleyball, women's softball, and men's baseball. Oregon Tech also supports a men's Rugby program as an extramural sports.

Athletics, TechRec, Intramurals, and Extramural Sports are funded by sales revenue (tickets, concessions, camps etc.), Incidental Fees, Oregon State Lottery funds, State General Appropriations, and contributions from the community through the Oregon Tech Foundation.

### **Competitive Athletic Teams**

The Oregon Tech Athletic department is dedicated to preparing our student-athletes for professional and personal success in the real world by learning the values of integrity and excellence on the court, field, and in the classroom. To that end, we are committed to field teams with the talent and ability to compete at the top of the Cascade Collegiate Conference, as well as regionally and nationally in the NAIA while representing Oregon Tech with dignity and class. To date, Oregon Tech has brought home five NAIA National Championships in team sports – men's basketball in 2004, 2008 and 2012; softball in 2011, and women's cross-country in 2018. The privilege of participation in intercollegiate athletics and dedication to team goals provides a classroom where students may experience the development of skills, sportsmanship, loyalty, self-discipline, and responsibility while learning the values of winning, losing, and competing. The Oregon Tech athletic program contributes to campus life by providing a focal point for social interaction, leadership development, involvement in peer support groups, and entertainment.

### **Intramural Sports**

The Oregon Tech intramural program offers a variety of individual and team events such as basketball, volleyball, and futsal. We hope that our program and its diversity will invite each of you to participate in at least one event during the academic year. Call (541) 885-1561 for information about intramural sports programs or see the website for rosters and information.

### **TechRec (Student Fitness Center)**

TechRec is a newly renovated student fitness center that opened fall of 2020. For more information about workout facilities available to students, please visit <https://oregontechowls.com/sports/2020/11/18/tech-rec-closed.aspx>.

### **Bookstore, Tech Nest**

College Union, 1st Floor  
(541) 885-1050  
[bookstore@oit.edu](mailto:bookstore@oit.edu)

The Tech Nest Store provides a diverse selection of textbooks, trade books, course materials and supplies to the students, faculty, staff and community. The Tech Nest is your resource for Oregon Tech apparel, gifts and souvenirs.

Online: [oregontech.bncollege.com/shop/oit/home](http://oregontech.bncollege.com/shop/oit/home).

### **Campus Dining**

College Union, 2nd Floor  
(541) 885-1076  
[oit.sodexomyway.com](http://oit.sodexomyway.com)

Dining services, provided by Sodexo Inc., offer a dining program complete with services in several locations across campus, and menu selections that include just about every item you can imagine.

The Marketplace features a wide variety of fresh food designed to satisfy everyone's appetite with food choices to rival restaurant favorites. The Bistro is a quick-serve coffee/espresso and light meals venue located on the first floor of the College Union. Duffie's, located in the Purvine building, offers a variety of fresh items to get you going in the morning or for a quick pick-me-up between classes. The Night Owl, the residence hall snack bar, is open only at night and offers a selection of beverages and snacks to satisfy that late night hunger.

### **Document Resource Center**

College Union, 1st Floor  
(541) 885-1894  
[servicecenter@oit.edu](mailto:servicecenter@oit.edu)

The DRC is a one-stop shop for printing and bulk mailing needs. Services are available to faculty, staff, and students.

Black and white, color, digital printing, as well as laminating, comb binding and gluing are available at low costs. Electronic job submission provides the campus with access to services and completed jobs can be delivered to campus mailboxes within 24 hours.

Mail services include bulk mailing; mail merge; folding and inserting; and postcard mailings. Special requests will be addressed on an individual basis. Hours of operation are 7 am to 5 pm Monday through Friday.

### **Housing and Residence Life**

Housing Office Residence Hall, A151  
(541) 885-1094  
[housing@oit.edu](mailto:housing@oit.edu)  
[www.oit.edu/campus-life/housing](http://www.oit.edu/campus-life/housing)

Housing and Residence Life encourages self-responsibility, a necessary ingredient for the accomplishment of academic, social, and personal objectives. Every attempt is made to provide an environment to accomplish this aim. Oregon Tech's Housing and Residence Life program provides a vital aspect of a student's educational experience, from support in the classroom to extracurricular activities designed to supplement in class learning. Emphasis is on providing accommodations that are attractive, safe, reasonably priced, and offering stimulating programs that satisfy individual needs for privacy, community life, diversity in living arrangements, and educational growth. In the Housing Office, students can find answers to housing-related questions, gain assistance with personal matters, consult with staff, make suggestions for improvements, discuss financial issues, and receive assistance for a variety of housing related concerns and interests.

Residence facilities at Oregon Tech are operated on a self-supported financial basis. Living on campus relieves the student of many time-consuming and expensive tasks, including driving to and from campus and preparing meals. With this extra time and financial savings, students can devote more energy to their studies, participate in non-academic learning experiences, and enjoy recreational and stress-relieving pursuits, making new and often lifelong friends.

Information about on-campus housing is sent to all students admitted to Oregon Tech. Students living on campus must sign up for the meal plan. Apply now to live on campus with us. Visit our webpage at [www.oit.edu/campus-life/housing](http://www.oit.edu/campus-life/housing), click on Apply Now, and follow the 5 steps to apply for on campus housing!

Completed applications for on-campus housing received in the Housing Office by May 1st are guaranteed a space on campus for the upcoming academic year.

### **Room-and-Board Rates**

Room-and-board rates at Oregon Tech are announced publicly after university approval. Current rate information and any other information concerning Housing can be obtained from the Housing and Residence Life Office, Oregon Tech, 3201 Campus Dr., Klamath Falls, OR 97601-8801, or online.

## **Student Services (services may vary by campus location)**

### **Student Involvement & Belonging**

Klamath Falls, College Union 107

Portland-Metro, WV 432  
(541) 885-1829  
[www.oit.edu/get-involved](http://www.oit.edu/get-involved)

The department of Student Involvement & Belonging (SIB) is "Where Students Connect!". We promote the holistic growth and development of Oregon Tech students through involvement and support. We create a community where all feel a sense of belonging. SIB provides opportunities for student engagement beyond the academic experience. These include the New Student Orientation and Week of Welcome program, leadership development & community service opportunities, Diversity & Belonging programs, International Student Services, Military-Affiliated Student Support, and the organizational management of all RSOs. Additionally, SIB leads the management of the Oregon Tech App, provides free student resources (ex: Bird Feeder Student Food Pantry), and advises student led programs.

### **Free Student Support Resources**

#### **Bird Feeder Student Food Pantry**

The Bird Feeder is a free student food pantry (for immediate consumption & emergency groceries). This resource is maintained by financial contributions & donations of nonperishable food items.

Klamath Falls: The Bird Feeder is located on the first floor of the College Union, next to the SIB office (CU 107). Requests for emergency groceries and/or hygiene products can be emailed to [getinvolved@oit.edu](mailto:getinvolved@oit.edu).

Portland-Metro: Requests for emergency groceries and/or hygiene products can be emailed to [portland@oit.edu](mailto:portland@oit.edu).

#### **Book Depot**

The Book Depot is managed by ASOIT and SIB. Students can view the current inventory at <https://oitcampuslife.librarika.com/>. Please note: We do our best to keep the inventory updated, but some books may not be available, even if they are listed.

Klamath Falls: The Book Depot is located on the first floor of the College Union, next to the SIB office (CU 107).

#### **International Student Services**

This office serves as a resource for international students and staff, international student orientation and advising (personal, academic and social); F1 visa compliance; SEVIS; and the Study Abroad Program. We strive to provide the best services and exceptional support. If you ever have any questions or concerns about your immigration status, adjusting to American customs, or whatever the issue might be, please make an appointment with your International Advisor (located on the Portland-Metro campus) at [www.oit.edu/campus-life/international](http://www.oit.edu/campus-life/international).

## **Leadership & Service**

### **Leadership**

Oregon Tech offers students leadership development opportunities and training throughout the year provided by a wide range of departments. Staff members in Campus Life, Diversity & Belonging, Career Services, Student Services, and the Student Success Center are available to help students identify the ways you are developing skills, document, and speak to your incredible achievements.



## **Community Service**

The Volunteer Owls foster community service and local engagement. All students can find information about service-related projects or opportunities in their local areas at <https://www.noblehour.com/oregontech>. The Volunteer Owls program host service projects in and around Klamath Falls throughout the year. Many opportunities exist for community service projects both on and off-campus. For tracking community service hours or to find suitable opportunities for your club, go to [www.oit.edu/community-service](http://www.oit.edu/community-service).

## **Family and Alumni Weekend**

Family and Alumni Weekend is open to all Oregon tech students, faculty, staff, alumni, and their families! Bring your children, siblings, parents, grandparents, partners, and friends and join us for the weekend!

## **New Student Orientation**

### **Orientation Online**

This is self-paced introduction to all things Oregon Tech. Once you've attended New Wings and registered for class you will be added to the Orientation Online Canvas Class. This free class provides information about how to use Canvas, TECHweb, campus resources, and navigating Oregon Tech.

### **Week of Welcome**

New Student Orientation (NSO)'s Week of Welcome program is held each year prior to the start of fall term classes. It is designed to help new students acclimate to Oregon Tech, meet their fellow students, and feel ready for the start of a successful year. Students who come to orientation receive Oregon Tech gear, free meals, and the chance to win great prizes while learning all about being an Oregon Tech Owl!

### **Student Engagement**

Student involvement has been shown to correlate with academic and career success. Programs and activities are aimed at fostering a sense of community at Oregon Tech. As a student, you can be involved in a variety of ways. You could start or join a campus club or organization, serve on a committee, run for office, or apply for various student staff positions.

SIB invites you to get involved in any way you can! We strive to build programs and offer activities which foster a vibrant community, provide an experience of belonging, and celebrate the unique talents and interests of the student body. Opportunities are created for hands-on learning, self-discovery, leadership, teamwork, and community citizenship. Students are encouraged to "find their home" at Oregon Tech through one or many opportunities and truly make their college experience their own. With over 75 different activities, student leadership programs, and clubs, there is something for everyone, including the chance to start a new organization and connect with those who have shared interests.

All students should download the Oregon Tech App to see the most updated information about events, services, hours of operations for office and support services, giveaways, and drawings.

### **Registered Student Organizations (RSOs)**

Student clubs and organizations add another important dimension to life on campus. Almost half of the approximately 60 clubs are related to various academic disciplines and provide opportunities for students to meet, study, and take part in professional development opportunities such as conferences and competitions related to their majors. Clubs and organizations also work together to support service learning by participating in a variety of community service projects at home and abroad. Clubs are also linked to special interests, sports, recreation, and cultural, spiritual, and social activities.

In addition, there are nine student programs, which are larger student organizations, that exist to provide resources to a specific constituency of students. Student Programs have office space on campus, paid student leader positions, and a budget allocation each year.

### **ASOIT (Student Government)**

[www.oit.edu/asoit](http://www.oit.edu/asoit)

The purpose of ASOIT is to supplement the social, cultural, physical, and educational interests of its members, and to represent the individual and collective interests of the students of Oregon Tech. The membership consists of all admitted students at Oregon Institute of Technology holding a current, valid student ID card.

### **Campus Activities Board**

[www.oit.edu/getinvolved](http://www.oit.edu/getinvolved)

The purpose of the Campus Activities Board (CAB) is to provide a wide array of activities, opportunities, and entertainment for all students, taking into consideration their expressed wishes, interests, and needs. A broad array of events has been offered to students including bands, comedians, student talent shows, lectures, discount bowling and movie nights, and homecoming week.

## **Outdoor Program (OP)**

[www.oit.edu/op](http://www.oit.edu/op)

The Oregon Tech Outdoor Program (OP) is a student-funded and student-led organization that allows students to enjoy fun activities and the beautiful scenery that surrounds them for an extremely low and reasonable price! Past trips have included: camping, rafting, skiing, mountain biking, and skydiving. In addition to sponsoring trips, the OP also offers low-cost rental equipment for a variety of outdoor activities.

## **Residence Hall Association (RHA)**

[www.oit.edu/getinvolved](http://www.oit.edu/getinvolved)

Each student living on campus is a member of the Residence Hall Association (RHA). This organization works with the Residence Life staff to promote, organize, coordinate and implement programming during the academic year. RHA sponsors everything from "Spring Fling" to movie nights. The RHA is funded in part through incidental fees and belongs to the residents.

## **Student Veterans Program (SVP)**

[www.oit.edu/svp](http://www.oit.edu/svp)

The members of the SVP are dedicated to satisfying the needs of any veteran of the Oregon Tech and KCC community during and after their time as a student, staff, or faculty. With the direction of the elected officers of SVP, the support of KCC Veterans Club, and the assistance of the Campus Veterans Service Officer (CVSO), the SVP shall reach out to the greater Oregon Tech and Klamath community and seek ways of building friendships and partnerships that are based on the same honor, duty, loyalty, and selfless service instilled in all veterans.

## **Student Media**

### **The EDGE - Student Newspaper**

<https://www.oit.edu/SIB/student-media>

The Edge is student led and student read. Oregon Tech's student newspaper, The Edge, is a weekly publication written by students from all majors and produced by a student staff. It is published during fall, winter, and spring terms, with a satirical edition, The Ledge, published once per term.

### **KTEC Campus Radio Station**

[www.oit.edu/ktec](http://www.oit.edu/ktec)

89.5 FM

KTEC hit the milestone of their 65th year of operation in the spring of 2017 and is the oldest FM station in Southern Oregon. KTEC is operated by student staff and volunteers and is programmed to serve the interests of the Oregon Tech student body and the Klamath Falls community. Throughout the school year, KTEC provides a varied program schedule of music, educational material and special events. Any student interested in radio broadcasting is encouraged to join KTEC.

### **Oregon Technical Broadcasting (OTB)**

[www.oit.edu/otb](http://www.oit.edu/otb)

Oregon Tech Broadcasting (OTB) is the student-run video production program at Oregon Tech. OTB films campus events and provides video services to campus organizations upon request. Anyone who is interested in TV/video/film productions, acting or comedy is encouraged to get involved with OTB. No previous experience is necessary. OTB also offers free equipment rental and tutorials for all Oregon Tech students.

## **Career Services**

Klamath Falls: LRC, 219

(541) 885-1020

[career@oit.edu](mailto:career@oit.edu)

Portland-Metro: Room 131

(503) 821-1155

[career@oit.edu](mailto:career@oit.edu)

[www.oit.edu/career](http://www.oit.edu/career)

Career Services works in comprehensive ways to support Oregon Tech's students and alumni into developing and achieving their career goals. Services include: individual career advising; workshops and classroom presentations on resume writing, job interviewing, job search, and applying to graduate school; on-campus employer recruitment, career fairs, career resource materials, and a website with information on a wide range of career topics.

Career Services also offers all students and alumni the Handshake website, a centralized job portal where employers connect with students for on-campus jobs, part-time off campus jobs, internships, and career positions.

## **College Union**

Information Desk

(541) 885-1030

[www.oit.edu/visitors-info/college-union](http://www.oit.edu/visitors-info/college-union)

The College Union is the center of student activity on campus. Located within the Union are Admission, Financial Aid, the student government offices, Student Involvement & Belonging, the Treehouse, Student Affairs staff, Campus Dining operations, The Edge student newspaper, the Tech Nest bookstore, the Outdoor Program, the Student Veterans Program and lounge, and the main campus auditorium. In addition, there are comfortable study and lounge areas and meeting rooms for both student and community use. Coffee house functions, lectures, special classes, shows, dances, and movies are among the typical events scheduled in this facility.

For information about using space in the College Union or to make a reservation, contact the CU Information Desk located on the lower level, south of the main entrance.

## **Disability Services**

Klamath Falls: LRC 229C, (541) 851-5227

Portland-Metro: Room 432, (503) 821-1305

[access@oit.edu](mailto:access@oit.edu)

[www.oit.edu/academics/ssc/disability-services](http://www.oit.edu/academics/ssc/disability-services)

Oregon Institute of Technology is committed to accommodating the academic and programmatic needs of qualified students with disabilities. Students with a documented disability who require assistance or academic accommodations should contact the office of Disability Services at [access@oit.edu](mailto:access@oit.edu) immediately to discuss eligibility, and to ensure timely provision of services. Please contact the Disability Services office at the campus closest to you: Klamath Falls (541) 851-5227 or Portland-Metro (503) 821-1305. Specific information and Disability Services forms can be found at [www.oit.edu/academics/ssc/disability-services](http://www.oit.edu/academics/ssc/disability-services).

## **Integrated Student Health Center (ISHC)**

Phone (541) 885-1800

Fax (541) 885-1866

[health@oit.edu](mailto:health@oit.edu)

The Integrated Student Health Center (ISHC), located at the main campus in Klamath Falls, provides general medical care for illnesses and accidents, medical referral, counseling and wellness programs. Students taking six or more on-campus credit pay the Student Health fee each term, which covers most services offered by the clinic (including counseling, medical appointments, and a variety of other services); see section below for more details. Students with less than six credit hours can utilize ISHC services by paying the student health fee. Students at the Portland-Metro campus also pay a Student Health fee, which funds a full-time counselor on-site.

### **Health Requirements to Register**

Newly admitted students must complete the following health requirements upon admission (note: International students must complete a similar process prior to coming to campus; work with your Admissions Counselor to provide the required information). Failure to complete these requirements will result in a "health hold" on the student's account, affecting a student's ability to conduct Business Office transactions and to register or make changes to your courses. Once students are admitted, they will be able to access the Student Health Portal, located in TECHweb, under the "Student Resources" tab. After confirming their date of birth, students will need to do the following:

- access the required forms by clicking on "Forms"
- complete the "Health History Form" and "High Risk Tuberculosis Screening Questionnaire" by clicking on the hyperlinks
- acknowledge "Privacy Practices" and "Consent for Treatment" by clicking on their links
- click on the "Immunizations Page in EMF Forms" hyperlink, and provide the dates that you received 2 doses of the Measles or MMR vaccine.
- two doses of measles/mumps/rubella vaccine (MMR) are required for all full-time college students born on or after Jan. 1, 1957. The first dose must be given after the first birthday. The second dose must be after 1989.\*

This requirement is supported by: Oregon Administrative Rule 333-050-0130 and the American College Health Association Guidelines: Recommendations for Institutional Pre-matriculation Immunizations, April 2014.

### **Medical Clinic Services**

Oregon Tech's ISHC health care providers are committed to providing high quality, personalized care. The medical clinic is staffed by a physician, advanced practice nurse, registered nurse, and a psychiatric nurse. Diagnosis and treatment of acute and chronic illnesses, birth control and emergency contraception, routine laboratory procedures, immunizations, wart removal, gynecological exams, minor surgery and care of minor injuries are some of the services provided. Major emergencies are referred to Sky Lakes Medical Center adjacent to the Klamath Falls campus. Referrals are made to specialists as needed. Visits are free with low costs for medications, laboratory work, immunizations, and some treatments.

### **Counseling Services**

Counselors are available to discuss personal, academic and career concerns. Crisis services are available and referrals are made to community resources if needed. Sessions are confidential and are provided free of charge to students enrolled for six or more on-campus credits. Testing is also available for Attention Deficit Hyperactivity Disorder for an additional fee.

Personal counseling focuses on concerns such as self-esteem, relationship issues, academic performance, family difficulties and troubled sleep. Some specific issues dealt with are: depression; anxiety, substance abuse, suicide, conflicts with parents, spouses or children; loneliness; dating problems; study skills; coping with past or present abusive situations; and grief. A psychiatric nurse practitioner is available for psychotropic medicine management.

### **Wellness Programs**

A Health Educator is on staff to assist students in staying healthy and fit while attending Oregon Tech. Free individual appointments are available for personalized health and fitness programs, BMI testing, nutrition education and smoking cessation. Awareness events and health promotion programs are also provided on a regular basis campus-wide. Please call the ISHC to make an appointment or learn more about various campus-wide wellness activities.

### **Student Health Advisory Committee (SHAC)**

SHAC serves as an advisory committee to the ISHC and a voice to the administration about student health concerns. All students are welcome to apply to join this committee. Call or visit the ISHC to apply.

### **Fees/Charges**

As indicated previously, students taking six or more on-campus credit hours pay a Student Health fee each term. This fee entitles students to services offered by the medical clinic, counseling and wellness programs. Other students can use the center if they pay the health fee. Office visits are free for illness and injury, evaluation, treatment, questions and other reasons. However, additional charges may be necessary for medications, treatments, supplies, immunizations and laboratory tests. Costs for these services and supplies are kept well below the market price for student affordability. No cash is necessary at the time of visit and no insurance is required. All medical expenses rendered outside the ISHC from private physicians, laboratories, or hospitals are the student's financial responsibility.

## **Diversity & Belonging**

Klamath Falls, College Union 107

Portland-Metro, WV 432

(541) 885-1829

<https://www.oit.edu/campus-life/multicultural-student-services>

### **Diversity & Belonging**

The Office of Diversity and Belonging promotes a dynamic, diverse, and inclusive campus through events, programs, and relationship building with all members of the Oregon Tech community. We mentor and empower student populations and communities, with a specific focus on understanding difference, promoting social justice, cultural awareness, and intersectionality. We provide Oregon Tech with opportunities (trainings, workshops, events) throughout the year that expand the dialogue around diversity, equity, and inclusion among faculty, staff, and students. Our commitment to diversity includes bringing people together to create a community at Oregon Tech where all feel a sense of belonging.

### **Treehouse**

[www.oit.edu/treehouse](http://www.oit.edu/treehouse)

The Treehouse is a student-led organization that focuses on spreading awareness and inclusivity mostly through the organization of student events. The Treehouse is responsible for helping plan, advertise, organize and lead student events focused on increasing a deeper understanding and appreciation for diversity, bringing people together, while making something happen on campus and in people's lives.

Our vision is centered on a deeper understanding and appreciation for diversity, inclusivity, and equality for the people of Oregon Tech, Klamath Falls, and the world at large. Our mission is to provide programs, education, events, physical space, support and advocacy to the peoples of Oregon Tech, to work actively against oppression, hate, sexism, racism, inequality and other injustices, and promote a safe and welcoming environment for women, people of color, the LGBTQIA+ community, and other diverse groups.

## **Student Affairs**

College Union, 2nd Floor

(541) 885-1011

[www.oit.edu/student-affairs](http://www.oit.edu/student-affairs)

The Student Affairs Office is the location for the Vice President for Student Affairs and the Dean of Students, and the Executive Assistant. The division of Student Affairs provides direct service to students in the following offices: Athletics, Campus Life, Campus Safety, Career Services, College Union, Housing & Residence Life, the Integrated Student Health Center, Veteran Student Services, and the Student Success Center, which is composed of Disability Services, Peer Consulting Services, and TOP (a Trio program).

The Vice President for Student Affairs and her staff maintain close relationships with all Oregon Tech students, including the Klamath Falls campus, Portland-Metro campus, Online, Salem, Seattle and student organizations. Student Affairs staff are available for consultation and collaboration on all matters pertaining to student well-being and success.

## **Student Success Center (SSC)**

Learning Resources Center, Room 228

(541) 851-5179

[ssc@oit.edu](mailto:ssc@oit.edu)

[www.oit.edu/ssc](http://www.oit.edu/ssc)

The Student Success Center (SSC) is a multi-purpose department designed to enrich learning, teaching, and student success at Oregon Tech. The SSC consists of Peer Consulting (Tutoring), TOP, Disability Services, and testing for students with approved accommodations through Disability Services or make-up testing for students who have missed exams due to illness, athletics travel schedules, or other faculty approved occurrences.. The SSC helps students succeed by providing effective academic assistance, support, and resources through promotion of student learning, personal growth, and programs designed to enhance achievement, retention, persistence, graduation, and post-graduate success. The SSC provides peer tutoring for matriculated Oregon Tech students, academic success (ACAD) classes, accommodations for students with disabilities, as well as many other services to support students, staff, and faculty in an effort to facilitate student success at Oregon Tech.

The SSC is an integral part of Oregon Tech's student success initiatives and strives to provide effective programs and services to create a welcoming, supportive, and successful campus.

## **Tech Opportunities Program – TRIO**

Learning Resource Center, Room 228

(541) 885-1125

[TOP@oit.edu](mailto:TOP@oit.edu)

[www.oit.edu/academics/ssc/tech-opportunities-program](http://www.oit.edu/academics/ssc/tech-opportunities-program)

The Tech Opportunities Program (TOP) is a federally funded TRIO program designed to assist first-generation students, low-income students, and student with disabilities in completing their degrees at Oregon Tech. The dedicated advising team works closely with students to comprehensively assess academic and financial needs and to develop personalized plans for college success.

Participants may be eligible for a variety of academic support services, including group and/or individual tutoring, peer mentoring, networking with other students, college-success workshops and classes, supplemental academic advising, and limited financial assistance. Learn more about TOP at [www.oit.edu/academics/ssc/tech-opportunities-program](http://www.oit.edu/academics/ssc/tech-opportunities-program).

## **Alternative Testing Services**

Klamath Falls: LRC 230, (541) 851-5226

[testing@oit.edu](mailto:testing@oit.edu)

Portland-Metro: 503-821-1250

[portland@oit.edu](mailto:portland@oit.edu)

[www.oit.edu/academics/ssc/testing-services](http://www.oit.edu/academics/ssc/testing-services)

Alternative testing services are available for students with approved accommodations through the Disability Services office. Make-up testing is also available to students who have missed exams due to illness, athletic travel schedules, or other faculty approved occurrences.

## Peer Consulting Services

Klamath Falls: LRC 233, (541) 851-5226  
peerconsulting@oit.edu

Portland-Metro: Room 429, (503) 821-1263  
w.peerconsulting@oit.edu

[www.oit.edu/academics/ssc/peer-consulting-services](http://www.oit.edu/academics/ssc/peer-consulting-services)

Peer Consulting is a completely free academic support service available to ALL students of Oregon Tech. PCS services include:

- Individual peer to peer tutoring appointment available virtually or in-person.
- Group tutoring sessions by request.
- Supplemental Instruction for most general education courses.
- The Online Writing Lab (OWL): Writing support for undergraduate students.
- Heartful Editor: Graduate students can connect with a professional writing tutor.
- TutorMe: A supplemental tutoring option for students who need help during PCS "off" hours. Access a tutor 24/7 and get connected to a professional tutor in your subject area.

For more details regarding the above services and to schedule your tutoring appointment, visit the PCS website.

## Veteran Student Services

541-885-0191

Learning Resource Center, Room 219C

Veteran Student Services is Oregon Tech's one-stop-shop to support current and incoming veteran and military-dependent students. In partnership with other university and community entities, Veteran Student Services provides navigation and connection assistance with: admissions, VA education benefits, career services, disability resources, financial aid opportunities, transfer credit evaluations, peer advising, connection with the Student Veterans Program (SVP), and a host of other community and university support services. Additionally, Veteran Student Services provides unique learning opportunities for students, faculty, and staff geared at helping veterans acclimate and be successful in the higher education environment. For more information, please contact Veteran Student Services Director Jay Headley at [jay.headley@oit.edu](mailto:jay.headley@oit.edu).

## University Development

Hoss Business Center  
(541) 885-1130

The University Development Department is charged with providing financial support of Oregon Tech's mission by connecting donors, alumni, and friends with philanthropic opportunities at the university in partnership with the Oregon Tech Foundation. University Development works to build positive relationships with students, faculty, staff, alumni and friends of the university to enhance and create opportunities that foster a tradition of philanthropic support. University Development engages in initiatives and activities that embody institutional values and position Oregon Institute of Technology among the nation's leading technological and health professions universities. Fundraising, alumni relations, community outreach and other activities serve to promote the distinctive role and numerous educational, research and public service contributions of Oregon Tech throughout our communities, the nation, and internationally.

## The Oregon Tech Alumni Association

(503) 821-1145  
[alumni@oit.edu](mailto:alumni@oit.edu)  
[alumni.oit.edu](http://alumni.oit.edu)

The Alumni Relations office promotes interactions and loyalty of alumni and currently enrolled students toward Oregon Institute of Technology. Services and activities include regional social events, student activities, reunions and continuing education programs. Alumni have the opportunity to keep in touch with other alumni through the university's alumni Web page and other means of communications regarding their academic major and Oregon Tech.

The Oregon Tech Alumni Association, established in 1949, is guided by the Alumni Advisory Board and exists to support and promote Oregon Tech as a premier learning institution and to provide a structure for alumni affiliation. Membership is free and automatic to anyone who has completed at least 90 credits at Oregon Tech. Areas of special interest for the Alumni Association include assisting the university with new student recruitment

activities, career networking, social and educational activities and the financial support of Oregon Tech. The Alumni Association is an affiliated organization of the Oregon Tech Foundation.

## **The Oregon Tech Foundation**

(541) 885-1130

The Oregon Tech Foundation was established to support the educational, cultural, charitable, and service activities of Oregon Institute of Technology through philanthropic support. Established as a 501(c)(3) tax-exempt organization, the Foundation is a separate legal entity from the University and is the designated charitable arm of the University.

The Foundation is governed by a Board of Directors that represents a broad range of community leaders, alumni and private benefactors. The Foundation board of directors is tasked with management and growth of the assets of the Foundation and for participating in fundraising efforts of Oregon Tech.

The Foundation has enriched the University and student life by combining their efforts with the Oregon Tech administration and community leaders to accomplish some of the most notable projects on campus:

- Martha Anne Dow Center for Health Professions
- Jesse A. Crabtree Civil Engineering Learning Plaza
- Danny Miles Court floor and scoreboard replacement
- Shaw Historical Library
- John F. Moehl football stadium

Enabling Oregon Tech to build a great university and maintain an unparalleled level of excellence for students, the Foundation annually provides approximately \$1 million to Oregon Tech. The Foundation provides student support through numerous scholarships, innovation through student projects, hands-on experiences with equipment in modern classrooms, labs, and buildings, and providing a professional network through alumni relations.

The Foundation works closely with its affiliated organizations, including the Oregon Tech Alumni Association and the Shaw Historical Library.

## **Directories**

### **Governance of Oregon Institute of Technology**

Prior to 2015, the Oregon Institute of Technology was governed by the Oregon State Board of Higher Education, the governing board for the seven public universities in Oregon. In April 2014, the State Board of Higher Education authorized the Oregon Institute of Technology to establish a Board of Trustees, appointed by the Governor and approved by the Senate.

Effective July 1, 2015, the University became an "independent public body" governed by the Board of Trustees with every authority necessary or appropriate for the operation of a major public university. The Oregon Tech Board of Trustees approves the University's mission, programs, budgets, and strategies; and works with the Higher Education Coordinating Commission (HECC) to provide final approval for the University's mission and any new academic programs.

### **Oregon Tech Board of Trustees**

Members and term expiration dates:

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Kathleen Hill, 2022

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Kelley Minty Morris, 2022

Michele Vitali, 2021

Mike Starr, 2022

Paul Stewart, 2022

Fred Ziari, 2022

Vacant position #9

Oregon Tech President, ex-officio

## Administrative Offices

**President**, Nagi G. Naganathan, Ph.D., ASME Fellow

**Provost and Vice President for Academic Affairs**, Joanna Mott, Ph.D.

**Vice President for Finance and Administration**, John Harmon, M.B.A.

**Vice President for Institutional Advancement**, Ken Fincher, Ph.D.

**Vice President for Strategic Enrollment Management, Dean of Online Learning**, Vacant

**Vice President for Student Affairs and Dean of Students**, Erin Foley, Ph.D.

**Vice Provost for Research & Academic Affairs**, Abdy Afjeh, Ph.D.

**Associate Vice Provost for Academic Excellence**, Dina Battaglia, Ph.D.

**Associate Vice President and Chief Information Officer**, Connie Atchley, M.S.

**Associate Vice President for Human Resources and Affirmative Action**, Vacant

**Assistant Vice Provost for Faculty Relations**, Beverley McCreary, Ph.D.

**Assistant Vice President for Financial Operations**, Vacant

**Assistant Vice President for Government Relations**, Vacant

**Dean, College of Engineering, Technology and Management**, Tom Keyser, Ph.D.

**Dean, College of Health, Arts and Sciences**, Dan Peterson, Ph.D.

**Admissions**, Vacant

**Advising & Retention**, Vacant

**Athletics**, John Van Dyke, M.S., Director

**Campus Security**, Ed Daniels, Director

**College Union**, Shellie Wilson, M.B.A., Manager

**Educational Partnerships and Outreach**, Carlene Starr, M.A.I.S., Director

**Emergency Management & Environmental Health and Safety**, Vacant

**Facilities Management and Planning Services**, Thom Darrah, Director

**Financial Aid**, Tracey Lehman, M.M., Director

**Housing and Residence Life**, Mandi Clark, Ed.D. Director

**Institutional Research**, Farooq Sultan, B.S., Director

**Integrated Student Health Center**, Gaylyn Maurer, M.A., Administrative Director

**Library Services**, John Schoppert, MLIS, Director

**Marketing, Communication, and Public Affairs**, Marcus Popiolek, B.A., Executive Director

**Office of Diversity, Inclusion, and Cultural Engagement**, Vacant

**Online Learning**, Carrie Dickson, M.B.A., Director

**Oregon Manufacturing Innovation Center, Research & Development (OMIC)**, Craig Campbell, JD, Executive Director

**Oregon Renewable Energy Center**, Mason Terry, Ph.D., Director

**Payroll Services**, Karen Blevins, A.S., Associate Director

**Procurement, Contracts and Risk Management**, Vivian Chen, J.D., Director

**Registrar's Office**, Wendy Ivie, M.M., University Registrar

**Senior Advisor to the President and Board Secretary**, Office of the President and Oregon Tech Board of Trustees, Sandra Fox, M.B.A.

**Sponsored Projects & Grants Administration**, Barbara Neal, M.S., Director

**Student Success Center**, Tara Coty, M.S., Director

**University General Counsel**, David Groff, J.D., General Counsel

**Veterans Services**, Jay Headley, M.S., Director



# Oregon Tech Foundation Board of Directors

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## **Ex-Officio**

Ken Fincher, Executive Director  
Nagi Naganathan, Oregon Tech President  
John Harman, Oregon Tech Vice President for Finance and Administration  
Ken Vandehey, Oregon Tech Alumni Advisory Board President  
Jeremy Morris, President, Shaw Historical Library

## Administration

**Abdy Afjeh** (2018), Associate Provost of Research and Academic Affairs. B.S., Sharif University of Technology (1997); M.S., University of Toledo (1981); Ph.D., University of Toledo (1984).

**Holly Anderson** (2012) Associate Director Student Involvement and Belonging. B.S. (2008), Warner Pacific College.

**Diana Angeli** (2006), Executive Assistant, President's Office.

**Cody Apple** (2020), Machining Solutions Researcher, OMIC.

**Connie Atchley** (2019) Associate Vice President/Chief Information Officer. B.S. (1998) Oregon State University; M.S. (2010) University of Oregon.

**Jennifer Bavarskas** (2005), Health Educator, Integrated Student Health Center. B.A. (1991), University of Oregon; M.S. (2000), San Jose State University.

**Ryan Beesley** (2020), TechRec Coordinator, Athletics. B.S. (2010), Oregon Institute of Technology.

**Jennifer Berdyugin** (2019), OREC Lab Manager.

**Karen Blevins** (2013), Associate Director Payroll Services, Business Affairs. A.S. (2010), Klamath Community College.

**Rebecca Burkeen** (2017), Alumni Relations Manager, Development. B.A. (1995), University of San Diego.

**Kelly Caleb** (2007), Athletic Trainer, Athletics. A.S. (1996), Oregon Institute of Technology; B.S. (1999), Oregon State University.

**Brenda Campbell** (2019), Executive Assistant, Office of the Provost. M.A. (2010), Wheaton College; B.A. (1980), Ohio Christian University.

**Craig Campbell** (2018), Director of OMIC Research and Development. J.D. (1992), University of Oregon; M.A. (2005), American Military University; B.S. (1989), University of Oregon.

**Marc Campolo** (2020), Director, DPT Program. Ph.D. (1999), Seton Hall University; M.A. (1987), Adelphi University; B.S. (1981) Hunter College.

**Katie Cavendish** (2015), Program Manager, Development. A.S. (2005), Mt. Hood Community College.

**Willow Charlton** (2021), Admissions Counselor. B.S. (2019), Oregon Institute of Technology.

**Vivian Chen** (2015), Contracts Officer & Legal Liaison. J.D. (2011) University of California, Berkeley; B.A. (2006) Wellesley College;

**Cindy Childers** (2006), Accounting Manager, Business Affairs. B.S. (2004), Oregon Institute of Technology.

**Anna Clark** (2018), Financial Analyst, Budget Office. M.S. (2014), University of Wyoming; B.S. (2007) California Polytechnic State University.

**Mandi Clark** (2004), Director, Housing and Residence Life. Ed.D. (2020), Concordia University-Chicago; M.S. (1999), University of Nebraska; B.A. (1997), Kansas State University.

**Tammy Clark** (2007), Executive Assistant, College Health, Arts and Sciences. A.S. (2006), Klamath Community College.

**Jason "Jake" Coatney** (2007), Senior Counselor, Financial Aid. A.A. (2002), College of the Siskiyous; B.S. (2005), Eastern Oregon University.

**Chris Cook** (2014), Grounds Supervisor, Facilities Management Services. B.S. (1978), Oregon State University.

**Tanya Coty** (2018), Diversity and Title IX Officer. M.S. (2017), University of Alaska, B.S. (1991), University of Minnesota.

**Edward Daniels** (1988), Director, Campus Safety.

**Julie Daniels** (2007), Scholarship Officer/Counselor, Financial Aid. B.A. (2003), Southern Oregon University.

**Krista Darrah** (2017), Operations Manager, Development. B.S. (1999), Oregon Institute of Technology.

**Thom Darrah** (2016), Director, Facilities Management Services.

**Ryan Deady** (2016), Assistant Director, Admissions. B.A. (2014) University of Montana.

**Carrie Dickson** (2014), Director, Online Learning, M.B.A. (2013), Southern Oregon University; B.S. (2009), Oregon Institute of Technology.

**William Dowling** (2016), Counselor, Integrated Student Health Center. M.S. (2013), Oregon State University; B.S. (2000), Park University.

**Melissa Dubois** (2014), Director, South Metro-Salem STEM Hub, Ph.D. (2005), University of Wisconsin; B.S. (1999), Northeastern University.

**Erin Foley** (1999), Vice President of Student Affairs; Dean of Students. Ph.D. (1996), Indiana University; M.A. (1991), Michigan State University; B.S. (1988), University of Arizona.

**Sandra Fox** (2014) Senior Advisor Board Secretary M.B.A. (1996), Cal Poly, San Luis Obispo; B.S. (1994), Cal Poly, San Luis Obispo.

**Lori Garrard** (2018). Executive Assistant, Development. B.A. (1996), George Fox College.

**Michael Garrard** (2007), Sports Information/Marketing Director, Athletics.

**Jacob Garsez** (2020), Head Baseball Coach, Athletics. M.A. (2011), George Fox University.

**Celia Green** (2020), Operations Assistant, Business Affairs. M.A. (2005), University of Wyoming; B.A. (1992), University of Wyoming.

**David Groff** (2018), University General Counsel. J.D. (1993), Willamette University; B.A. (1989), Dartmouth College.

**Pamela Grove** (2018), Assistant University General Counsel. A.A., Coastline Community College.

**Sandi Hanan** (2008), Associate Director, Human Resources. B.S. (2013), Oregon Institute of Technology; A.S. (1999), Oregon Institute of Technology.

**John Harman** (2021), Vice President Finance & Administration. M.B.A. (1993), East Tennessee State University; B.B.A. (1989), East Tennessee State University.

**Lori Harris** (2009), Assistant Director, Business Affairs. B.S. (2015), University of Phoenix; A.S. (1983), Oregon Institute of Technology.

**Jay Headley** (2020), Director of Veteran Services, Veteran Services. M.S (2019), Virginia Tech; B.S. (2016), Portland State University.

**Brandon Held** (2018), Academic Specialist, Retention. M.A. (2013), University of Wisconsin-Milwaukee; B.A. (2009), University of Wisconsin-Milwaukee.

**Sarah Henderson-Wong** (2017), Benefits, Leave, and Wellness Manager, Human Resources. M.S. (2005), Golden Gate University; B.A. (2000), San Francisco State University.

**Leticia Hill** (2006), Procurement and Risk Officer. B.S. (2016), Oregon Institute of Technology.

**Shaundrea Hirengen** (2015), Assistant Director, Student Success Center. B.A. (2014), George Fox University.

**Trish Hower** (2009), Executive Assistant, Portland-Metro, Office of the Provost. B.A. (2004) Oregon State University.

**Josie Hudspeth** (2014), Director, Student Involvement & Belonging. M.A. (2013), California State University, Fullerton. B.A. (2011), California State University, Fullerton.

**Brandy Hunter** (2007), Assistant Director, Student Health.

**Wendy Ivie** (1999), University Registrar, Registrar's Office. M.M. (2005), Southern Oregon University; B.S. (1997), Oregon State University.

**Cathy Jinich** (2019), Counselor, Integrated Student Health Center. M.A. (2013), Naropa University; B.A. (2009), Massey University; B.A. (2005), Western State College.

**Gale Jones** (2016), Pre-College Coordinator, Academic Agreements. M.A. (2013), University of Portland; B.A. (2012), Washington State University.

**Zachary Jones** (2018), Program Director, Student Success Center. M.A. (2018), Portland State University; B.A. (2014), Western Oregon University.

**Nicole Kandra** (2020), Assistant Athletic Trainer, Athletics. M.S. (2017), University of Hawaii Manoa; B.S. (2015), Oregon State University

**Jack Kegg** (2011), Head Track & Field and Cross-Country Coach, Athletics. B.S. (1996) Western Oregon University.

**Thomas Keyser** (2018), Dean, College of Engineering, Technology, and Management. Ph.D. (1995), Clemson University; M.S. (1991), Colorado State University; B.S. (1988), New Mexico State University.

**Joshua Koch** (2018), CNC Programmer, OMIC.

**Fredrick Kowalski** (2018), Director, IT Security and Compliance. M.S. (2003), Towson University; B.S. (1996), McGill University.

**James Lake** (1988), Maintenance Supervisor, Facilities Services. A.S. (1984), Sierra College.

**Tracey Lehman** (1999), Director, Financial Aid. M.M. (2005), Southern Oregon University; B.A. (1988), State University of New York; A.S. (1986), Mohawk Valley Community College.

**Tabitha Maldonado** (2014), Counselor, Financial Aid. B.A. (2008), Concordia University (Oregon).

**Kendal Marks** (2012), Financial Aid & Registration Coordinator, Financial Aid. M.S. Ed., (2013) Arizona State University; B.S., (2007) Southern Oregon University.

**Sarah Matchett** (2016), Assistant Director, Housing and Residence Life.

M.A. (2017), University of Nebraska; B.A. (2014), Oregon Institute of Technology.

**Gaylyn Maurer** (2013), Administrative Director, Integrated Student Health Center. M.A. (1996), University of Denver; B.S. (1993), University of Houston.

**Kelsey McCauley** (2020), Government Relations Coordinator. B.S. (2017), University of Montana; A.A. (2015), Cottey College.

**Liam McClary** (2020), Financial Analyst, Budget Office. M.B.A. (2019), Corban University; B.S. (2017), Corban University.

**Michael McCormick** (2020), Title IX & Employee Relations Investigator. B.A. (2017), Louisiana Tech University; A.A. (2014), New Mexico Military Institute.

**Joel McPherson** (2011), Director of Marketing. B.S. (2007), University of Oregon.

**Jordan Meader** (2021), Robotics Solutions Researcher, OMIC. B.S. (2017), Oregon State University.

**Barb Meng** (2015), Executive Assistant, Academic Excellence.

**Scott Meredith** (2009), Head Women's Basketball Coach, Athletics. M.A. (2000) St. Mary's College; B.A. (1987) Humboldt State University

**Michelle Meyer** (2014), Accounting Services Manager, Business Affairs. B.S. (2004), Oregon State University; Certified Public Accountant, Oregon.

**Sarah Moore** (2016), Associate Director, Career Services. M.S. (2017), University of Kentucky at Kearney; B.S. (2014), Oregon Institute of Technology

**Joanna Mott** (2019), Provost & Vice President for Academic Affairs. Ph.D., Texas A & M; M.S., University of Waterloo; B.S., University of Aston.

**Kenneth Murczek** (2020), Head Women's Volleyball Coach, Athletics. Ed.D. (2019) University of North Carolina; M.A. (2007), Western Michigan University; M.A. (2000), University of Arizona; B.S. (1998), California State University, San Diego.

**Corey Murphy** (2014), Coordinator, Retention. B.S. (2011), Oregon State University.

**Iona Musgnung** (2018), Associate Director, Campus Life, Portland-Metro. M.A. (2018), Lewis & Clark Graduate School of Education and Counseling; B.A. (2012), University of Oregon.

**Nagi Naganathan** (2017), President. Ph.D. (1986), Oklahoma State University; M.S. (1981), Clarkson University; B.E. (1978), National Institute of Technology.

**Urmaze Naterwalla** (2019), Research Operations Officer, OMIC. M.B.A. (2009), University of Oregon; M.S. (1996), Ohio State University; B.S. (1993), Indiana Institute of Technology

**Barbara Neal** (2016), Director of Grants & Sponsored Research. M.S. (2015), Emmanuel College; B.S. (2004), University of South Florida

**Valjean Newsome** (1997), Executive Assistant, College of Engineering, Technology, and Management. A.S. (1998), Oregon Institute of Technology.

**Monica Ourada** (2020), Admissions Counselor, Admissions. M.Ed. (2020), University of Southern California; B.S. (2017), University of Louisiana.

**Deanne Pandozzi** (2002), Coordinator of the ROCK. B.S. (2010), Oregon Institute of Technology.

**Justin Parnell** (2012), Head Men's Basketball Coach, Athletics. B.S. (2011), Oregon Institute of Technology.

**Adria Paschal** (2007), Senior Executive Assistant to the President. A.A. (2016), Oregon Institute of Technology.

**Ashlie Pence** (2016), Assistant Registrar, Registrar's Office. B.S. (2016), Oregon Institute of Technology.

**Dan Peterson** (2007), Dean, College of Health, Arts & Sciences, Ph.D. (2002), Ohio University; M.A. (1999), Brigham Young University; B.A. (1996), Brigham Young University.

**Suzet Petersen** (2002), Assistant Director, Financial Aid. B.S. (1998), Oregon Institute of Technology.

**John Phillips** (2020), Admissions Counselor, Admissions. J.D. (2019), Willamette University; B.A. (2015), University of Minnesota; A.A. (2013), Minneapolis Community and Technical College.

**Marcus Popiolek** (2021) Executive Director, Marketing. B.A. (1992), Central Michigan University.

**Lara Pracht** (2016), Director Academic Affairs, Portland-Metro. Office of the Provost. Ph.D. (2017), University of Washington; B.S. (2010), University of Kansas.

**Anthony "Tony" Richey** (2003), Director, Information Technology Operations & Educational Technology. M.S. (2010), Colorado Technical University; B.S. (2005), A.A. (1989), Oregon Institute of Technology.

**Ken Sartain** (2020), Budget Director, Academic Affairs. B.S. (1973), San Jose State University.

**Taylor Schaming** (2020), Machine Operator, OMIC.

**John Schoppert** (2019), University Librarian, Library. MLIS (2012), Emporia State University; B.A. (1992), Portland State University; A.A. (1989), Portland Community College.

**Briana Schwenk** (2018), Academic Specialist, Student Success Center. B.S. (2016), Oregon Institute of Technology.

**John Scott** (2019), Counselor, Integrated Student Health Center. M.A. (2019), East Tennessee State University; B.S. (2016) East Tennessee State University.

**Carleen Starr** (2013), Director, Educational Partnerships & Outreach. M.A.I.S. (2007), Oregon State University; B.S. (2005), Oregon State University.

**Greg Stewart** (2004), Head Women's Softball Coach, Athletics. B.S. (1992), Sterling College.

**Nellie Stewart** (2007), Executive Assistant, Finance and Administration. B.S. (2011), Oregon Institute of Technology.

**Harmony Stobaugh** (2018), Talent Acquisition & Talent Management

Manager, Human Resources. B.S. (2016), Campbellsville University.

**Cynthia Stripling** (2013), Office Coordinator, Admissions. B.A. (1996), Jacksonville State University.

**Karissa Sultan** (2010), Accounts Receivable Manager, Business Affairs. B.S. (2005), University of Nevada-Reno.

**Carl Thomas** (2011), Assistant Director, Educational Partnerships & Outreach. MiM (2002), Southern Oregon University; B.S. (1994).

**Paul Titus** (2018), Executive Assistant, Office of the Provost. B.S. (2013), Oregon Institute of Technology.

**John VanDyke** (2018), Director, Athletics. M.S. (2007), United States Sports Academy; B.A. (1992), Western Washington University.

**Michelle Vitali** (2017), Operations & Policy Advisor, OMIC. B.S. (1990), Florida Atlantic University.

**Christine Ward** (2018), Instructional Designer, Online Learning. M.Ed. (2009), Boise State University; B.A. (2003), George Fox University.

**Joshua Wetzler** (2016), Marketing and Promotions Coordinator, Athletics. B.S. (2009); Oregon Institute of Technology.

**Dierdre Williams** (2009), Executive Assistant, Strategic Enrollment Management.

**Erin Williams** (2013), Athletic Programs Operations, Athletics. B.S. (2017) Eastern Oregon University.

**Shellie Wilson** (2004), Manager, College Union. M.B.A. (2009), Southern Oregon University; B.S. (2004), A.S. (2001), Oregon Institute of Technology.

**Rachel Winters** (2014), Executive Secretary, Student Affairs.

**Mira Wonderwheel** (2018), Annual Giving Manager, Development. B.A. (1999), Sonoma State University.

**Desiré Wooten** (2019), Academic Specialist, Student Success Center. B.S. (2019) Colorado State University.

**Lynde Wright** (2018), Employer  
Relations Specialist, Career Services

## Instructional Faculty

*This listing reflects faculty for the 2021-22 academic year. In some cases, changes taking effect for 21-22 are included in the faculty lists under the department descriptions.*

**Mateo Aboy** (2005), Professor, Electrical Engineering and Renewable Energy. B.S. (2002), B.S.E.E. (2002), M.S.E.C.E. (2004), Portland State University; Dipl. Ing. (2003), M.Phil. (2004), Ph.D. (2005), ETSIT-University of Vigo; Exec. Cert. (2007), Massachusetts Institute of Technology; M.B.A. (2011), L.L.B./QLD (2014), University of London. Registered Professional Engineer (PE), European Union (COIT No. 12684). Registered US Patent Agent (USPTO Bar Admission No. 64040). Certified Licensing Professional (CLP).

**Abdelouahab Abrous** (2014), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1981), University of Science & Technology, Algeria; M.S. (1984), University of Washington, Seattle; Ph.D. (1988), University of Washington, Seattle. Registered Professional Engineer, Washington, Idaho, Oregon, and California.

**Dawn Bailey** (2017), Associate Professor, Humanities and Social Sciences, Clinical Director/Practicum Coordinator MS Applied Behavior Analysis Program. B.S. (1996), M.S. (2005), Ph.D. (2008), Florida State University.

**Richard L. Bailey** (1991), Professor, Management. B.S. (1984), M.A. (1985), Utah State University. Certified Public Accountant.

**Sandra Bailey** (2000), Professor, Management. B.S. (1985), Utah State University; M.Ed. (2005), Oregon State University.

**Rachelle Barrett** (2018), Instructor, Medical Laboratory Science. Certificate (2013), University of Texas Medical Branch; B.S. (2005), Oregon State University; B.S. (2006), Oregon Institute of Technology.

**Krista Beaty** (2017), Assistant Professor, Dental Hygiene. A.A.S. (2004), Clark College; B.S. (2008), Eastern Washington University; M.S.(c), Idaho State University.

**Sharon Beaudry** (2014), Associate Professor, Management. B.S. (1985), College of New Rochelle; J.D. (2009), Northwestern California University; M.B.A. (2013), Northcentral University. Senior Professional in Human Resources (SPHR).

**Vanessa Bennett** (2008), Associate Professor, Medical Imaging Technology. B.S. (2001), Oregon Institute of Technology; M.Ed. (2015), Western Governors University. Certified Nuclear Medicine Technologist (CNMT).

**Jeanne Bopp** (2016), Instructor, Dental Hygiene. B.S. Dental Hygiene (2011), Oregon Institute of Technology; M.S. (2020) Oregon Institute of Technology; .

**Charisse Botsch** (2015), Instructor, Dental Hygiene (Salem). B.S. (1985), Oregon Health Sciences University.

**Monica Breedlove** (2013), Associate Professor, Medical Imaging Technology. B.S. (1996), Oregon Institute of Technology; M.Ed. (2015), Western Governors University. Registered Technologist (R, M, CT, MR, ARRT).

**Todd W. Breedlove** (1999), Professor, Computer Systems Engineering Technology. B.S. (1996), Oregon Institute of Technology; M.S. (1999), Southern Oregon University.

**Kevin J. Brown** (2001), Professor, Communication. A.A. (1986), Ricks College; B.A. (1988), Idaho State University; M.A. (1991), Washington State University; Ph.D. (2000), University of Utah.

**Ryan Brown** (2016), Assistant Professor, Medical Laboratory Science. B.S. (2006), Arizona State University; M.S. (2011), Rosaling Franklin University.

**Ben S. Bunting, Jr.** (2013), Associate Professor, Humanities and Social Sciences. B.A. (2003), Kent State University; M.A. (2007); Ph.D. (2012), Washington State University.

**Calvin K. Caldwell** (1986), Professor, Computer Systems Engineering Technology. B.S. (1981), Oregon Institute of Technology; M.S. (1989), California State University, Chico.

**Dan Carrere** (2017), Assistant Professor, Information Technology. B.S (1998), M.MIS (2000), Georgia College and State University.

**Richard D. Carson** (2006), Associate Professor, Medical Imaging Technology. B.S. (1997), Oregon Institute of Technology; M.Ed. (2012), Western Governors University. Registered Technologist (R) (CT) ARRT.

**Christopher L. Caster** (1999), Associate Professor, Medical Imaging Technology. A.A. (1975), Oregon Institute of Technology; B.S. (1979), Eugene Bible College; B.S. (1996), Oregon Institute of Technology; M.Ed. (2002), University of Phoenix.

**Kyle Chapman** (2016), Assistant Professor, Humanities and Social Sciences. B.A. (2008), Texas Tech University; M.A. (2011) Texas Tech University; Ph.D. (2014), University of Kansas.

**Adelaide Clark** (2016), Assistant Professor, Natural Sciences. B.S. (2011) Emory & Henry College; Ph.D. (2016), Baylor University.

**Robyn L. Cole** (2004), Associate Professor, Medical Imaging Technology. B.S. (2000), Oregon Institute of Technology; M.Ed. (2007), Western Governors University.

**Marc Compolo** (2020), Program Director, Physical Therapist Education. B.S. (1981), Hunter College; M.A. (1987), Adelphi University; Ph.D. (1999), Seton Hall University.

**Cristina Crespo Veiga** (2009), Professor, Electrical Engineering and Renewable Energy. B.S. (2002), M.S. (2004), Portland State University; M.Phil. (2009), Ph.D. (2010), Etsit-University of Vigo. Registered US patent agent (USPTO bar admission no. 68725).

**Vicki Crooks** (2020), Assistant Professor, Communication. B.S. (2001), Oregon Institute of Technology; M.S. (2006), Portland State University; Ph.D. (2014), Scripps College of Communication.

**David Culler** (2007), Professor, Manufacturing and Mechanical Engineering and Technology. A.A. (1985), University of New Mexico, Albuquerque; B.S. (1988), M.S. (1990), Ph.D. (1994), New Mexico State University, Las Cruces.

**Kate P. Darling** (2003), Instructor, Emergency Medical Services. A.A.S. (1997), Oregon Health and Science University; B.A. (1976), College of the Atlantic.

**Don DaSaro** (2008), Assistant Professor, Management. A.S. (1964), Metropolitan College; B.S. (1967), University of Missouri Science and Technology; M.B.A. (1991), Marymount University.

**Kenneth Davis** (2016), Assistant Professor, Mathematics. B.A. (1981), Reed College; M.S. (1985), Portland State University; Ph.D. (1989), Washington State University.

**Dibyajyoti Deb** (2013), Associate Professor, Mathematics. B.S. (2004), Chennai Mathematical Institute, India; M.S. (2006), University of Kentucky; Ph.D. (2010), University of Kentucky.

**Irina Demeshko-Prosnik** (2006), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1996), B.A. (2001), M.S. (1996), M.A. (2001), Far Eastern State Transport University.

**Elise Donovan** (2017), Assistant Professor, Natural Sciences. B.S., Ph.D. (2002), University of Toledo; M.S. (2005), Long Island University; Ph.D. (2011), Colorado State University.

**Caroline Doty** (2016), Associate Professor, Medical Laboratory Science. B.S. (2007), Clayton State University; M.S. (2012), Northwestern University; B.S. (2014), Oregon Institute of Technology and Oregon Health Sciences University. M.t. (ASCP) certified.

**Allan A. Douglas** (2014), Associate Professor, Electrical Engineering and Renewable Energy. B.S. (1991), M.S. (1993), Oregon State University.

**George Drouant** (2018), Instructor, Computer Systems Engineering Technology. B.S.

**James Eastham** (2014), Assistant Professor, Electrical Engineering and Renewable Energy. B.S. (2009), Oregon Institute of Technology; M.S. (2014), Portland State University.

**Todd Ellingson** (2008), Assistant Professor, Medical Director, Emergency Medical Services. B.S. (1998), Washington and Lee University; M.D. (2003), Oregon Health and Science University.

**Tricia Elliott** (2018), Instructor, Natural Sciences. B.S. (1998), California State Polytechnic University, Pomona; M.S. (2002), California State Polytechnic University, Pomona.

**Jared Emard** (2016), Professor of Practice, Management. B.S. (2009), B.S. (2010), Oregon Institute of Technology; M.B.A. (2016), Southern Oregon University.

**Kerry Farris** (2017), Instructor, Natural Sciences.

**James P. Fischer** (1999), Professor, Mathematics. B.S. (1989), B.A. (1991), Humboldt State University; M.S. (1993), University of New Hampshire; Ph.D. (1998), Oregon State University.

**Carey Fitzgerald** (2019), Assistant Professor, Humanities and Social Sciences. B.S. (2006), Central Michigan University; M.S. (2008), Central Michigan University; Ph.D. (2011), Central Michigan University.

**Sarah Fitzpatrick** (2013), Associate Professor, Respiratory Care and Sleep Health. B.S. (2010), Oregon Institute of Technology; M.H.A. (2012), Pacific University.

**Tiernan Fogarty** (2002), Professor, Mathematics. B.S. (1995), M.S. (1997), Ph.D. (2001), University of Washington.

**Matthew Frye** (2017), Assistant Professor, Communication. B.A. (2008), DePauw University; M.A. (2010), Washington State University; Ph.D. (2017), Washington State University.

**Andria "Andie" Fultz** (2012), Assistant Professor, Communication. B.S. (1997), M.S. Communication Studies (2007), M.S. Post-Secondary, Adult, & Continuing Education (2007), Portland State University.

**Kamal Gandhi** (2017), Assistant Professor, Natural Sciences. B.S. (2001), UC San Diego; Ph.D. (2006), UC Berkeley.

**Kapil Gangwar** (2020), Assistant Professor, Manufacturing & Mechanical Engineering Technology. B.Tech. (2010), IIT-Kanpur, India; M.S. (2012), POSTECH, Pohang, South Korea; Ph.D. (2017), University of Washington.

**Yanqing Gao** (2013), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1982), Qingdao University of Science & Technology; M.S. (2000), Southern Illinois University, Edwardsville; M.S. (2001), Ph.D. (2010), University of Arizona.

**Kevin Garrett** (2017), Assistant Professor and Clinical Director, M.S. Marriage and Family Therapy Program, Humanities and Social Sciences. B.S. (2003), Utah State University; M.Ed. (2006), University of Oregon; MedFT Certificate (2009), University of Nebraska Medical Center/University of Nebraska-Lincoln; Ph.D. (2014), Kansas State University.

**Michael C. Gilinsky** (2016), Assistant Professor, Director of Clinical Education, Respiratory Care. B.S. (2012), Oregon Institute of Technology; Registered Respiratory Therapist (RRT), RRT-Neonatal Pediatric Specialty, RRT-Adult Critical Care Specialty.

**Iris K. Godwin** (2007), Associate Professor, Head of Special Collection and University Archives, Library Services. B.A. (2000), Rhodes College; M.L.I.S. (2005), University of Tennessee, Knoxville.

**Ashton Greer** (2019), Assistant Professor, Civil Engineering. B.S. (2014), The University of Alabama; M.S. (2015), The University of Alabama.

**Tara Guthrie** (2011) Assistant Professor, Medical Imaging Technology. B.S. (2003), B.S. (2004), Oregon Institute of

Technology. Registered Vascular Technologist and Diagnostic Cardiac Sonographer (2005) ARDMS; M.S. (2016), University of Nebraska Kearney.

**David K. Hammond** (2013), Associate Professor, Mathematics. B.S. (1999), California Institute of Technology; Ph.D. (2007), New York University.

**Christopher Hamper** (2012), Instructor, Emergency Medical Services. A.A.S. (2010), Oregon Health and Science University/Oregon Institute of Technology; B.S. (2017), Portland State University/Oregon Health and Science University.

**Michael Healy** (2016), Assistant Professor, Computer Systems Engineering Technology. A.S. Electronic Systems Technology (1987), Community College of the Air Force; B.S.E.E. (1992), Northeastern University, Boston; M.B.A. (1998), University of New Mexico.

**Cecily Heiner** (2019), Assistant Professor, Computer Systems Engineering Technology. B.S. (2003), Brigham Young University; M.S. (2005), Carnegie Mellon University; Ph.D. (2009), University of Utah.

**Paula Hendrix** (2019), Associate Professor, Dental Hygiene. B.S. (1985) Oregon Health Sciences University; M.Ed. (2013), Concordia University.

**Suzanne D. Hopper** (2005), Professor, Dental Hygiene. A.A.S. (1981), B.S. (1999), Oregon Institute of Technology; M.A. (2006), University of Phoenix.

**Eklas Hossain** (2015), Associate Professor, Electrical Engineering and Renewable Energy.

**Philip Howard** (2014), Associate Professor, Computer Systems Engineering Technology. B.S. (1982), B.A. (1982), Central Washington University; Graduate Certificate (1988), Multnomah School of the Bible; Ph.D. (2012), Portland State University.

**Franny Howes** (2014), Associate Professor, Communication. B.A. (2006), M.A. (2010), Michigan State University; Ph.D. (2014), Virginia Polytechnic Institute and State University.

**Richard G. Hoylman** (2002), Professor, Medical Imaging Technology. B.S. (1988), Oregon Institute of Technology; M.M. (2006), Southern Oregon University. Certified Nuclear Medicine Technologist (CNMT).

**Alishia Huntoon** (2005), Professor, Humanities and Social Sciences. B.S. (1999), University of Wisconsin, Stevens Point; M.S. (2002), Ph.D. (2005), Washington State University.

**Janette A. Isaacson** (1994), Associate Professor, Distance Education. A.S. (1984), Spokane Community College; B.S. (2005), Oregon Institute of Technology; M.Ed. (1998), University of Phoenix; M.Ed. (2002), Ed.D. (2002), Seattle University. RVT, RDCS, FSVU, LMHC.

**Hugh E. Jarrard** (2013), Assistant Professor, Emergency Medical Services. A.A.S. (2009), Oregon Health and Science University/Oregon Institute of Technology; B.S. (1984), Haverford College; Ph.D. (1997), University of Oregon.

**Teshome Edae Jiru** (2011), Associate Professor, Electrical Engineering and Renewable Energy. B.S. (1995), Addis Ababa University, Ethiopia; M.S. (2001), Catholic University of Leuven, Belgium; Ph.D. (2006), Concordia University, Canada.

**David Johnston** (2018), Instructor, Natural Sciences. B.S. (2006), Binghamton University; M.S. (2008), The College of William & Mary; Ph.D. (2017), The College of William & Mary.

**Leah Jolly** (2014), Assistant Professor, Medical Imaging Technology. B.S. (2003), Oregon Institute of Technology. Registered Vascular Technologist (RVT) and Registered Phlebology Sonographer (RPhS).

**Jherime L. Kellermann** (2013), Associate Professor, Natural Sciences. B.A. (1998), Penn State University; M.S. (2007), Humboldt State University; Ph.D. (2012), University of Arizona.

**Jamie Kennel** (2010), Associate Professor, Emergency Medical Services. A.A.S. (2009), Oregon Health and Science University/Oregon Institute of

Technology; B.S. (1996), Ferris State University; M.S. (2011), Embry- Riddle Aeronautical University.

**Maria Lynn Kessler** (2002), Professor, Humanities and Social Sciences. B.S. (1983), Northeastern University; M.S. (1989), Southern Illinois University, Carbondale; Ph.D. (1994), Florida State University.

**Jesse M. Kinder** (2016), Assistant Professor, Natural Sciences. B.A. (2001), Depauw University; M.S. (2004) University of Pennsylvania; Ph.D. (2008) University of Pennsylvania.

**Grant C. Kirby** (2003), Associate Professor, Management. B.S. (1987), Oregon Institute of Technology; M.B.A. (1999), University of Oregon; M.S. (2013), Portland State University; Graduate Certificate, M.S. (2013), Portland State University.

**Eve Klopff** (2014), Associate Professor, Program Director, Electrical Engineering and Renewable Energy. B.S. (2002), Texas A&M University; M.S. (2008), Ph.D. (2011), Colorado State University.

**Veronica Koehn** (2012), Associate Professor, Communication. B.A. (2001), M.A. (2002), University of Colorado at Denver; Ph.D. (2010), University of Denver.

**Bobbi Kowash** (2010), Assistant Professor, Medical Imaging Technology. B.S. (1999), Oregon Institute of Technology; MHSc (2017), NOVA Southeastern University.

**Karen E. Kunz** (2001), Associate Professor, Head of Systems and Technical Services, Library Services. B.S. (1978), Oregon State University; M.L.S. (1997), Emporia State University.

**Amber Lancaster** (2018), Assistant Professor, Communication.

**Dongbin (Don) Lee** (2013), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1992), M.S. (2000), Kwangwoon University; Ph.D. (2009), Clemson University.

**Hui Yun Li** (2006), Professor, Natural Sciences. B.S. (1988), National Taiwan University; M.S. (1990), Michigan State



University; Ph.D. (1994), University of Massachusetts, Amherst.

**Roger V. Lindgren** (1999), Professor, Civil Engineering. Dip1H. (1985), Northern Alberta Institute of Technology; B.Sc. (1989), University of Alberta; Ph.D. (2005), Portland State University. Registered Professional Engineer: Alberta, Nevada.

**Gary Lompfrey** (2019), Assistant Professor, Management. B.S. (2005), Northwest Christian University; M.S. (2008), University of Oregon.

**Dawn Lowe-Wincentsen** (2008), Professor, Head of Portland-Metro and Extension Library Services, Creative Writing. B.A. (2000), Linfield College; M.L.I.S. (2003), Louisiana State University.

**Jessica Luebbers** (2015), Assistant Professor, Dental Hygiene. A.A.S. (2010), Portland Community College; B.S. (2012), Oregon Institute of Technology; M.S. (2017), Idaho State University; Ed.D. (In progress), George Fox University.

**Travis J. Lund** (2014), Associate Professor, Natural Sciences. B.S. (2006), George Fox University; Ph.D. (2013), University of Colorado Boulder.

**Kari J. Lundgren** (2014), Associate Professor, Communication. B.A. (2004), Franciscan University of Steubenville; M.A. (2006), Ph.D. (2013), Carnegie Mellon University.

**Douglas W. Lynn** (1996), Professor, Computer Systems Engineering Technology. B.S. (1982), M.E. (1985), Ph.D. (1988), Brigham Young University.

**Ryan Madden** (2010), Associate Professor, Humanities and Social Sciences. B.A. (1984), University of California – Davis; M.A. (1988), University of Vermont; Ph.D. (1993), University of New Hampshire.

**Rosalind J. McClure** (2000), Professor, Natural Sciences. B.S. (1986), Oregon Institute of Technology; M.S. (2010), University of North Dakota.

**Debbie L. McCollam** (1995), Professor, Medical Imaging Technology. B.S. (1990), Oregon Institute of Technology; M.B.A.

(1996), Southern Oregon University. Registered Technologist (R, M, ARRT).

**Don McDonnell** (2007), Professor, Medical Imaging Technology. B.S. (1997), Oregon Institute of Technology; M.Ed. (2012), Western Governors University. Registered Technologist (R, ARRT).

**Andrea McCracken** (2019), Instructor, Communication. B.A. (2004), Michigan State University; M.A. (2006) University of Montana; Ph.D. (2009) University of Texas at Austin.

**Tatiana V. McVay** (2001), Professor, Natural Sciences and Medical Imaging Technology. M.D. (1994), Moscow Medical Academy; B.S. (2000), Oregon Institute of Technology.

**Nathan D. Mead** (1998), Professor, Oregon Tech–Seattle at Boeing, Manufacturing and Mechanical Engineering and Technology. B.S. (1989), M.S. (1991), Oregon State University; Ph.D. (1998), University of Utah.

**Robert F. Melendy** (2017), Associate Professor, Electrical Engineering and Renewable Energy. B.S. (1992), M.S. (1994), M.S. (1998), Ph.D. (2008), Oregon State University.

**Carmen Morgan** (1989), Associate Professor, Management. A.A. (1984), B.S. (1986), Oregon Institute of Technology; M.B.A. (1991), Portland State University. Certified Public Accountant: Oregon; Certified Management Accountant; Certified in Financial Management, Personal Financial Specialist.

**Brian Moravec** (1989), Professor, Manufacturing and Mechanical Engineering and Technology. B.S.M.E. (1980), M.S.A.A. (1987), University of Washington.

**Mike Myers** (2016), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S.A.E. (1984), University of Kansas; Ph.D. (2012), Vanderbilt University; Teaching Certificate (2012); Vanderbilt University.

**Mark Nardin** (2018), Professor of Practice, Electrical Engineering and Renewable Energy.

**Sophie Nathenson** (2012), Associate Professor, Medical Sociology,

Humanities and Social Sciences. B.S. (2006), University of Tulsa; M.S. (2009), Ph.D. (2012), University of Utah.

**Cristina Negoita** (2004), Professor, Mathematics. B.A. (1995), University of Oregon; M.S. (2002), Ph.D. (2003), Arizona State University.

**Hallie A. Neupert** (1999), Professor, Management. B.A. (1994), Wellesley College; M.S. (1996), University of Arizona.

**Mark A. Neupert** (1998), Professor, Humanities and Social Sciences. B.A. (1987), University of Colorado, Boulder; M.S. (1992), Ph.D. (1999), University of Arizona.

**Phong Nguyen** (1999), Assistant Professor, Computer Systems Engineering Technology. B.S.E.E. (1985), United States Naval Academy; M.S.E.E. (1992), Naval Post Graduate School, Monterey.

**Peter Overholser** (2018), Instructor, Applied Mathematics. B.A. (2007), Gustavus Adolphus College; Ph.D. (2013), University of California, San Diego.

**Rosanna Overholser** (2017), Assistant Professor, Applied Mathematics. B.S. (2006), California Polytechnic State University; M.S. (2008), Ph.D. (2013), University of California, San Diego.

**Gregory Pak** (2010), Associate Professor, Natural Sciences. B.S. (1992), University of Illinois at Urbana-Champaign; B.S. (1994), Illinois Institute of Technology; M.D. (2001), Jagiellonian Collegium Medicum.

**Jeffrey Pardy** (2009), Associate Professor, Respiratory Care and Sleep Health. A.S. (1994), Rogue Community College; B.S. (2001), Regis University; M.B.A. (2012), Southern Oregon University.

**Lloyd Parratt** (2010), Associate Professor, Natural Sciences. B.S. (1972), University of Redlands; M.S. (1974), University of Wyoming.

**Timotius Pasang** (2020), Professor, Manufacturing & Mechanical Engineering Technology. B.E. (1992), Bandung, Indonesia; Ph.D. (2001), Monash University, Australia.

**Randall D. Paul** (2004), Professor, Mathematics. B.A. (1989), Rice University; M.S. (1998), Ph.D. (1998), University of Texas at Austin.

**Robert Paxton** (2017), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (2000), University of Waikato; Ph.D. (2006), Auckland University of Technology.

**Trevor J. Petersen** (2013), Associate Professor, Humanities and Social Sciences. B.S. (2006), Brigham Young University; M.S. (2009), Ph.D. (2013), Ohio University.

**Dan Peterson** (2007), Dean, College of Health, Arts, and Sciences. Professor, Communication. B.A. (1996), M.A. (1999), Brigham Young University; Ph.D. (2002), Ohio University.

**Slobodan Petrovic** (2009), Professor, Electrical Engineering and Renewable Energy. B.S. (1979), University of Belgrade, Serbia; Ph.D. (1984), Technical University of Dresden, Germany.

**Amanda Petty** (2021), Director of Clinical Education, Doctor of Physical Therapy. B.S. (2008), Brandeis University; Doctor of Physical Therapy (2011), University of Colorado.

**Alla V. Powers** (2004), Associate Professor, Digital Initiatives Librarian, Library Services. B.A. (1985), Karelian State Pedagogical Institute; M.S. (1993), Karelian College of Culture; M.L.I.S. (2009), Drexel University.

**Scott Prah** (2012), Professor, Electrical Engineering and Renewable Energy. B.S. (1982), California Institute of Technology; Ph.D. (1988), University of Texas at Austin.

**Bren Raffaelli** (2017), Professor of Practice, Management. B.S. (1995), Southern Illinois University, Carbondale; M.B.A. (1998), University of Phoenix.

**Joseph Reid** (2009), Associate Professor, Mathematics. B.S. (2006), Western Oregon University; B.S. (2008), Oregon Institute of Technology; M.S. (2009), University of Washington; M.A.S. (2013), Penn State University.

**Charles "C. J." E. Riley** (2008), Professor, Civil Engineering. B.S. (2001),

Swarthmore College; M.S. (2003), Ph.D. (2009), Colorado State University, Ft. Collins. Registered Professional Engineer: Oregon.

**John A. Ritter** (1996), Professor, Geomatics. B.A. (1976), University of California, Los Angeles; M.S. (1977), Ph.D. (1983), University of Michigan, Ann Arbor.

**Wendy Rogers** (2018), Instructor, Medical Imaging Technology. B.S. (1993), Oregon Institute of Technology.

**Yasha Rohwer** (2013), Associate Professor, Humanities and Social Sciences. B.A. (2000), University of Washington; M.A. (2006), Florida State University; M.A. (2009), Ph.D. (2012), University of Missouri.

**Abigail Rollins** (2020), Instructor, Dental Hygiene. B.A. (1981), University of Oregon; DMD (1989), Oregon Health and Sciences University.

**Paula Russell** (2011), Associate Professor, Dental Hygiene. B.S. (1998), Oregon Institute of Technology; M.Ed. (2010), University of Phoenix. Expanded Practice Dental Hygienist (EPDH).

**Mostafa Saber** (2017), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (2001), Sharif University of Technology; M.S. (2003), University of Tehran; Ph.D. (2013), North Carolina State University.

**Troy Scevers** (2013), Associate Professor, Computer Systems Engineering Technology. B.S. (1997), M.S. (2002), Oregon Institute of Technology.

**Patrick Schaeffer** (2009), Associate Professor, Management. B.S. (1986), M.S. (1994), San Jose State University.

**Tracy Scharn** (2021), Assistant Professor, Instruction and Outreach Librarian. A.A. (1995), Lane Community College, B.A. (1997), University of Oregon, M.S. (2009), University of Washington.

**Aaron Scher** (2012), Associate Professor, Electrical Engineering and Renewable Energy. B.S. (2003), M.S. (2005), Texas A&M University, College Station; Ph.D. (2008), University of Colorado, Boulder.

**Matthew W. Schnackenberg** (2005), Professor, Communication. B.A. (1995), Michigan State University; M.A. (1998), Ph.D. (2006), Washington State University.

**Heather Schudel** (2019), Clinical Instructor, Dental Hygiene. B.S. (2000), Oregon Tech; M.S. (2018), Concordia University.

**Stephen M. Schultz** (1995), Professor, Medical Imaging Technology. B.S. (1983), M.S. (1994), State University of New York, Buffalo. B.S. (2009), Oregon Institute of Technology. R.T. (R) (N) (CT) ARRT.

**Michael Schwartz** (2007), Program Director, Sleep Health. M.A. (1992), San Francisco State University.

**Matthew Search** (2010), Associate Professor, Communication. M.A. (1999), University of Central Florida; Ph.D. (2010), Iowa State University.

**Maureen Sevigny** (1995), Professor, Management. B.A. (1976), Barnard College; M.B.A. (1978), New York University; Ph.D. (1995), University of Maryland.

**Feng Shi** (2011), Assistant Professor, Electrical Engineering and Renewable Energy. B.S. (1985), Northwest Normal University, P.R. China; MME (1991), Yunnan Normal University, P.R. China; M.S. (2002), University of Rochester; Ph.D. (2008), University of Toledo.

**Hong "Randy" Y. Shih** (1984), Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1979), Chung-Yuan University, Taiwan; M.S. (1984), University of Nebraska, Lincoln.

**Sean Sloan** (2010), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1989), M.S. (1994), University of Illinois.

**Sean W. StClair** (2004), Professor, Civil Engineering. A.S. (1996), Ricks College; B.S. (1998), Utah State University; M.S. (2000); Ph.D. (2004), Georgia Institute of Technology. Registered Professional Engineer: Oregon.

**Lisa Steinbock** (2016), Instructor, Medical Imaging Technology. B.S. (2005), Oregon Institute of Technology; B.S.

(2011), Weber State University. Registered Technologist (R) (CT) (T) (ARRT).

**Lindy Stewart** (2015), Assistant Professor, Management. B.S. (2012), Oregon Institute of Technology; M.S. (2015), Boston University.

**Clifford Stover** (2017), Associate Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1992), M.S. (1995), Cal Poly Pomona.

**Wangping Sun** (2005), Professor, Manufacturing and Mechanical Engineering and Technology. B.S. (1988), Beijing Jiaotong University; M.S. (2002), Ph.D. (2005), Kansas State University.

**Darlene J. Swigart** (2017), Assistant Professor, Dental Hygiene. B.S. (1998), Idaho State University.

**Christopher J. Syrnyk** (2012), Associate Professor, Communication. Director, Oregon Tech Honors Program. B.A. (1991), M.A. (1998), University of Oregon; M.A. (2000), Virginia Polytechnic Institute and State University; Ph.D. and Ph.D. Minor (2016), University of Wisconsin-Madison.

**Dawn Taylor** (2010), Associate Professor, Medical Laboratory Science. B.S. (1986), Illinois State University; Ed.M. (2014), Oregon State University. M.T. (A.S.C.P.) certified.

**Mason Terry** (2016), Associate Professor, Electrical Engineering and Renewable Energy. Director, Oregon Renewable Energy Center. EET (1999), University of

Washington; M.S.E.E. (2002), University of New South Wales, Australia; Ph.D. (2007).

**Chelsey Torgerson** (2018), Instructor, Humanities and Social Sciences. B.S. (2009), North Dakota State University; M.A. (2015), Appalachian State University; Ph.D. (2018), Kansas State University.

**Terri Torres** (2008), Professor, Mathematics. B.S. (1981), Brigham Young University; M.S. (1994), Idaho State University; M.S. (2010), Bowling Green State University.

**Kenneth C. Usher** (2000), Professor, Natural Sciences. B.S. (1990), University of Alberta; Ph.D. (1996), University of Oregon.

**Christy VanRooyen** (2013), Assistant Professor, Natural Sciences. B.S. (2001), Oregon Institute of Technology. M.S. (2018) Southern Oregon University.

**Chitra Venugopal** (2018), Assistant Professor, Electrical Engineering and Renewable Energy.

**Adam Wagner** (2010), Instructor, Emergency Medical Services. A.A.S. (2009), Oregon Health and Science University/ Oregon Institute of Technology; B.A. (2003), B.S. (2003), University of Montana.

**Jack A. Walker** (1984), Professor, Geomatics. B.S. (1981), Oregon Institute of Technology; M.S. (1983), Purdue

University, West Lafayette. Registered Professional Land Surveyor: Oregon.

**Jintai Wang** (2021) Assistant Professor, Civil Engineering. B.S. (2010), Tongji University, China; M.Eng.(2014), Tongji University, China; Ph.D. (2018), Pennsylvania State University.

**Kristen Weber** (2020), Instructor, Medical Laboratory Science. B.S. (1989), San Francisco State University; M.S. (2017), Portland State University.

**Kristy Weidman** (2012), Associate Professor, Management. B.S. (2001), Oregon Institute of Technology; M.A. (2006), Thomas Edison State University.

**Elizabeth Wells** (2018), Instructor, Dental Hygiene. B.S. (2014), Oregon Institute of Technology; M.S. (2020), Oregon Institute of Technology.

**Robyn S. Wilde** (2002), Professor, Natural Sciences. B.S. (1994), Utah State University; M.S. (1996), Ph.D. (2000), University of Nebraska, Lincoln.

**Sherry Yang** (1997), Professor, Computer Systems Engineering Technology. B.S. (1986), M.S. (1989), Ph.D. (1996), Oregon State University.

**Yuehai Yang** (2016), Assistant Professor, Natural Sciences.

**Laurie Yates** (2015), Instructor, Management. B.A. (1973), Portland State University; M.B.A. (2002), University of Oregon; DMgt (2011), George Fox University.

## Faculty Senate Presidents

1965-1966 Eugene A. Wellman  
1966-1967 Max A. Saunders  
1967-1968 Arthur A. LeCours  
1968 George E. Miller  
1968-1969 Dalhart R. Eklund  
1969-1970 Walter R. Richartz  
1970-1971 William L. Bradford, Jr  
1971-1972 Dale W. King  
1972-1973 Larsen S. Svanevik  
1973-1974 Sherman A. Anderson  
1974-1975 Thomas J. Connors  
1975-1976 James J. Boyle  
1976-1977 Joseph T. Riker  
1977-1978 Robert C. DeRosier  
1978-1979 Richard H. Zbinden  
1979-1980 Gary E. Wehr  
1980-1981 Keith L. Spickler  
1981-1982 Earl D. Kurtz  
1982-1984 Charles V. Higbee  
1984-1985 Edward Silling  
1985-1987 Herbert H. Jolliff  
1987-1988 Charles E. Harris  
1988-1989 Ross S. Carroll  
1989-1990 Pearl O. Juris  
1990-1991 John V. Stec  
1991-1993 James R. Etchison  
1993-1995 Bradley D. Burda  
1995-1997 Valerie J. Vance  
1997-1999 David C. Warner  
1999-2000 Alberto Bello, Jr.  
2000-2002 Mark Clark  
2002-2003 Timothy Thompson  
2003-2006 Bradley D. Burda  
2006-2008 Mark Neupert  
2008-2009 Marla Miller  
2009-2010 Debbie Caldwell  
2010-2012 Matt Schnackenberg  
2012-2014 Dan Peterson  
2014-2016 Robyn Cole  
2016-2018 David Thaemert  
2018-2020 Terri Torres  
2020-Present Don McDonnell

## Emeritus Faculty

**Marshall Ager**, B.S., Assistant Professor, Civil Engineering and Geomatics, 1977-2004.

**Randal Albert**, M.S., Computer Systems Engineering Technology, 1984-2013.

**Robert E. Baird**, E.E., Professor, Electrical Engineering and Renewable Energy, 1958-1979.

**Lynda M. Baker**, M.F.A., Professor, Humanities and Social Sciences, 1989-2012.

**James Ballard**, Ed.D., Associate Professor, Mathematics, 2000-2016.

**William Bradford**, M.S., Professor, Medical Laboratory Technology, 1960-1986.

**Judy Bronkey**, M.A., Associate Professor, Director, Ethnic and International Student Services, 1969-1995.

**Gene Bruner**, M.S., Professor, Electrical Engineering and Renewable Energy, 1982-2004.

**Barry Canaday**, M.S., Associate Professor, Medical Imaging Technology, 2009-2021.

**Ralph Carestia**, M.S., Computer Systems Engineering Technology, 1990-2013.

**Ross Carroll**, Ph.D., Professor of Communication, 1984-2003.

**Thomas J. Connors**, Ph.D., Professor and Vascular Technology Program Director, 1969-1999.

**Harriet Cornachione**, M.S., Professor, Civil Engineering, 1995-2010.

**Michael Cornachione**, M.S., Professor, Civil Engineering, 1992-2010.

**Ben Cornelius**, M.A., Mathematics, 1980-2013.

**Jesse Crabtree**, Assistant Professor, Civil Engineering Technology, 1947-1976.

**G. Gene Culver**, B.S., Associate Professor, Associate Director, Geo-Heat Center, 1960-1995.

**Hugh Currin**, Ph.D., Manufacturing and Mechanical Engineering Technology, 1984-2013.

**W.M. Douglass**, M.Ed., Professor and Dean of Administration, 1954-1983.

**Elaine M. Deutschman**, M.B.S., Professor, Mathematics, 1983-2004.

**David Dyrud**, Ph.D., Professor of Communication, 1975-2003.

**Marilyn Dyrud**, Ph.D., Professor of Communication, 1983-2017.

**James R. Etchison**, M.Ed., Professor and Chair, Electrical Engineering and Renewable Energy, 1986-2004.

**Marian Ewell**, B.S., Assistant Professor, Allied Health Partnerships, Clinical Laboratory Science, 2001-2012.

**Jeanne Ford**, R.N., Assistant Professor, Administrative Director, Student Health Service, 1964-1983.

**Abraham Furman**, Clinical Laboratory Science, 2001-2016.

**C. Fred Foulon**, M.Ed., Professor, Civil Engineering Technology, 1954-1986.

**James R. Gerhardt**, M.S., Professor, Medical Imaging Technology, 1967-1992.

**Charles C. Glover**, B.S., Associate Professor, Diesel Power Technology, 1966-1990.

**Harold E. Godfrey, Jr.**, B.S., Assistant Professor, Medical Imaging Technology, 1975-1997.

**Yolanda Guran-Postlethwaite**, M.S.E.E., Professor, Electrical Engineering and Renewable Energy, 1986-2004.

**Charles E. Harris**, M.S., Professor, Department of Extended Studies and Summer Session, 1976-1996.

**Irving H. (Bud) Hart, III**, M.S., Professor, Mathematics, 1972-1999.

**Donald R. Hefty**, M.S.E.E., Professor, Electrical Engineering and Renewable Energy, 1973-1993.

**Charles A. Hermach**, M.S., Professor, Manufacturing and Mechanical Engineering and Technology, 1983-1993.

**Fred Hess**, M.S., Professor, Mathematics, 1969-1991.

**Charles V. Higbee**, M.B.A., Professor, Business, 1970-1987.

**David M. Hull**, M.S., Professor, Civil Engineering Technology, 1962-1987.

**Margaret Huntley**, Professor, Management, 1975-2006.

**Herbert H. Jolliff**, M.S., Professor and Department Chair, Mathematics, 1968-1999.

**Charles Jones**, Ph.D., Dean, College of Engineering, Technology, and Management. 1997-2015.

**Lewis Jones**, M.A., Professor, Computer Systems Engineering Technology, 1969-1986.

**Pearl O. Juris**, M.S., Professor, Nursing, 1977-1992.

**Claude Kansaku**, Professor, Engineering Technology and Management, 1998-2018.

**Jenny Kellstrom**, M.Ed., Professor, Medical Imaging Technology, 1992-2016.

**Richard A. King**, M.S.E.E., Professor, Computer Systems Engineering Technology, 1982-2002.

**David G. Korzan**, M.S., Professor, Natural Sciences, 1973-2003.

**Cecil R. Lake**, M.Ed., Professor, Director of Planning and Research, 1949-1986.

**Arthur LeCours**, M.Ed., Professor, Physics, 1959-1982.

**John W. Lund**, Ph.D., Professor, Civil Engineering, and Director, Geo-Heat Center, 1967-1999.

**Russell Madsen**, M.Ed., Professor, Diesel Power Technology, 1958-1986.

**LeAnn Maupin**, M.Ed, Dean, College of Health, Arts, and Sciences, 1997-2019.

**James C. McAtee**, M.S., Professor, Dean, Computer Systems Engineering Technology, 1969-1996.

**Marla Miller**, M.S., Management, 1998-2013

**Robert H. Mitchell**, M.S., Professor, Natural Sciences, 1975-1998.

**Richard M. Moore**, Ph.D., Professor and Director, Portland-Metro Operations, 1972-1997.

**W. Howard Morris**, M.Ed., Professor, Physical Education, Director of Athletics, 1962-1992.

**Julianne Murray**, M.A., Associate Professor, Management, 1987-2011.

**Gary J. Naseth**, Ph.D., Professor, Humanities and Social Sciences, 1975-2009.

**JoAnne M. Ogborn**, M.S., Professor, Director, Extended Studies and Summer Session, 1968-1996.

**Kenneth R. Ostrom**, M.S., Professor, Mathematics-Physics, 1966-1995.

**Alf L. Peterson**, M.S., Professor, Business Technologies, 1969-1990.

**Ralph L. Pettit**, M.S., Professor, Humanities and Social Sciences, 1969-1986.

**Donald Phillips**, M.S., Professor, Computer Systems Engineering Technology, 1972-1995.

**Wayne Phillips**, M.E., Professor, Manufacturing and Mechanical Engineering and Technology, 1979-1989.

**David N. Pocock**, M.S.E., Associate Professor, Electrical Engineering and Renewable Energy, 1991-2008.

**Richard Pope**, M.Ed., Professor, Manufacturing and Mechanical Engineering and Technology, 1957-1984.

**Lawrence W. Powers**, M.A., Dean, College of Health, Arts, and Sciences, 1993-2013.

**John R. Puckett**, B.A. Associate Professor, Communication 1986-2012.

**Winston D. Purvine**, L.L.D., President, Oregon Institute of Technology, 1947-1976.

**Wayne Rawson**, M.Ed., Professor, Civil Engineering Technology, 1955-1986.

**Margaret E. Reid**, M.S., Associate Professor, Nursing, 1981-1997.

**Suzanne Riverman**, M.N., Professor, Nursing, 1971-1989.

**Alfred Roberson**, M.Ed., Associate Professor, Director of Advising, 1966-1991.

**Robert Rogers**, M.S., Professor, Manufacturing and Mechanical Engineering and Technology, 1992-2007.

**Errol Roy**, M.B.A., Professor, Management, 1992-2004.

**Mata A. Rust**, M.S., Professor, Communication Department, 1972-1999.

**Kathleen Sale**, M.S., Associate Professor, Natural Sciences, 1992-2011.

**Joseph E. Sarsenski**, Ph.D., Professor, Civil Engineering, 1998-2008.

**Elvira Schechtel**, M.S., Professor, Natural Sciences, 1990-2021.

**Andrew J. Sedlock**, M.S., Professor, Electrical Engineering and Renewable Energy, 1988-2008.

**Jill Schultz**, Professor, Dental Hygiene, 1984-2018.

**Edward Silling**, Ph.D., Professor, Communication Department, 1975-2003.

**Jay F. Silva**, M.S., Professor, Manufacturing and Mechanical Engineering and Technology, 1962-1981.

**Donald R. Skudstad**, Ph.D., Professor, Manufacturing and Mechanical Engineering and Technology, 1976-1996.

**Susan K. Snyder**, M.S., Professor, Physical Education, 1964-1995.

**John V. Stec**, M.B.A., Professor, Management, 1986-1990 and 1992-2007.

**James V. Stewart**, M.Ed., Professor, Mathematics, 1984-2002.

**Charles R. (Dick) Strohkirch**, M.S., Professor, Medical Imaging Technology, 1972-1998.

**William J. Stuart** M.S. Associate Professor, Manufacturing and Mechanical Engineering and Technology, 2004-2019.

**Edward R. Stuedli**, D.D.S., Professor, Dental Hygiene, 1976-1998.

**Pauline Stuedli**, Assistant Professor, Dental Hygiene, 1977-1999.

**Rees Stuteville**, M.Ed., Professor, Medical Imaging Technology, 1991-2007.

**Larsen S. Svanevik**, Ph.D., Professor, Natural Sciences, 1966-1997.

**Ron Swisher**, Ph.D., Professor, Natural Sciences, 1976-2016.

**Donald P. Theriault**, Ed.D., Professor, Assistant to the President, Director of Development, 1962-1986.

**Timothy C. Thompson**, Professor, Mathematics, 1997-2017.

**Francis M. (Mel) Turner**, Associate Professor, Electrical Engineering and Renewable Energy, 1982-2000.

**David J. Vargas**, M.S.C.E., Associate Professor, Civil Engineering Technology, 1985-1997.

**Eric E. Wakkuri**, M.S., Professor, Mathematics, 1975-2004.

**John G. Ward**, M.B.A., Professor, Management Department, 1969-1995.

**David C. Warner**, Ph.D., Professor, Natural Sciences, 1984-2002.

**Gary E. Wehr**, M.A., Professor, Department Chair, General Studies, 1969-1996.

**John M. Yarbrough**, M.A., Professor, Electrical Engineering and Renewable Energy, 1972-2002.

**Linda S. Young**, Ph.D., Professor, Communication, 1983-2017.

**Richard H. Zbinden**, B.S.C.E., Professor and Chair, Civil Engineering Technology, 1976-1997.

**James W. Zipay**, Assistant Professor,  
Electrical Engineering and Renewable  
Energy, 2001-2017.

**Raenelle J. Zumbo**, M.S., Assistant  
Professor, Communication, 1976-2008.

## Emeritus Administration

**Linda "Abbie" Allen**, M.S., Student Services Specialist, 1988-2015.

**Mary J. Bradford**, M.S., Aquatics Director/Softball Coach, 1975-2004.

**Christopher Campbell**, A.A., Facilities Services, 1990-2014.

**Paula Cloud**, Executive Secretary to the President, 1997-2008.

**Delores "Lita" Colligan**, Associate Vice President, Strategic Partnerships, 2007-2017.

**Joemae Cox**, M.S., Online Learning, 1994-2010.

**Nancy K. Cox**, Executive Secretary to the President, 1961-1999.

**Barb DeKalb**, M.A.T., Online Learning, 1986-2013.

**Ted E. Dobson**, M.A., Executive Director, Institutional Advancement, 1986-2001.

**William R. Dodge**, B.A., Director of Paper Owl Bookstore, 1985-1999.

**Martha Anne Dow**, Ph.D., President, 1998-2007.

**Marla Edge**, M.Ed. Director, Academic Agreements, 1983-2019.

**Christian H. Eismann**, Ph.D., Professor and Dean of Academic Affairs, 1986-1996.

**Sharon Hanson**, Media Services Coordinator, Information Technology, 1986-2009.

**David "Haldane" Harris**, M.B.A., Budget Officer, Financial Administration, 1990-2008.

**Roger Hulet**, A.A., Facilities Services, 1983-2014.

**Mary Jane Isensee**, B.S., Director, Student Health Center, 1983-1997.

**Charles Jones**, Ph.D., Dean, College of Engineering, Technology, and Management. 1997-2015.

**Sandra "Sam" King**, Payroll Supervisor, Business Office, 1990-2012.

**April C. Leifeste**, A.A., Executive Secretary, Academic Affairs, 1972-2006.

**Paul Lienau**, M.S., Professor and Director of the Geo-Heat Center, 1968-1997.

**John Lund**, Ph.D., Geo-Heat Center, 1967-2010.

**LeAnn Maupin**, M.Ed, Dean, College of Health, Arts, and Sciences, 1997-2019.

**Ron McCutcheon**, B.A., Chief Human Resources and Civil Rights/Diversity Officer, 1996-2016.

**Cheryl Meyers**, Executive Assistant, Provost and Vice President of Academic Affairs, 1989-2015.

**Daniel J. Miles**, B.A., Athletic Director and Men's Basketball Head Coach, 1970-2002.

**Beth Murphy**, M.S., Assessment, 1990-2010.

**J. Samuel Murphy**, Ph.D., CFLAT Specialist, Student Services, Assistant Professor, 1990-2011.

**E. Susan Richards**, B.S., Registrar's Office, 1989-2013.

**Raymond Setters**, B.S., Purchasing Manager, Business Affairs, 1989-2008.

**Sandra Setters**, Benefits Officer, Human Resources, 1989-2008.

**Timothy J. Stanaway**, Ed.D., Interim Provost and Vice President for Student Affairs, 1975-1999.

**Robert Thompson**, B.S., Sports Information Director, Athletics, 1993-2007.

**Gary L. Willhide**, M.S., Director, Public Affairs, 1988-2005.

**Shelby Wilsdon**, B.S., Director, Human Resources, 1971-2003.

**Lawrence Wolf**, President Emeritus, Professor, Manufacturing and Mechanical Engineering and Technology, 1991-2017.

**Douglas P. Yates**, Ed.D., Vice President for Finance and Administration, 1980-2002.

**Betty J. Young**, Office Manager, Business Office, 1961-1999.