Welcome to Oregon Tech
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To assist you in navigating the 2012-13 General Catalog, we have organized its contents into nine major areas. The index at the end of this catalog can help in locating specific information. The general catalog is printed annually and available on the Web at www.oit.edu.

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General Information

The Oregon Tech Admissions Office is located on the first floor of the College Union on the Klamath Falls campus. It is open weekdays from 8 a.m. to 5 p.m. 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 or by e-mailing oit@oit.edu. If you wish to visit one of Oregon Tech’s other campuses, the Admissions Office can provide you with a contact person who can make arrangements for you.

Non-Discrimination Policy
Oregon Institute of Technology 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 person is designated to handle inquiries and complaints regarding this non-discrimination policy: Affirmative Action Officer, Oregon Tech, 3201 Campus Dr., Klamath Falls, OR 97601-8801; (541) 885-1108; FAX (541) 851-5200; e-mail: ron.mccutcheon@oit.edu.

Students with Disabilities
Oregon Institute of Technology is committed to accommodating the academic and programmatic needs of qualified students with disabilities. Students with disabilities who anticipate needing accommodations should contact Services for Students with Disabilities, LRC 223, as soon as possible in advance of enrollment, to ensure timely provision of services. Questions may be directed to: Services for Students with Disabilities, Oregon Tech, 3201 Campus Dr., Klamath Falls, OR 97601-8801. (541) 885-1129;

Alternate Format
This publication is available in an alternate format for persons with disabilities. Please contact Services for Students with Disabilities at (541) 885-1129 or joan.loustael@oit.edu.

Accreditation
Oregon Institute of Technology 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 2012-13 General Catalog was produced by the Registrar's Office and the Marketing and Communication Department at Oregon Tech. Wendy Pedersen, University Registrar, and Crystal Pound, Registration Specialist; Gwen Raubolt, Director of Marketing and Communication; typesetting and cover design by Bill Goloski, Publications and Graphic Design Manager. 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 printed annually and available on the Web at www.oit.edu.
President’s Welcome

Welcome to the Oregon Tech Family. You are embarking upon one of the most exciting and challenging educational opportunities available during a time of profound change in our society. But it is exactly because we live in a time of profound change that Oregon Tech is an excellent choice for your post-secondary education.

With locations in Klamath Falls, La Grande, Salem, Wilsonville, and Seattle, Oregon Tech is home to numerous student groups and organized activities. Everyone at Oregon Tech is proud of our students’ accomplishments. Equally important, we are small enough to allow students and faculty to really get to know each other.

Student success is our highest priority and is measured in a variety of ways: our impressive post-graduate employment and graduate-/professional-school placement, starting salaries, how well the university scores on graduate-satisfaction surveys, and the lists of universities and colleges across the country on which we appear.

Our tagline, “Hands-on education for real-world achievement,” is more than a slogan – it truly is the way we do business. Our low student-to-faculty ratio of 20:1 allows for consistent personal interactions between faculty and students. Faculty members bring their personal problem-solving experiences into the classroom, and Oregon Tech students have myriad opportunities to gain real-world experience through externships, internships, cooperative programs, and capstone projects. Our applied approach to education is the main reason so many employers seek Oregon Tech alumni.

By choosing Oregon Tech, you have made a decision about your education and your future that we know will be filled with learning, success, satisfaction, and a lifelong connection to the university. We all are delighted that you chose Oregon Tech to continue your education and we all look forward to seeing you earn your diploma, after which we will be following your successes throughout your post-Oregon Tech career. Again, welcome to the Oregon Tech Family – we’re glad you’re here!

Mission Statement and Core Values

**Mission Statement**
Oregon Institute of Technology, a member of the Oregon University System, offers innovative and rigorous applied degree programs in the areas of engineering, engineering technologies, health technologies, management, and the arts and sciences. To foster student and graduate success, the university provides an intimate, hands-on learning environment, focusing on application of theory to practice. Oregon Tech offers statewide educational opportunities for the emerging needs of Oregon’s citizens and provides information and technical expertise to state, national and international constituents.

**Core Themes**
Oregon Institute of Technology:
- Applied Degree Programs
- Student and Graduate Success
- Statewide Educational Opportunities
- Public Service

*This statement of mission and the core values for Oregon Tech was approved by the State Board of Higher Education on January 7, 2011.*
Academic Calendar 2012-2013

Fall Term, 2012

MAY 14-24  Registration for Fall Term
SEP 20-21  Registration for those not registered in advance (new freshmen, new transfer students, and new non-admitted students and re-enrolling students)
SEP 21-22  New student orientation
SEP 24  Classes begin
SEP 24-OCT 5  Fee payment
SEP 28  Last day to use Web for Student for all registration changes
OCT 5  Last day to pay fees or register without late charge
OCT 5  Last day to drop without a "W"*

Winter Term, 2013

NOV 5-16  Registration for Winter Term
NOV 9  Last day for course withdraw*
NOV 12  Veterans Day holiday
NOV 21 (1:00 p.m.)-NOV 25  Thanksgiving holiday
NOV 30  Last day to completely withdraw from the University
DEC 3-6  Final exams week
DEC 7  Fall Term ends

Spring Term, 2013

FEB 18-28  Registration for Spring Term
FEB 22  Last day for course withdraw*
MAR 15  Last day to completely withdraw from the University
MAR 18-21  Final exams week
MAR 22  Winter Term ends

Summer Term, 2013 (8-week session)

MAY 6  Registration for all students begins
JUN 24  Classes begin
AUG 16  Summer Term ends

First 4-week Session
JUN 24  Classes begin
JUL 19  First 4-week Session ends

Second 4-week Session
JUN 24  Classes begin
JUL 19  First 4-week Session ends

* Instructor and advisor permission required after the fifth day of classes.
Additional calendars can be viewed at: www.oit.edu.
Clinical Laboratory Science Program
Academic Calendar 2012-2013

**Summer Term, 2012 (8-week session)**
- JUN 18: Classes begin
- JUN 24: Last day to pay fees without late charge
- JUL 4: Independence Day holiday
- JUL 29: Last day to drop without a “W”
- AUG 10: Summer Term ends
- AUG 20: Externships begin
- SEP 3: Last day to drop without a “W”
- AUG 20: Labor Day holiday
- DEC 8: Graduation for 5th Term Students

**Fall Term, 2012**
- AUG 20: Externships for 5th Term Students begin
- SEP 12: Mandatory Orientation for Entering 1st Term Students
- SEP 17: Classes begin for Entering 1st Term Students
- OCT 5: Last day to pay fees without late charge
- OCT 5: Last day to drop without a “W”
- NOV 12: Veterans Day holiday
- NOV 21 (1:00pm) - NOV 25: Thanksgiving holiday
- DEC 7: Fall Term ends – 1st and 5th Term Students
- DEC 8: Graduation for 5th Term Students

**Winter Term, 2013**
- JAN 7: Classes begin
- JAN 18: Last day to pay fees without late charge
- JAN 18: Last day to drop without a “W”
- JAN 21: Martin Luther King, Jr. holiday
- MAR 22: Winter Term ends

**Spring Term, 2013**
- APR 1: Classes begin
- APR 12: Last day to pay fees without late charge
- APR 12: Last day to drop without a “W”
- MAY 27: Memorial Day holiday
- JUN 14: Spring Term ends

**Summer Term, 2013 (8-week session)**
- JUN 24: Classes begin
- JUN 29: Last day to pay fees without late charge
- JUL 4: Independence Day holiday
- JUL 27: Last day to drop without a “W”
- AUG 16: Summer Term ends
- AUG 26: Externships begin
- SEP 2: Labor Day holiday
- DEC 14: Graduation for 5th Term Students
About Oregon Tech

Oregon Institute of Technology is Oregon’s only public institution of higher education with a mission to deliver technology education throughout the Pacific Northwest. We partner with business and industry leaders to ensure our programs adapt to new technologies and workforce demands. This real-world focus gives our students a competitive edge: 90 percent are employed or in graduate school within six months of graduation. Year after year, our baccalaureate graduates earn excellent starting salaries.

Our applied approach to teaching, which blends theory and practice, is the main reason our alumni are so avidly recruited. Whether they study software engineering, vascular technology, management or dental hygiene, Oregon Tech students have amazing opportunities to apply what they learn in lab-based classes, clinics, externships and workplaces. This practical focus is reinforced in the classroom by instructors who come to Oregon Tech with relevant business, industrial, or clinical experience.

And in every program, major studies are underscored by a general-education core that broadens students’ understanding of the world and teaches them to communicate effectively, solve problems and think for themselves.

At Oregon Tech, students find a robust university atmosphere personalized by individual interactions with professors and staff. An enrollment of about 3,900 allows for an intimate campus environment distinguished by small classes and a student-to-faculty ratio of 20:1. This personal approach provides many benefits of a prestigious private education at a public price.

Oregon Tech, a public, state-supported institution belonging to the Oregon University System, is accredited by the Northwest Commission on Colleges and Universities. Individual programs also are accredited by the appropriate professional organizations.

One Oregon Tech, many locations

Oregon Tech is one institution with multiple locations. Established in 1947, Oregon Tech offers degree programs at locations throughout the State of Oregon and even beyond to meet the needs of students seeking a top quality, hands-on education.

The main, residential campus is located in Klamath Falls in beautiful Southern Oregon. Our campus in Klamath Falls is nestled on the eastern slope of the Cascade Mountains. The 190-acre campus offers spectacular views of Upper Klamath Lake, pine-studdned knolls and snow-capped peaks from nearly every building. Klamath Falls, a city of about 20,000 residents (45,000 in the urban growth area), is located in south-central Oregon, about 20 miles from the California border. Known as Oregon’s “City of Sunshine,” Klamath Falls enjoys about 300 days of blue skies each year.

Our new campus in Wilsonville, located in the greater Portland metro area, offers degree programs in a state-of-the-art facility. Oregon Tech has enjoyed a presence in the Portland area for more than 30 years. The university occupied four different locations throughout Portland over the years, but as of Fall 2012, the campuses are consolidating and all programs are moving to the beautiful, new Wilsonville campus. Oregon Tech will also keep a focused presence on the West side of Portland. The Wilsonville campus is our main campus in the northern portion of the state and is home to the nationally-recognized Renewable Energy Engineering program. The campus offers an array of programs and is easily accessible to green businesses for externships and employment located in the “Silicon Forrest.”

Since 2005, Oregon Tech has partnered with Oregon Dental Services to provide North Eastern Oregonians the opportunity to obtain an Associate of Applied Science degree in Dental Hygiene in La Grande.

The university also offers a baccalaureate program in dental hygiene in Salem through a partnership between Oregon Tech and 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 entry into the program.

Oregon Tech also offers programs in partnership with The Boeing Company in Seattle.

The university offers online programs through the Distance Education department. Oregon Tech understands that working professionals are busy and ready to advance their education as quickly and conveniently as possible. The university offers a growing number of degree completion programs through online delivery.
Essential Learning Outcomes for Students

Oregon Tech students will demonstrate these institutional student learning outcomes:

- Effective oral, written and visual communication
- The ability to work effectively in teams and/or groups
- An understanding of professionalism and ethical practice
- Critical thinking and problem solving
- Lifelong and independent learning skills
- Mathematical knowledge and skills
- Scientific knowledge and skills in scientific reasoning
- Cultural awareness

Degree Programs

**Master of Science**
- Civil Engineering
- Manufacturing Engineering Technology
- Renewable Energy Engineering

**Bachelor of Applied Science**
- Technology and Management

**Bachelor of Science**
- Allied Health Management
- Applied Mathematics
- Applied Psychology
- Biology
- Biology-Health Sciences
- Civil Engineering
- Clinical Laboratory Science (joint degree with OHSU)
- Communication Studies
- Computer Engineering Technology
- Dental Hygiene
- Diagnostic Medical Sonography
- Echocardiography
- Electrical Engineering
- Electronics Engineering Technology
- Embedded Systems Engineering Technology
- Environmental Sciences
- Geomatics, with options in:
  - Geographic Information Systems
  - Surveying

Information Technology, with options in:
- Accounting
- Applications Development
- Business/Systems Analysis
- Health Informatics
- Management, with options in: Accounting
- Entrepreneurship/Small Business
- Marketing
- Manufacturing Engineering Technology
- Mechanical Engineering
- Mechanical Engineering Technology
- Nuclear Medicine Technology
- Nursing (through OHSU, School of Nursing)
- Operations Management
- Radiologic Science
- Renewable Energy Engineering
- Respiratory Care
- Software Engineering Technology
- Vascular Technology

**Associate Degrees**

**Associate of Applied Science**
- Dental Hygiene
- Emergency Medical Technology – Paramedic (joint degree with OHSU)
- Polysomnographic Technology

**Associate of Engineering**
- Computer Engineering Technology
- Software Engineering Technology
History at a Glance

1947 – July 14, Under the direction of Winston Purvine, the first classes were held in a deactivated World War II Marine Corps hospital three miles northeast of Klamath Falls.

1951 – KTEC radio went on the air.

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 on campus.

1957 – The institute 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 – The institute was transferred to the jurisdiction of the State Board of Higher Education.

1962 – The institute was accredited by the Northwest Association of Secondary and Higher Schools.

1964 – The campus moved to newly constructed buildings on a geothermal site overlooking Upper Klamath Lake.

1966 – The institute received authorization to grant bachelor’s degrees.

1970 – Bachelor’s degree programs first accredited by ABET.

1975 – Geo-Heat Center established.

1976 – Kenneth Light appointed President upon Purvine’s retirement.

1983 – Larry Blake appointed President and the Metro Center was established in Portland.

1984 – Small Business Development Center established.

1988 – Portland Metro Center moved to its first permanent facilities on Southeast Harmony Road near Clackamas Town Center.

1989 – State Board authorized Oregon Tech to grant master degrees.

1991 – Lawrence J. Wolf appointed President.

1995 – Master’s degree first offered.

1998 – Martha Anne Dow appointed President.

2001 – Oregon Renewable Energy Center established.

2005 – Oregon Center for Health Professions established.

2008 – Christopher G. Maples appointed President.

2012 – Wilsonville Campus opens
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

The Oregon Tech Admissions Office is located on the first floor of the College Union on the Klamath Falls campus. Open weekdays from 8 a.m. to 5 p.m., 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 to daily tours, and sessions with admissions counselors, coaches, and other staff. Oregon Tech also hosts several Campus Preview events annually. For Campus Preview dates or to register online for a visit or Campus Preview, go to www.oit.edu/visit or call 541-885-1150 or 800-422-2017. To visit Oregon Tech Wilsonville, call 503-821-1250.

Hearing impaired persons may call the TTY number at 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 (excluding programs requiring specialized admission) are processed on the main campus in Klamath Falls 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. 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:

<table>
<thead>
<tr>
<th>Term</th>
<th>Date</th>
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<tbody>
<tr>
<td>Fall Term</td>
<td>September 3, 2012</td>
</tr>
<tr>
<td>Winter Term</td>
<td>December 17, 2012</td>
</tr>
<tr>
<td>Spring Term</td>
<td>March 11, 2013</td>
</tr>
<tr>
<td>Summer Term</td>
<td>June 3, 2013</td>
</tr>
</tbody>
</table>

Application Procedures

Every applicant must complete the following steps:

1. Complete the appropriate Application for Admission (www.oit.edu/applications).
2. Submit the $50 non-refundable application fee. Checks or money orders should be made payable to Oregon Tech. Students who qualify may opt to defer the application fee until enrollment in classes. OUS Application Fee Deferral Forms are available at www.oit.edu/applications.

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 (excluding programs requiring specialized admission) are processed on the main campus in Klamath Falls regardless of the campus location for the student.

Applications

Applications for admission are available online at www.oit.edu/apply. Distance Education online degree programs at Oregon Tech require a specialized application available at www.oit.edu/distance-education. A complete application consists of an application for admission, application fee, official transcripts, test scores, and other required documentation depending on the type of applicant (see Admission Eligibility Requirements).

Students who were previously admitted, but never enrolled, and students who want to re-enroll after skipping four or more terms, must submit a Re-Enrolling & Update Application Form. Students who have not yet registered for classes may change their entry term, a major or a campus location by completing the Application Change Form online.

Students who wish to enroll as non-degree seeking students in no more than eight credits per term may submit a Non-Admit Application form; however students must be fully admitted to qualify for financial aid. These forms are available online at www.oit.edu/applications.

International students must complete the International Student Application. Students seeking enrollment through an approved exchange program must complete the International Exchange Application. Both are available online at www.oit.edu/international. The MS-Manufacturing Technology, MS-Renewable Energy Engineering, and the following majors require a secondary application process after students are granted general admission and after students meet the eligibility requirements of the program. Each program has its own deadlines, admission requirements and processes which are outlined in the departmental pages of this catalog.

Clinical Laboratory Science (OHSU/Wilsonville)
Diagnostic Medical Sonography
Dental Hygiene (Salem, La Grande, Klamath Falls and online)
Echocardiography
Nuclear Medicine Technology
Nursing (with OHSU/Klamath Falls)
Paramedic/EMT (OHSU/Wilsonville)
Radiologic Science
Renewable Energy Engineering
Respiratory Care
Vascular Technology
3. Applicants who have earned fewer than 36 college credits must have official SAT I or ACT scores sent to Oregon Tech. Some applicants who graduated from high school three or more years ago may be exempted from this requirement by permission of the Admissions Director.

4. Have official transcripts from all postsecondary institutions that you attended, or received credit from, sent directly to the Oregon Tech Admissions Office. Any offer of admission is contingent upon the submission of satisfactory final transcripts prior to enrollment at Oregon Tech.

5. Have official high school transcripts or GED test results sent directly to the Oregon Tech Admissions Office. High School records are not required from applicants who graduated prior to 1997 and who have earned at least 36 college credits. Applicants who are currently enrolled in high school may be admitted on the basis of six or more semesters of high school work provided that they will have met the 15 subject requirements at the time of high school graduation. In any case, each student’s final official high school transcript must be provided upon graduation to complete the admission process.

6. Have official Advanced Placement (AP) or International Baccalaureate (IB) score reports sent to the Oregon Tech Admissions Office, if applicable.

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

Upon admission and prior to registration, a completed health form showing evidence of adequate immunizations must be on file with Oregon Tech’s Student Health Center. For further information, see the Student Health Center section of this catalog. Students are not required to submit these forms if taking fewer than six credits per term.

If a student fails to submit the required documents in complete and satisfactory order, admission and registration may be cancelled. All records become the property of Oregon Tech.

Social Security Number Disclosure and Consent Statement

Students are requested to provide voluntarily a Social Security Number (SSN) to assist Oregon Tech and the Oregon University System (and organizations conducting studies for or on behalf of OUS) 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. When conducting studies, OUS will disclose a student’s Social Security Number only in a manner that does not permit personal identification by individuals other than representatives of OUS (or the organization conducting the study for OUS) and only if the information is destroyed when no longer needed for the purposes for which the study was conducted. By providing your 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 law. Students may revoke consent for the use of a Social Security Number in these ways at any time by writing to: Office of the Registrar, Oregon Tech, 3201 Campus Dr., Klamath Falls, OR 97601.

However, Oregon Tech is required to obtain a Social Security Number in order to file certain returns with the Internal Revenue Service (IRS) and to furnish a statement to you. 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

Freshman Admission

Academic performance is not the sole criterion for admission. Oregon Tech may evaluate a person’s behavior and background to determine their ability to maintain the standards of academic and professional conduct expected at the university. An evaluation may take into consideration current behavior and performance as well as past experiences and actions. Simply qualifying for admission does not guarantee admission.

For freshman 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. Submit an official high school transcript. An unweighted cumulative high school grade point average of 3.00 is required for admission. Applicants with a GPA between 2.50 and 2.99 may qualify for admission provided they submit adequate SAT Reasoning Exam scores or ACT scores.

2. Submit results from either the SAT Reasoning Exam, SAT I or ACT. Applicants may submit scores from SAT I or ACT tests taken prior to March 2005; but applicants taking the tests after that time must also submit results from the SAT Writing test or the optional ACT Writing exam.

   a. Applicants with an unweighted cumulative high school grade point average of 3.00 or better must take the SAT or ACT and have official scores submitted to Oregon Tech, but there is no minimum SAT or ACT score.
b. Applicants with an unweighted GPA of 2.75 to 2.99 must submit combined SAT Reasoning Exam scores of 800 or better on the Critical Reading (formerly called Verbal) and Math tests with a score of at least 400 on the Math portion of the SAT. Those submitting ACT results must have an ACT Math score of at least 21 and a Composite score of at least 17.

c. Applicants with an unweighted GPA of 2.50 to 2.74 must submit combined SAT Reasoning Exam scores of 1000 or better on the Critical Reading (formerly called Verbal) and Math tests with a score of at least 500 on the Math portion of the SAT. Those submitting ACT results must have an ACT Math score of at least 21 and a Composite score of at least 21.

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.

a. English (4 units). Shall include the study of the English language, literature, speaking and listening, and writing, with emphasis on and frequent practice in writing expository prose during all four years.

b. Mathematics (3 units). Shall include first-year algebra and two additional years of college preparatory mathematics selected from geometry (deductive or descriptive); advanced topics in algebra (through Algebra II), trigonometry, analytical geometry, finite mathematics, advanced applications, calculus, and probability and statistics, or courses that integrate topics from two or more of these areas. One unit is strongly recommended in the senior year. (Algebra and geometry taken prior to 9th grade will be accepted.)

c. Science (3 units). Shall include at least one year each in two fields of inquiry based college preparatory science such as biology, chemistry, physics, or earth and physical science. Science courses that are “inquiry based” provide students the opportunity to apply scientific reasoning and critical thinking to support conclusions or explanations with evidence from their investigations. It is strongly recommended that one year be taken as a laboratory science.

d. Social Studies (3 units). Shall include analysis of societal issues and events. It is strongly recommended that study includes knowledge and use of geographic information, patterns of United States history, patterns of human history, structures and systems of US Government, and analysis of economic systems.

e. Second Language (2 units). Shall include two years of the same high school-level second language, or a C- or better in the third year of a high school-level language, or two terms of a college-level second language with a grade of C- or better, or satisfactory performance on an approved assessment of second language proficiency. Demonstrated proficiency in an American Indian language can meet all or part of the second language requirement, as certified by the governing body of any federally recognized tribe. American Sign Language meets the second language requirement. The second language requirement only applies to applicants graduating from high school in 1997 or later. If admitted as an exception, students failing to meet this requirement must complete two terms of the same college-level second language with a C- or better before earning a degree from Oregon Tech.

Applicants who are unable to meet the 15 subject requirements may be eligible for admission by earning a minimum score of 470 or above (940 total) on each of two College Board SAT Subject Tests (in Math level I or IIC and another test of the student’s choice). Students who do not take a SAT Subject test in a second language must prove language proficiency through another approved process.

Applicants who have not graduated from high school and who are applying on the basis of GED scores must submit test results showing a minimum composite score of 580 (58 on GED exams administered prior to 2002) with a minimum score of 410 on each GED subtest (41 on subtests administered prior to 2002). GED applicants must meet the Foreign Language requirement.

Public high school students must graduate from a standard or regionally accredited high school. Private high school students must graduate from regionally accredited high schools. Home-schooled students and graduates of unaccredited or non-standard high schools, as well as applicants who fail to meet the 15 subject requirements, may be admitted by submitting SAT Reasoning Exam score of 1000 on the Math and Critical Reasoning sections combined or an ACT composite score of 21 or better and a minimum score of 470 or above (940 total) on each of two College Board SAT Subject Tests (Math level I or IIC and another test of the student’s choice, in a subject other than math). An examination in a second language is strongly recommended to qualify the applicant for admission by meeting the language proficiency requirements. Students who do not take an SAT Subject test in a second language must prove language proficiency through another approved process.
Transfer Admission

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

- 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.
- In order 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.
- Transfer applicants must have completed two terms of a college-level second language with a grade of C- or better, or two years of the same high school-level second language with grades of C- or better, or satisfactory performance on an approved second language assessment of proficiency. Demonstrated proficiency in an American Indian language can meet all or part of the second language requirement, as certified by the governing body of any federally recognized tribe. American Sign Language meets the second language requirement. The second language requirement applies to transfer applicants graduating from high school in 1997 or after.
- 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.
- Applicants must be eligible to re-enroll in the previous institution attended.

Official transcripts from all postsecondary institutions must be submitted for consideration. Applicants who graduated from high school after 1997 must also submit official high school transcripts, unless they have completed two terms of college-level study in a second language.

Students who have earned between 12 and 36 quarter hours of college-level work must meet both freshman and transfer requirements. Students who have completed fewer than 12 transferable quarter credits (8 semester) must meet freshman admission requirements.

A Transfer Evaluation Report acknowledging the courses accepted by the university will be sent after admission status has been confirmed. 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.

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's 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; 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.

Admission to Programs Having 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
3. 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 Distance Education Office.

International Student Admission

Oregon Tech welcomes international students as applicants and as vital members of its campus community. In applying for admission, send the following to the Admissions Office:

1. An International Student Application for Admission accompanied by a $50 (U.S.) non-refundable fee.
2. Official transcripts, in English or with an accompanying official translation, of all high school and post-high school institutions attended.
3. 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, 190 computer-based TOEFL, 68 Internet-based TOEFL or 6 IELTS is required for consideration.

4. A completed Statement of Financial Responsibility form, indicating that you have 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.

7. An official credential evaluation from an Oregon Tech-approved credential service for all coursework completed at a postsecondary institution outside the United States. Examples include the Association of Collegiate Registrars and Admissions Officers (http://www.aacrao.org/international/foreignEdCred.cfm) and World Education Services (www.wes.org).

A completed health history and immunization form must be submitted. In addition to the health requirements that need to be fulfilled before registration (refer to Integrated Student Health Center section of this catalog for health history and immunization requirements), 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.

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 that is used to secure an 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.

Admissions with Special Conditions
Institutions are authorized to admit freshmen as exceptions to the stated admission requirements on a case-by-case basis. Institutions are also authorized to grant special admission to transfer applicants on a case-by-case basis in accordance with each institution's transfer admission policy.

ROAD (Registration, Opportunity and Discovery)
Registration for new students occurs prior to the start of each term. All students who are new to the Klamath Falls campus must attend ROAD to register for classes. In addition to placement testing and meeting with advisors to plan an academic schedule, students have the opportunity during ROAD to register for classes, set up Oregon Tech computer and e-mail accounts, receive a university ID card and learn more about making a successful transition to Oregon Tech. Students are encouraged to attend an early ROAD event rather than waiting to register at the beginning of term. Visit www.oit.edu/road or contact The Admissions Office (541) 885-1150 or oit@oit.edu for more information.

Placement Testing
Oregon Tech’s Center for Learning and Teaching (CFLAT) administers all placement testing for Oregon Tech students. 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 of the math requirements for their major, are exempt from the math placement requirement. Transfer students with more than 36 transferrable college credits are exempt from the reading placement requirement. Students transferring in college-level writing are exempt from the writing placement requirement. Entering students in health programs requiring Human Anatomy and Physiology with transferrable 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 (ROAD). Visit www.oit.edu/road or contact CFLAT at (541) 885-1791 or cflat@oit.edu for more information.

Financial Aid Programs and Application Process

College Union, 1st Floor
(541) 885-1280
dollars@oit.edu

The Financial Aid Office is committed to providing high-quality service to all Oregon Tech students, their families and the community. Our office strives to provide information on a complex topic that is accurate, easy to understand and 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. It is also available on our Website at www.oit.edu/aid. Additional questions regarding the application process should be directed to the Financial Aid Office.

Federal law mandates that all students apply-
ing for federal financial aid complete the Free Application for Federal Student Aid (FAFSA) available at 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.

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 January 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 Web for Student to view their award letter online. Students may accept their aid online and request changes. The Financial Aid award guide is located on our website at www.oit.edu/faid.

It is important that you read the guide and follow the instructions on the letter you are sent. Any updates to award letters will result in an email to the Oregon Tech student email account. Returning students receive an email to their Oregon Tech email account when their award letter is ready to view online. If additional information is requested, such as tax transcripts or worksheets, students should return the documents as soon as possible to receive an Offer of Financial Aid. The award 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 e-mail accounts for announcements and notifications from Financial Aid.

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 2012-13 is $5,550. Students may receive Pell Grants as long as they are attending at least half time (6 credits), but the grant will
be prorated accordingly. Pell Grant eligibility is limited to those students who have not yet obtained a bachelor’s degree. 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 2012-13 is $1,950. This grant program provides funds to Oregon resident undergraduate students attending Oregon schools. The Oregon Opportunity Grant is awarded by Oregon Student Access Commission. 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.

**Federal Supplemental Educational Opportunity Grants (SEOG)**
SEOG funds are very limited at Oregon Tech. Although priority for SEOG funds is given to full-time students, Oregon Tech may, on a case-by-case basis, award SEOG funds to students enrolled at least half time. The typical award is $300 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 Perkins Loan**
The Federal Perkins Loan Program has no origination or guarantee fees, a nine-month grace period after a student ceases to be enrolled at least half time before repayment begins and an interest rate of five percent that begins at repayment. Awards at Oregon Tech range from $1,000 to $2,000 per year and are based on need. Priority is given to students who are attending full time, but may also be awarded on a case-by-case basis to students attending part time.

**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 Web site. Awards are usually $1,500 per year, which can be earned at any time during the academic year provided the student is enrolled at least half time.

**Institutional Work Benefits**
Institutional Work Benefits (IWB) is a work study program through Oregon Tech. IWB is awarded to students with need and must be enrolled at least half-time (6 credits) to qualify. Students must work in an Oregon Tech approved IWB position part-time job and will receive a pay check, working up to the amount awarded. It differs from Federal Work Study because it is not Title IV Federal money. Therefore, students are not eligible for food stamps or able to list the work on the FAFSA as a work study position. IWB does not count for America Reads/Counts programs or off-campus positions. If awarded, contact Career Services for possible job opportunities. Contact the Financial Aid Office with any questions. (Email: dollars@oit.edu or Call: 541-885-1280)

**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 guaranteed and origination fee may be taken at the time of disbursement. Contact the Oregon Tech Financial Aid Office for most recent interest rates for loans. 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 fill out a promissory note before funds will be disbursed available at: www.dl.ed.gov/borrower/BorrowerWelcomePage.jsp and complete entrance counseling.

**Matthews Loan, Matthews Supplemental Loan and Oregon Tech Long Term Loan**
The Matthews Loan, Matthews Supplemental Loan and Oregon Tech Long Term Loan are loans offered by Oregon Institute of Technol-

ogy. These loans have a 5 percent interest rate, no originations fee and repayment begins six months after students cease to be enrolled at least half-time.

Students must complete a promissory note on loan to receive the funds.

**Federal Parent Loans for Undergraduate Students (PLUS)**
Parents of dependent students can apply for funds through PLUS. Loans are available for up to the cost of attendance minus other financial aid and resources each year. Interest begins to accrue immediately. Like the student loan, a four percent origination and guarantee fee may be taken at the time of each disbursement, but repayment begins 60 days after the final disbursement of the academic year. Parents may request interest payments only while the student is in school at least half time.

**Presidential Scholarships**
First-time freshman applicants and transfers will receive consideration for Presidential Scholarships by applying and being accepted for admission by March 1 for the following fall term and meeting the minimum scholarship requirements. Transfer students qualify on the basis of their college GPA. These scholarships are for full-time students only 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

**Klamath County Recognition Scholarship**
The Klamath County Recognition Scholarship is automatically awarded to any applicant living in Klamath County who will attend Oregon Tech starting the fall term after graduation from high school and who is able to meet these criteria: an unweighted high school cumulative GPA of 3.0 or better; a composite SAT I score of at least 1,050 (21 ACT). To qualify, students must simply apply for admission, meet all admission requirements and be accepted for admission by March 1 for enrollment fall term. Recipients must be new full-time undergraduate students at Oregon Tech. This scholarship is valued at $1000 and is NOT renewable.
Western Undergraduate Exchange

Students enrolled in some of Oregon Tech’s majors are eligible for the Western Undergraduate Exchange (WUE) program. WUE can save students from the Western United States thousands of tuition dollars each year. Students from Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, South Dakota, Utah, Washington and Wyoming are eligible. Students from these states who apply for WUE-eligible majors pay just 150 percent of the in-state tuition.

Eligible Programs
All majors in the College of Health, Arts and Sciences except:
• Clinical Laboratory Science
• Dental Hygiene and pre-Dental Hygiene
• Medical Imaging Technology and pre-Medical Imaging Technology
• Nursing after acceptance by Oregon Health Sciences University
All majors in the College of Engineering, Technology and Management except:
• Renewable Energy Engineering and pre-Renewable Energy Engineering

WUE is not offered for the Oregon Tech Distance Education programs. WUE students are ineligible for the Presidential Academic Scholarship, although WUE offers the greater savings for nonresident students.

WUE Requirements
WUE tuition rates are available for a maximum of 12 quarters at Oregon Tech. To maintain eligibility you must:
• Remain continuously enrolled throughout fall, winter and spring of the academic year. Summer enrollment at Oregon Tech is not required to maintain eligibility
• Enroll in at least 12 credits per term and maintain Satisfactory Academic Standing. Students who are simultaneously admitted to Oregon Tech and a community college to allow dual enrollment must take at least 9 credits per term from Oregon Tech with a combined total of 12 credits per term. GPA and completed credits are monitored each academic year.
• Students wishing to ‘stop-out’ of enrollment for a term must submit a written request to the Office of the Registrar before the start of that term. Requests are granted at the discretion of the university.

Oregon Tech Foundation Scholarships
More than 150 new and returning students annually receive scholarships from the more than 150 scholarships administered by the Oregon Tech Foundation. Alumni, businesses, industry, and friends of Oregon Tech generously fund these scholarships. To receive consideration, students must be currently enrolled at Oregon Tech or accepted for admission for the following fall term, and must submit an application. Application forms and deadlines are available on the Oregon Tech Web site at www.oit.edu/otfscholars. The online scholarship application process is seamless for students and automatically generates a list of scholarships the student is eligible to apply for. The application process opens in early December and has a deadline of March 1. For more information about scholarship opportunities, please visit www.oit.edu/otfscholars.

Leadership and Diversity Scholarships (LAD)
To be considered for the LAD Scholarship, students must submit the scholarship application (available from the Financial Aid Office) and the required essay. Students also should provide at least one letter of recommendation from a teacher, counselor, clergy or other appropriate reference. Candidates must be current Oregon Tech students or have been accepted for admission for the following fall term and submit all scholarship materials by March 1. Scholarship materials should be directed to the Financial Aid Office. For more information, call (541)885-1280.

Estimated Financial-Aid Budgets for 2012-13

Academic Year
Financial-aid budgets can include amounts for tuition and fees, books and supplies, room and board 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 on that Oregon Tech does not have a dual admit program with. 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.

When Oregon Tech is serving 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.

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/faid under “forms.” Students must provide Oregon Tech’s Financial Aid Office with a final grade report from the “host institution” prior to receiving aid for future terms.

**Residency**

In Oregon, as in all other states, tuition at publicly supported four-year universities is higher for nonresident 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 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. To find out if the community college in your area participates in these reciprocity agreements, contact its Admissions Office directly for further instructions. 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.

**Tuition and Fees**

*Snell Hall, 201*  
(541) 885-1235

Fees and deposits in all Oregon state institutions of higher education are charged according to a uniform plan, varying on different campuses according to differences in conditions or nature of coursework offered. The State Board of Higher Education reserves the right to make changes in fee schedules without notice.

**Special Fees**

All special fees are subject to change without notice.

**Application Fee (Not refundable)—$50**

Must accompany admission application.

**Matriculation Fee (Not refundable)—$150**

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

Below are listed the estimated fees paid by students regularly enrolled for undergraduate and graduate study. 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 (Tech Fit Center) 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 2012-13 academic years is provided for planning purposes only. Fees are subject to change. The current fee schedule is available from the Business Office, Registrar’s Office or on the University’s website.
Petition to Graduate Fee—$56

Late Fee Payment—$99
Students paying fees after scheduled payment dates of any term can be charged a late charge of $99.

Late Fee to Add, Drop or Withdraw—$20

Return-of-Check Fee—$25
If institutional charges are met by a check which is returned because of any irregularity for which the student is responsible, a fine will be charged. The late-payment fee will be added to the returned-check charge where the returned check was used to pay tuition and fees.

Special Examination Fee, per credit—$50
Examination for credit.

Lifetime Transcripts –$40
A one-time fee assessed to all new and transfer students for a lifetime transcript request. Official Transcripts are issued at no charge. Special Mailing Fee—$35.

Allied Health Curriculum Tuition
Tuition is assessed an additional 15 percent for courses specific to the Allied Health curriculum.

Special Course Fees, per course
Special fees, in addition to regular tuition, are assigned for some courses. These fees are noted in the Schedule of Classes for each term.

Room and Board Costs
The 2012-13 estimated annual room-and-board costs range from $7,885 to $9,486, depending on room type and amount of food purchased. Room-and-board charges are assessed by term. Fees are due in accordance with the same fee payment schedule as exists for tuition. Generally, payments are due during the first week of the term.

Senior Citizen Instruction Fee
Per-credit hour: no charge.

Senior citizens are persons age 65 or older. Such persons are authorized to attend classes on a space-available basis. Charges for special materials, if any, are additional. Incidental fee privileges are not provided.

The senior-citizen privilege is extended to persons auditing classes (not seeking credit or working toward a degree).

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 fees assessed, depending on the time of withdrawal. The refund schedule has been established by the State Board of Higher Education 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 on financial aid. All refunds are subject to the following regulations:

1. Any claim for refund must be made in writing before the close of the term in which the claim originated.
2. An official notice of withdrawal must be completed and necessary clearance signatures filed with the Registrar’s Office.
3. 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.

Parking Fees
All student, staff and faculty vehicles must be registered with the Traffic Commission 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 State Board of Higher Education and filed with the Secretary of State. Parking permits may be purchased at the Cashier’s Office. Vehicles must be registered by the first day after classes begin. Parking Fees for 2012-13 are:

<table>
<thead>
<tr>
<th>Students</th>
<th>Faculty/Staff</th>
<th>Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>$80/year</td>
<td>$130/year</td>
<td>Ad'l vehicle $10</td>
</tr>
<tr>
<td>$40/year</td>
<td>$65/term</td>
<td>one-term and full-year permits</td>
</tr>
</tbody>
</table>

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. Periodicals—Magazines and newspapers have a $1-per-day charge for each overdue item up to the maximum overdue fine.

3. Reserved books—The following fines will be charged for violation of rules governing reserve books and other restricted materials: For overdue items, 25 cents for the first hour and 25 cents for each succeeding hour, or portion thereof, until the material is returned or reported lost. In case of flagrant rule violation, a charge of $1 per hour may be assessed, but in no case will a fine of more than $10 be assessed.

4. Recalls—Materials needed for use in the library are subject to recall at any time. A maximum fine of $1 per day may be imposed for failure to return promptly.

5. 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.

6. 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.
Academic Programs
Degree Programs

**Klamath Falls**
**Master of Science**
- Civil Engineering
- Manufacturing Engineering Technology
**Bachelor of Applied Science**
- Technology and Management

**Bachelor of Science**
- Allied Health Management
- Applied Mathematics
- Applied Psychology
- Biology
- Biology–Health Sciences
- Civil Engineering
- Communication Studies
- Computer Engineering Technology
- Dental Hygiene
- Diagnostic Medical Sonography
- Echocardiography
- Electrical Engineering
- Embedded Systems Engineering Technology
- Environmental Sciences
- Geomatics, with options in:
  - Geographic Information Systems
  - Surveying
- Information Technology, with options in:
  - Accounting
  - Applications Development
  - Business/Systems Analysis
  - Health Informatics
- Management, with options in:
  - Accounting
  - Entrepreneurship/Small Business Management
  - Marketing
- Manufacturing Engineering Technology
- Mechanical Engineering
- Mechanical Engineering Technology
- Nuclear Medicine Technology
- Nursing (through OHSU School of Nursing)
- Operations Management
- Radiologic Science
- Renewable Energy Engineering
- Respiratory Care
- Software Engineering Technology
- Vascular Technology

**Associate Degrees**
- Associate of Applied Science
  - Polysomnographic Technology
- Associate of Engineering
  - Computer Engineering Technology
  - Software Engineering Technology

**Minors**
- Applied Mathematics
- Biology
- Business
- Geographic Information Systems
- Human Communication
- Information Technology
- International Business
- International Relations
- Psychology
- Surveying
- Technical Communication

**Specializations**
- Accounting
- Entrepreneurship/Small Business Management
- Marketing
- Picture Archiving and Communication Systems (PACS)

**Certificates**
- Accounting (post baccalaureate)
- Dispute Resolution
- Polysomnographic Technology

**Wilsonville**
**Master of Science**
- Manufacturing Engineering Technology
- Renewable Energy Engineering
**Bachelor of Applied Science**
- Technology and Management

**Bachelor of Science (degree completion)**
- Clinical Laboratory Science (joint degree with OHSU)
- Electronics Engineering Technology
- Embedded Systems Engineering Technology
- Information Technology, with options in:
  - Applications Development
  - Business/Systems Analysis
  - Health Informatics
- Manufacturing Engineering Technology
- Mechanical Engineering Technology
- Operations Management
- Renewable Energy Engineering
- Software Engineering Technology

**Associate of Applied Science**
- Polysomnographic Technology

**Minors**
- Applied Psychology
- Business
- Information Technology

**Specialization**
- Picture Archiving and Communication Systems
- Travel and Tourism

**Certificate**
- Polysomnographic Technology

**Online**
**Master of Science**
- Manufacturing Engineering Technology
**Bachelor of Applied Science**
- Technology and Management

**Bachelor of Science**
- Allied Health Management
- Dental Hygiene (degree completion)
- Diagnostic Medical Sonography (degree completion)
- Echocardiography (degree completion)
- Information Technology with option in:
  - Applications Development
  - Operations Management
  - Radiologic Science (degree completion)
  - Respiratory Care (degree completion)
  - Vascular Technology (degree completion)

**Associate of Applied Science**
- Polysomnographic Technology

**Minors**
- Applied Psychology
- Business
- Information Technology

**Specialization**
- Picture Archiving and Communication Systems
- Travel and Tourism

**Certificate**
- Polysomnographic Technology

**Seattle at Boeing**
**Master of Science**
- Manufacturing Engineering Technology

**Bachelor of Science**
- Manufacturing Engineering Technology
- Mechanical Engineering Technology

**Chemeketa Community College**
**Bachelor of Science**
- Dental Hygiene

**La Grande (ODS College of Dental Sciences)**
**Associate of Applied Science**
- Dental Hygiene

(See advisor for a list of available minors.)
Introduction

For more than 60 years, Oregon Institute of Technology has focused on changing the lives of Oregonians by preparing them to meet the technical and management needs of business, industry and healthcare agencies.

Today, Oregon Tech offers a menu of academic choices that features bachelor of science programs in engineering, the engineering and health technologies, management, communication and the applied sciences. These include bachelor's degree-completion programs offered online and at locations in Wilsonville, Oregon and Seattle, Washington. Oregon Tech also offers a number of associate degree programs.

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.

Degree Programs

Graduate Programs
A Master of Science in Manufacturing Engineering Technology is offered at Oregon Tech campuses in Wilsonville, Klamath Falls, at The Boeing Company in Washington and online.

A Master of Science in Civil Engineering is offered at Oregon Tech's Klamath Falls campus.

A Master of Science in Renewable Energy Engineering is offered at Oregon Tech's Wilsonville campus.

Undergraduate Programs
The School of Health, Arts and Sciences includes Clinical Laboratory Science, Dental Hygiene, Health Sciences, Medical Imaging Technology, Applied Psychology, Environmental Sciences, Communication Studies, Paramedic Education, Respiratory Care and Polysomnographic Technology. Nursing is offered as part of a statewide program administered by the Oregon Health & Science University. Programs in Clinical Laboratory Science and Paramedic Education are offered in Portland in conjunction with OHSU.

Medical Imaging, one of the largest bachelor's degree programs in the nation in this field, includes majors in Radiologic Science, Vascular Technology, Diagnostic Medical Sonography, Nuclear Medicine Technology and Echocardiography.

The faculty in the School of Health, Arts and Sciences includes individuals with nationally-recognized credentials and international experience. Clinical practice and externships are included in health technology education, while the arts and sciences provide exposure to liberal studies that complement technical coursework.


The School's faculty is composed of professional engineers, certified public accountants and those with corporate executive experience. From accounting to robotics, these programs include extensive laboratory time to apply the theories that are studied.

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 distance education.

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.
Wilsonville Programs

Administration
Mateo Aboy, Associate Provost & Vice President for Research
Lita Colligan, Associate Vice President for Strategic Partnerships

Directors
Todd Ellingson, M.D., Medical Director - Division of Health Sciences - Paramedic
Suzann Schmidt, Program Director - Division of Health Sciences - Paramedic

Professors:
Lisa Taylor, Division of Science, Engineering and Mechanical Engineering and Technology
Marian Ewell, Division of Health Sciences
Dawn Taylor, Division of Health Sciences - Clinical Laboratory Science

Associate Professors:
Jay Bockelman, Computer Systems Engineering
Lawrence Wolf, Manufacturing and Mechanical Engineering and Technology

Assistant Professors:
Grant Kirby, Management
Slobodan Petrovic, Electrical Engineering and Renewable Energy Engineering
Steve Goodstein, Division of Health Sciences - Clinical Laboratory Science
Abraham Furman, Division of Health Sciences - Clinical Laboratory Science

Oregon Institute of Technology serves students and employers in the Portland metropolitan area by offering degree programs at the Oregon Tech Wilsonville Campus and the Willow Creek Center (WCC) in Beaverton. Oregon Tech’s high-demand BS and MS degrees are accessible to traditional full-time students, community college transfer students, working professionals, and busy adults by offering day, evening, weekend, and online courses.

At Oregon Tech Wilsonville, students can:
• Transfer up to 120 applicable credits from a community college, or other accredited college, depending on courses taken and degree desired.
• Earn up to 45 credits of “Credit for Prior Learning” (varies by program) through:
  a. Credit by Examination: Challenge courses where you have working knowledge of the subject.
  b. Credit by Portfolio: Demonstrate mastery of course outcomes through documentation.
  c. Military course credit through accredited evaluation.
• Enjoy small student-to-faculty ratio in the classroom.
• Expect industry-experienced faculty to teach classes.
• Pay public tuition rates and receive full student assistance services.
• Expect to become highly desirable employees.

The Oregon Tech degree programs offered at the Wilsonville Campus are included under the institutional accreditation by the Northwest Commission on Colleges and Universities, the same agency that accredits all Oregon University System (OUS) institutions. Additionally, ABET accredits our engineering (ABET-EAC) and engineering technology (ABET-TAC) programs. Engineering and engineering technology programs offered at Oregon Tech Wilsonville list their ABET accreditation status on their website and catalog page.

Oregon Tech Wilsonville offers nine Bachelor of Science degree programs, one Bachelor of Applied Science, one Associate of Applied Science, and two Master of Science programs.

Oregon Tech’s programs include Bachelor of Science degrees in Electronics Engineering Technology, Operations Management, Information Technology (options: Business/Systems Analysis, Application Development and Health Informatics), Manufacturing Engineering Technology, Mechanical Engineering Technology, Renewable Energy Engineering, Embedded Systems Engineering Technology, and Software Engineering Technology. Additional degrees offered are an Associate of Applied Science in EMT-Paramedic (joint with OHSU), a Bachelor of Science in Clinical Laboratory Science (joint with OHSU), and a Bachelor of Applied Science degree in Technology and Management. At the graduate level, Oregon Tech Wilsonville offers a MS in Renewable Energy Engineering and a MS in Manufacturing Engineering Technology.

Oregon Tech also provides unique general education courses that complement a foundation of general education courses offered by community colleges and other educational institutions in the region.

All programs are offered in cooperation with other OUS institutions and area community colleges. While most courses are offered at the main Oregon Tech campus in Portland located in Wilsonville (Oregon Tech Wilsonville), some programs are also offered on the Portland Westside (Beaverton) to better serve Silicon Forest business and working professional students in the Hillsboro and Beaverton area.

A schedule of degree-related courses for Oregon Tech Wilsonville is published on the Oregon Tech website about six weeks prior to each term. Information can be obtained through the Oregon Tech Wilsonville administrative office or accessed at www.oit.edu/portland.
Seattle at Boeing

John Bridge, Program Director
Vacant, Assistant Program Director
(425) 965-9707 office
(425) 965-1514 fax
www.oit.edu/seattle
oitseattle@oit.edu

Associate Professor: Nathan Mead

Oregon Tech offers Bachelor and Master of Science Degrees in Manufacturing Engineering Technology and a Bachelor of Science Degree in Mechanical Engineering Technology to employees of The Boeing Company at sites in the Puget Sound area. Also offered are review classes for the Society of Manufacturing Engineers’ CMfgT and CMfgE exams and a Certificate of Completion in Composites.

Distance Education

Barb DeKalb, Director
Boivin Hall, 186
(541) 885-1142
barb.dekalb@oit.edu

The primary mission of Distance Education at Oregon Tech is to offer convenient programs for degree completion and graduate education. Oregon Tech currently offers one graduate program online, the Master of Science in Manufacturing Engineering Technology. Working adults, particularly those registered or licensed in an array of health professions, may easily utilize these Web-based offerings. Currently, Oregon Tech offers degree completion programs in Diagnostic Medical Sonography, Echocardiography, Diagnostic Medical Sonography, Respiratory Care programs must meet all regular admission requirements and be professionals working in their chosen field. This will assure access to clinical sites as required in these programs.

Oregon Institute of Technology also offers a distance program leading to Bachelor of Science degrees in Information Technology and Operations Management. Although most of the coursework for these majors may be completed through online delivery, a handful of courses may require students to complete on-site laboratory work in Portland or Klamath Falls. Students from outside the area may complete these requirements by transferring approved courses from another college or university.

A degree in Allied Health Management is available for students who have earned licensure or registry in selected allied health fields. The Master of Science in Manufacturing Engineering Technology is delivered fully online with no residency requirement.

Students wishing to be admitted to Radiologic Science, Vascular Technology, Echocardiography, Diagnostic Medical Sonography, or Respiratory Care programs must meet all regular admission requirements and be professionals working in their chosen field. This will assure access to clinical sites as required in these programs.

Oregon Institute of Technology also offers a certificate program and an Associate of Applied Science degree in Polysomnographic Technology.

In addition, Oregon Tech offers a Bachelor of Applied Science in Management and Technology. This degree is designed for students with associate degrees and technological careers to improve their employment opportunities by obtaining a Bachelor’s degree.

Oregon Tech also offers a certificate program and an Associate of Applied Science degree in Polysomnographic Technology.

Additionally, Distance Education offers online courses leading to a minor in Information Technology, which can be completed in conjunction with a degree program at Oregon Tech or Eastern Oregon University; certification in Picture Archiving Communication Systems (PACS); and a bank of online general education courses open to all Oregon Tech students.

Distance education classes are offered on a 10 week quarter-based academic calendar. They are paced to keep students on track, while allowing them to complete weekly assignments at their convenience.
Youth and High School Programs

Crystal Murphy, Coordinator
(541) 885-1668
www.oit.edu/programs/youth-programs

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:

1. Increase understanding and interest in STEM careers among participants;
2. Build confidence in their technical abilities; and
3. Introduce them to role models and mentors.

**Youth Camps**

**GEAR UP**
A series of special programs, created in partnership with Oregon GEAR UP, to ensure that Oregon’s low-income middle school and high school students are prepared for, pursue and succeed in post-secondary education.

**I’m Going To College**
In partnership with NELA, this day program brings sixth-grade students to campus to expose them to college. The students attend classes, tour Oregon Tech and have lunch. A follow-up meeting with parents will be hosted by students’ elementary schools.

**MATHCOUNTS**
An annual competition in February that challenges students’ math skills, develops their self-confidence and rewards them for their achievements. Open to sixth-, seventh- and eighth-grade students in the Klamath Basin, this program gives students the opportunity to participate in individual and team competitions. The top students advance to the state and national levels.

**Teen Women In Science (TWIST)**
This residential weeklong summer program focuses on high school women. The program integrates principles of math, computer applications, and engineering. Students experience campus life and gain exposure to career choices in science and engineering. Oregon Tech celebrates 18 years of bringing TWIST to young women.

Summer programs include: DayDreamer, LEGO Beginners and LEGO Challenge. For information on these programs, please visit: www.oit.edu/programs/youth-programs.

**High School Programs for College Credit**
Brandy Brown, Articulation and Dual Credit Coordinator
(541) 885-1844

**Advance Credit Program**
The Advance Credit Program (ACP) 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 20 high schools and offers more than 15 introductory college courses. The Advance 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. ACP gives students the opportunity to try college-level courses, gain valuable skills, and develop study habits for college.

**High School Transition Program**
The High School Transition Program (HST) at Oregon Institute of Technology gives qualified high school students the opportunity to come to the Klamath Falls 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 ACP and HST Programs allow Oregon Tech to reduce the normal tuition fee by a considerable amount. Cost to the participating high school student is $25 per credit.

For more information on these programs please visit www.oit.edu/programs/youth-programs.
Academic Policies and Procedures

Procedures and Regulations

Student Responsibility

Students are responsible for knowing and understanding Oregon Institute of Technology’s requirements relating to registration, academic standards, student activities and student organizations. A partial view of academic regulations is included in the class schedule introduction pages on Oregon Tech’s Web site and distributed to new students during their first registration at Oregon Tech. 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.

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. The student’s advising file will be transferred to and maintained by the new advisor. Degree-seeking students are required to meet with their advisors prior to registration.

Student Classification

In the Oregon University System 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 10 weeks each and a summer session of eight weeks.

Academic Progress and Petitions Committee

Administration of the regulations governing academic requirements is vested in the Academic Progress and Petitions 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 meet 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.

The Academic Progress and Petitions 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 Academic Progress & Petitions (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 or more 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.

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 reenroll, 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 reenrollment information. Students who have been suspended are denied all privileges of the institution.

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

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 academic 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 an accrediting body recognized by the Council for Higher Education (CHEA).

Students transferring work from an institution that is not 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.

### 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 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; 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 complete, written transfer evaluation 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 written transfer evaluation 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. Oregon Tech does not normally transfer math courses with a “D” grade.

### Pre-College Level Transfer Credit
Oregon Tech does not accept for transfer credit courses that are considered pre-college or vocational. Oregon Tech determines the level and nature of the course by examining the catalog description and course numbering system of the student’s prior college.

### 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 and the Oregon University System. 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 equivalences 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. No credit is awarded for Subsidiary Level exams. 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 in the Office of Distance Education, which coordinates online degree completion programs offered by Oregon Tech.

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. Credit by examination counts toward graduation residency requirements. For a bachelor’s degree, students must complete 45 credits at Oregon Tech with the last 15 to be taken on campus. For the associate degree, students must complete 30 credits with the last 15 to be taken on campus.
5. 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.
6. Students must pay a non-refundable per-credit fee, as published by the Office of Business Affairs, prior to the examination.
7. 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 to be equivalent to 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 replace 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 pay-
ment 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, who have adequate training in portfolio evaluation 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 appropriate faculty evaluator as determined by the department chair. The faculty member will review the portfolio and if necessary will interview the student. Review of the portfolio will ensure that the learning experience demonstrates the theories, competencies, and outcomes of the academic subject matter. 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).

**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:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Meaning</th>
<th>Points Per Credit Hour</th>
<th>Used to Calculate GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Exceptional</td>
<td>4</td>
<td>Yes</td>
</tr>
<tr>
<td>B</td>
<td>Superior</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>C</td>
<td>Average</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>D</td>
<td>Inferior</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>F</td>
<td>Failed</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>IP</td>
<td>In Progress</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>Audit</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>NP</td>
<td>No Pass</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>W</td>
<td>Withdrawal</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>Z</td>
<td>No Grade Assigned</td>
<td>0</td>
<td>No</td>
</tr>
</tbody>
</table>

**Grade Change Policy**

All grades except for ‘I’ and ‘IP’ are 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. No grade other than ‘I’ or ‘IP’, once reported, may be revised by re-testing or by completing additional work. 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 Dean and the 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.

**Incomplete**

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 “I” may be assigned and additional time granted for completion. The instructor

<table>
<thead>
<tr>
<th>Grade</th>
<th>Point Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
</tr>
</tbody>
</table>

**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 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:

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

**Total** 54

GPA = Sum of earned grade points / Credits attempted = 54 / 17
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.

Medical Withdrawal
Students requesting a medical withdrawal based on a physical or mental-health condition should consult with the Vice President for Student Affairs (VPSA) or designee. For more information, please refer to the Student Handbook.

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 de-layed 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. Upon completion of the required coursework the “IP” grade will be replaced by a letter grade.

Academic Term Honors
President’s List (Applicable to full-time 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 students only)
Each term, students with a GPA of 3.30-3.69 are included on the Dean’s List.

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 petition to graduate.

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 fifteen 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 petition for graduation 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 appropriate vice president 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. They 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 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 school and students should be given at least three weeks prior notice of the change.

**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.

**Veterans Satisfactory Progress Standards**

The Veterans Certifying Official administers the satisfactory-progress standards for students who are receiving educational benefits. The following satisfactory progress requirements apply:

1. Students must make satisfactory progress toward their certified educational objectives. They must satisfactorily complete all courses for which they have been certified.
2. Students who reduce their course load at any time during the term must notify the Veterans Certifying Official of this reduction. Withdrawals from courses after the drop period may result in an overpayment of benefits unless there are mitigating circumstances.
3. Students must maintain a term GPA of 2.0 or better. A term GPA of less than 2.0 constitutes unsatisfactory progress.

4. The Veterans Administration will be notified by Oregon Tech within 30 days of any change in status or failure to meet satisfactory progress.

5. Students will be placed on probation at the end of the first term of unsatisfactory progress. The length of the probationary status is one term. Failure to meet satisfactory progress at the end of the probationary term could result in termination of benefits.
Graduation

Application for Graduation

Students must file an Application to Graduate and a Petition for Graduation at least two terms prior to the term of graduation. These forms are available online at www.oit.edu/registrar, at the Registrar's Office, in the Wilsonville Programs offices and in academic departments. They are submitted to the Registrar's Office for evaluation.

Oregon Tech Wilsonville 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.

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.

Course Substitutions

Students may seek course substitution approval by completing the Course Substitution form and obtaining the signature of the advisor, department chair and University Registrar. Course substitutions for general-education requirements must satisfy the same category of general education requirement. For example, a humanities course specified by the major department may be substituted for another humanities course, subject to the above approvals.

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 a Petition to Graduate 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 graduation ceremony is held in June each year at which time degrees are granted to all who have satisfactorily completed all major and university general education requirements during the preceding spring term. Summer, fall and winter-term graduates who have already received diplomas may also participate in Commencement.
Students who demonstrate the ability to graduate in the following summer term may also participate in Commencement ceremonies. However, summer graduates will not receive academic honors or diplomas at the spring commencement.

**Diplomas**

Oregon Tech awards diplomas at Commencement based on preliminary grades and preliminary degree checks for spring-term graduates. Students who receive a diploma at Commencement, but do not subsequently complete degree requirements, will be notified after the final degree check. The student will be asked to return the diploma. The university will place a hold on the student’s registration privileges and transcript if the diploma is not returned.

Those students with estimated failing or incomplete grades will receive a letter, rather than a diploma, inside the diploma cover. After completion of all degree requirements, these students will receive their diplomas in the mail. Diplomas will also be held until all fees and charges due Oregon Tech have been paid and exit interviews have been completed for Federal, Perkins and institutional loans.

**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.

**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.

The General Education Advisory Council and 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. If a student holds a baccalaureate degree or higher from a recognized, accredited institution, as determined by Oregon Tech, the general education requirements for the Oregon Tech baccalaureate may be waived subject to departmental program requirements.

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 waived subject to departmental program requirements.

Transfer students entering Oregon Tech who have earned either an Associate of Arts Or-
egon 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.

Communication
- SPE 111 Fundamentals of Speech
- WRI 121 English Composition
- WRI 122 English Composition

Plus nine credits from the following list:

Humanities
Nine credits selected by student or specified by a major department from the following:
- ART–Art
- ENG–Literature
- HUM–Humanities
- 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
Twelve 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. No more than three credits of activity or performance-based courses may be used in this category.

* ANTH 101 may not be used to satisfy both Social Science and Science credits.
* GEOG 105 and GEOG 115 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), mathematics (MATH), physical sciences (PHY), physical geography (GEOG 105 or GEOG 115) geology (GEOL) or physical anthropology (ANTH 101).

Remedial or developmental courses, including MATH 100 and WRI 115, cannot be used for graduation.

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: ENG 266 Native American Literature and Film; ENG 235 American Multicultural Literature; ENG 381 Contemporary World Literature; HUM 147, 148, 149 Introduction to the Humanities.


Notes
Students who graduated from high school in 1997 or after, who did not complete two years of a foreign language in high school, must complete two terms of college-level foreign or second language in order to receive an Oregon Tech degree.
University Departments and Programs
Clinical Laboratory Science Program

Cara Calvo, Program Director
Assistant Professors: C. Calvo, D. Taylor
Associate Professors: A. Furman, S. Goodstein

Degree Offered
Bachelor of Science in Clinical Laboratory Science (joint degree between Oregon Tech and OHSU)

The CLS Program prepares students for entry into the clinical laboratory science profession. Students learn about laboratory sciences and develop skills in analytical thinking, problem solving, and communication to provide better health care. Upon successful completion of the program, graduates are eligible to take the American Society for Clinical Pathology (ASCP) Board of Certification (BOC), the nationally recognized certification examination for medical laboratory scientists.

Program Overview
The Clinical Laboratory Science Program, established in 1933 on the OHSU campus, culminates in a Bachelor of Science in Clinical Laboratory Science degree (also known as Medical Technology or Medical Laboratory Science). Students may enter the program with or without a baccalaureate degree. Those students entering the program without a degree must have completed at least 100 transferable quarter hours at an accredited college, community college and/or university prior to matriculation, have a minimum cumulative 2.50 GPA in previous college work and be eligible for an Oregon Tech/OHSU baccalaureate degree upon completion of the CLS program. Transfer students without a baccalaureate degree must meet all Oregon Tech general education requirements.

The program extends over a period of 15 months (5 terms), 40 hours per week. Four consecutive terms on the Oregon Tech Wilsonville campus include technical instruction and practical experience providing students with theoretical background and basic laboratory skills at the senior level. This is followed by an extended (16 week) fifth term clinical laboratory externship that gives the student the opportunity to apply and develop, in a modern clinical laboratory, the basic theoretical knowledge and laboratory skills learned on campus. Clinical externships are predominantly located in hospital and reference laboratories throughout the Pacific Northwest and Nevada. During the fifth term, no on-campus courses are given and students are in clinical rotations full-time (40 hours/week) Monday through Friday.

The program determines clinical site assignment. Students admitted into the CLS Program are guaranteed a clinical externship. Due to limitations in available externship sites from year to year, student placement at a specific site, or at a specific time, may not be possible. Placement in a clinical externship is subject to the following:
1. All academic on-campus requirements must be met before the start of the externship.
2. Externship placement occurs no later than the fourth term (summer).
3. Prior to the start of the externship, students must comply with all externship facility requirements. This may include passing a drug test and completing a request for criminal history.

The CLS faculty is dedicated to providing excellence in training, while at the same time offering personalized attention to students. Graduates of the CLS Program are in demand and well prepared to enter the profession of clinical laboratory science.

Accreditation
The Clinical Laboratory Science Program is accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS), a specialized accrediting body recognized by the Council for Higher Education Accreditation. Contact information for NAACLS is:

National Accrediting Agency for Clinical Laboratory Sciences
5600 North River Road, Suite 720
Rosemont, IL 60018-5119
(773) 714-8880
(773) 714-8886 (fax)
info@naacls.org
http://www.naacls.org

Mission Statement
The mission of the Oregon Tech–OHSU CLS Program is to provide a quality education to the students in the field of Clinical Laboratory Science. Our goals are to admit and retain students with demonstrated abilities from all segments of the population and to continue to provide students with a quality of education that exceeds national accreditation standards. Our expectation is to graduate individuals who are professionally competent; who possess a commitment to lifelong learning; who exhibit a sense of commitment to the ethical and humane aspects of patient care; who appreciate the need for research to develop knowledge of health, disease, health care management and education; and who recognize the role of the medical laboratory scientist in the assurance of quality health care.

Admission
There are two tracks into the CLS Program, early admission to the Clinical Laboratory Science Program (EACLSP) and admission into the program as a non-Oregon Tech student or as an Oregon Tech student not in the EACLSP.

Early Admission to the Clinical Laboratory Science Program (EACLSP)
EACLSP Advisor: Rosalind McClure

The Early Admission Program allows students that are enrolled at Oregon Tech to apply to the professional phase of the Clinical Laboratory Science Program. At the completion of the sophomore year at Oregon Tech, equivalent to about 45 quarter credits of academic work, a student may apply for acceptance into the EACLSP. Students who successfully complete all of the requirements of this track will be automatically admitted to the professional (fourth year) phase of the CLS program, conducted at the Wilsonville campus in the Portland metropolitan area.

Students enrolled in the EACLSP track must meet the following criteria to be admitted into the professional portion of the CLS Program:

a. Enroll at one of the Oregon Tech campuses during the sophomore and junior years (the freshman year can be either at Oregon Tech or another school);
b. Carry a minimum of 12 credits per term;
c. Complete all required courses with a letter grade of “C” or better (see list of required courses);
d. Earn a minimum GPA of 3.0 in each term;
e. Possess a minimum cumulative GPA for all courses taken at Oregon Tech of 3.25;
f. Adhere to all Oregon Tech Student Life and Academic policies and regulations (see the Oregon Tech General Catalog and Oregon Tech Student Handbook);
g. Complete CLS 100 Introduction to Clinical Laboratory Science with a minimum grade of “B”;
h. Complete a minimum interval of 10 hours of job shadowing at an approved clinical laboratory setting (see the EACLSP academic advisor for approved sites);
i. Complete an interactive exercise with the Wilsonville faculty (time and type of activity to be arranged by the EACLSP advisor); and
j. Pass a criminal background check.

Qualifying students are those that have completed at least their sophomore and junior years at Oregon Tech. Students who transfer courses from another institution must have earned a “C” or better in all required courses. Students may transfer up to 45 quarter term credits (one year) into the EACLSP program.

Letter grades of “I”, “N”, “NP”, or “Z” do not apply toward the GPA requirements, nor do repeated classes or withdrawals. Each student’s cumulative GPA will be reviewed by the EACLSP advisor annually after spring term grades are posted. Students who fail to meet any of these criteria will be notified of their dismissal from the EACLSP Program but meet any of these criteria will be notified of their dismissal from the EACLSP Program but are encouraged to apply to the CLS Program through the regular admission process their third (Junior) year (see CLS Program application dates).

Students may submit an application to the EACLSP advisor for automatic admission after the completion of the spring term of their freshman year. Transfer students should submit their application no later than the completion of their sophomore year. Notification of acceptance will be made within three months after submission and notification of continuing eligibility will be made during the summer following each spring grade posting.

Courses for "C" grade requirement (grades in these courses or their transfer equivalents are counted toward meeting the requirement):

- MATH 111 College Algebra (4 credits)
- BIO 231-233 Human Anatomy and Physiology (12 credits)
- BIO 345 Medical Microbiology (5 credits)
- BIO 346-347 Pathophysiology (6 credits)
- BIO 436 Immunology (4 credits)
- CHE 221-223 General Chemistry (15 credits)
- CHE 331-332 Organic Chemistry (8 credits)
- CHE 360 Clinical Pharmacology for the Health Professions (3 credits)
- CLS 100 Introduction to Clinical Laboratory Science (2 credits, must have a “B” or higher)

Admission to the Program as non-Oregon Tech Students and Students not in the EACLSP

Students admitted to the professional phase of the CLS Program at Wilsonville must have completed, prior to matriculation, 103 transferrable quarter hours at an accredited community college, college and/or university. Although students may apply while in the process of completing the admission requirements, those admitted must provide a final transcript prior to registration at Oregon Tech showing the completion of the requirements listed below.

Program Admission Requirements

All students must have no less than 103 transferrable quarter hours to include:

- **Biology**: at least 24- quarter credit hours. Once course each in Microbiology/bacteriology and Immunology required. **Highly recommended courses**: genetics, physiology, anatomy, cellular and molecular biology.
- **Chemistry**: at least 24- quarter credit hours. No required courses. **Highly recommended courses**: general chemistry, inorganic chemistry, organic chemistry, biochemistry, quantitative analysis and physical chemistry.
- **Mathematics**: once college level course. MATH 111 meets minimum requirements. Additional **recommended course**: statistics.

*Survey courses do not qualify as fulfillment of these prerequisites.

Degree Requirements

Applicants who are or will be a recipient of a baccalaureate degree prior to entering the CLS Program need only complete the Program Admission Requirements and Foreign Language requirements, all other Oregon Tech degree requirements are waived.

Those applicants aiming to receive their first baccalaureate degree through the Oregon Tech-OHSU Clinical Laboratory Science Program must complete a total of 186 credits by the end of the program with a cumulative GPA of 2.00 or better, and satisfactorily complete the CLS curriculum and the following additional liberal arts credits:

1. Eighteen quarter hours of specified communication courses (writing and speech);
2. Nine quarter hours of Humanities: such as English (excluding composition), Philosophy, Comparative Religion, Theater Arts, Foreign Language (excluding 1st year), History of Art/Music, Music Appreciation. Only three quarter hours of performance-based Humanities may be used;
3. Twelve quarter hours of Social Science: such as Sociology, Psychology, Anthropology, Economics, Political Science, History;
4. Two terms of a college-level second language or two years of the same high school-level second language with a grade of C- or better, or satisfactory performance on an approved second language assessment of proficiency.

Prerequisite course work must be completed before admission to the Program; it does not need to be completed to apply. The Oregon Tech Registrar’s Office will review each applicant’s transcripts to confirm that the requirements are met. Applicants who have met Program Admission Requirements seven or more years prior to application to the CLS Program must complete additional academic work to qualify. This may be accomplished by:

1. Completing a course in chemistry or biology with a grade of “C” or better – upper-division level courses recommended; or
2. Receiving credit by examination in biochemistry and in microbiology; or
3. Achieving a CLEP score at or above the 50th percentile on both the biology
and chemistry examinations. (Information can be obtained by writing to the Educational Testing Service, CLEP, Box 592, Princeton, NJ 08540).

Applicants with foreign degrees are asked to have their transcripts evaluated by acceptable evaluation agencies and must meet requirements as described above.

Graduation Requirements
Students must maintain a minimum GPA of 2.00 to be eligible for graduation. In addition, a final grade of “C” or better in all lecture and student laboratory courses, as well as receiving a grade of “Pass” in all rotations in the clinical externship is required for graduation.

Bachelor of Science in Clinical Laboratory Science
Curriculum
All senior level courses require admission to the Clinical Laboratory Science Program or instructor consent. Required courses and recommended terms during which they should be taken:

Pre-Clinical Laboratory Science

<table>
<thead>
<tr>
<th>Freshman Year</th>
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<td>BIO 231</td>
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Sophomore Year

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* Freshman fall Intro elective – choose one of the following:
  - ACAD 105 Achieving Academic Success
  - HED 240 Emergency Care & CPR
  - HED 246 Drugs and Alcohol Problems of Modern Society
  - HED 250 Contemporary Health Issues
  - HED 260 Diet and Exercise for Lifetime Fitness
## Professional Courses

### Senior Year

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<tr>
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<td>CLS 420</td>
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<td>CLS 443</td>
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<tr>
<td>CLS 444</td>
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### Senior Year

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<td>CLS 447</td>
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### Senior Year

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<td>CLS 419</td>
<td>Immunohematology</td>
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<td>CLS 422</td>
<td>Theories of Molecular Methods</td>
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<td>CLS 442</td>
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<td>CLS 443</td>
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<td><strong>Group 1</strong></td>
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<td>CLS 444</td>
<td>Practicum: Microbiology</td>
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<td>CLS 445</td>
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* * The class is divided into two groups. Students will be assigned to a group for practicum rotations.
Paramedic Education Program

Suzann Schmidt, Program Director
Todd Ellingson, M.D., Medical Director
Instructors: K. Darling, J. Kennell, S. Schmidt, A. Wagner

Adjunct Faculty: The program utilizes professional instruction from many of the faculty physicians, physician’s assistants, and nurses at OHSU, as well as many other health care professionals from the community.

Degree Offered
Associate of Applied Science in Emergency Medical Technology—Paramedic (joint degree through Oregon Tech and OHSU).

The Associate of Applied Science in EMT–Paramedic (also called the Paramedic Education Program) prepares students for a clinical career as a paramedic. Upon completion of the program, graduates are eligible to sit for the National Registry EMT–Paramedic examination. Successful completion of the national examination process can lead to both national and Oregon certification.

The Paramedic Education Program (PEP) was established in 1977 at Oregon Health & Science University. The PEP was transferred to the Oregon Institute of Technology in 2001 and remains a collaborative program with OHSU. Academic classes utilize facilities at both the Wilsonville campus and at OHSU. Clinical rotations utilize a variety of departments in Portland-area hospitals. The students complete a field externship practicum with one of a variety of agencies throughout the country, who are affiliated with the program.

Accreditation
The Paramedic Education Program is nationally accredited by the Committee on Accreditation of Educational Programs for the Emergency Medical Services Profession (CoAEMSP), a specialized accrediting body recognized by the Council for Higher Education Accreditation and/or the U.S. Department of Education.

Mission Statement
The mission of the Oregon Health & Science University/Oregon Institute of Technology Paramedic Education Program is to educate pre-hospital care providers; to prepare EMS leaders of the future; and to enhance the delivery of health care in the pre-hospital setting.

Career Opportunities
Job opportunities are available for certified paramedics in a variety of settings. Paramedics work for ambulance, fire and air-medical transport agencies, industrial sites, tactical-medical teams, and hospitals. Paramedic Education Program graduates often find employment opportunities from the agency where they completed their field externship, and are sought after by many emergency services agencies nationwide.

Admission Requirements
Students entering the Paramedic Education Program must have completed 37 credit hours of prerequisite courses prior to beginning the program. Prerequisite coursework includes the following required classes:

- At least 37 term credit hours of general education coursework including writing composition, public speaking, elementary algebra, human anatomy and physiology (12 credits at a 200 level or above), health and physical education, computer science, psychology, social science and an approved elective.
- Technical coursework required includes Emergency Medical Technician–Basic (EMT-B), EMT-B Cooperative Work Experience. Applicants must have an Oregon EMT–Basic Certification by the beginning of fall term. Out-of-state applicants certified as EMTs may apply for Oregon reciprocity. Applicants are required to have work experience in health care, with a preference given to EMS experience, either volunteer or paid.

Clinical and Field Externship Practicum
The 12-month Paramedic Education Program is divided into three phases. Following 18 weeks of didactic studies in the classroom and skills lab setting, students enter a 16-week clinical rotation phase. During this phase of the program, student work under the supervision of paramedics, physicians, nurses, respiratory therapists, and other health care professionals. The clinical sites are primarily located at Oregon Health & Science University, with additional sites at five of the Portland-area hospitals and health care facilities.

Once students have successfully completed all requirements of the didactic and clinical phases of the program, they spend an additional 10 weeks working under the direct supervision of a Paramedic Field Training Officer responding to actual emergencies. Students have the opportunity to stay in the Portland area for this training, or to go out of-state. Externship sites include both in-state and out of state locations.

Graduation Requirements
Students must maintain a minimum GPA of 2.50 to be eligible for graduation. In addition, a “Pass” grade must be achieved for all externship requirements.
Associate of Applied Science in Emergency Medical Technology–Paramedic Curriculum

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

**Paramedic Professional Courses**

**Fall**
- CHE 210 Clinical Pharmacology 3
- EMS 215 Essentials of Paramedicine 3
- EMS 200 Medical Terminology 3
- EMS 218 Trauma Assessment and Management 3
- EMS 231 Medical Emergencies I 4
- EMS 235 Basic Electrocardiography 2
- EMS 271 EMT-Paramedic Skills Laboratory Part I 2

**Total** 20

**Winter**
- EMS 211 Prehospital Emergency Pharmacology 3
- EMS 232 Medical Emergencies II 3
- EMS 236 Advanced Electrocardiography 2
- EMS 272 EMT-Paramedic Skills Laboratory Part II 3
- EMS 281 Clinical Practicum I 6

**Total** 17

**Spring**
- EMS 233 Medical Emergencies III 3
- EMS 273 EMT-Paramedic Skills Laboratory Part III 2
- EMS 282 Clinical Practicum II 2

**Total** 17

**Summer**
- EMS 290 Field Externship Practicum 18

**Total** 18

**Total Credit Hours for A.A.S. Degree in EMT–Paramedic:**
- Prerequisite General Education 37
- Paramedic Course 72

**Total Credit Hours** 109
Civil Engineering

Sean St. Clair, Department Chair
Roger Lindgren, Program Director, Master of Science in Civil Engineering
David Thaemert, Curriculum Coordinator
Professor: R. Lindgren
Associate Professor: S. St. Clair
Assistant Professors: C. Riley, D. Thaemert

The field of civil engineering is concerned with the responsible planning, design, construction and maintenance of the nation’s infrastructure. Civil engineers design highways, bridges, buildings, dams, communities, and water and waste management systems for the enhancement of human welfare and protection of our environment.

Degrees Offered
Master of Science in Civil Engineering
Bachelor of Science in Civil Engineering

Program Objectives
The department offers a bachelor’s degree in civil engineering. Graduates from this program will:
1. practice in civil engineering or a related field;
2. pursue advanced education in civil engineering or a related field;
3. act as responsible, effective, and ethical citizens;
4. communicate effectively;
5. collaborate effectively.

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 relevant theory common to all 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 design projects appropriate to the freshman level. 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 sustainability and engineering.

In junior civil engineering courses, students develop a broad engineering base. Junior courses include topics in structural, transportation, water resources and environmental engineering, as well as geotechnical engineering, project management and engineering economics.

In the senior 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 senior project also involves realistic constraints including cost and sustainability considerations, socioeconomic effects, aesthetic choices and ethical deliberations.

Graduating seniors prepare for the Fundamentals of Engineering (FE) examination as a first step toward licensure as professional engineers.

To ensure graduates can 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.

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 for entry into the Civil Engineering Program. Additional courses in mathematics and computer-aided drafting are desirable.

Career Opportunities
Upon completing the core curriculum, civil engineering students have a solid foundation in structural, transportation, water resources and environmental engineering. Students can then target specific careers within the broad field of civil engineering.

Structural engineering involves the planning, analysis and design of buildings and other structures, using the principal construction materials of wood, steel and concrete. Structural engineering is supported by geotechnical engineering, which includes design of building foundations and retaining structures, as well as slope stability, groundwater and drainage considerations. Graduates are aware of recent and emerging practices in green building design and technology.

Transportation engineering is concerned with the planning, design, construction, operation, performance, evaluation, maintenance, and rehabilitation of transportation systems and facilities, such as highways, railroads, urban transit, and air transportation systems. Graduates have career opportunities with consulting firms, government agencies, and industry.

Water resource engineering addresses the spectrum of water from supply to transport to use to discharge, and is at the junction of efforts to provide sustainable human and natural environments, in compliance with myriad regulatory mandates. Graduates have opportunities in planning, design, operation and maintenance of hydraulic and water resource projects, floodplain management, or resource management issues.

Environmental engineering continues to be an expanding field due to heightened environmental awareness and interest in sustainable practice and resulting regulatory mandates. Graduates have opportunities in planning, design, operation and maintenance of water and wastewater treatment facilities and remediation of existing environmental problems, or can address regulatory and compliance issues related to resource and waste management.

Construction management requires knowledge of traditional management methods including planning, economics, estimating and scheduling for projects as well as sustainable design principles and collaborative and integrated design models. Graduates may work with construction companies or consultants and in various capacities such as construction superintendents, project managers, project engineers or company owners.

Graduates may consider a concurrent degree in environmental sciences to expand career opportunities with a broad spectrum of government agencies, consulting firms, and industry.
Accreditation
The Civil Engineering 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 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.

A minimum of 182 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 courses listed as prerequisites for these courses.

Degree Requirements—Master of Science
The Master of Science in Civil Engineering requires completing 45 credit hours of graduate work. Both thesis and project options are available; students must complete 12 credits toward a thesis or 9 credits toward an approved project. Graduate course offerings currently emphasize the civil engineering disciplines of structural and transportation engineering.

Bachelor of Science in Civil Engineering Curriculum
Required courses and recommended terms during which they should be taken:

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<td>ENGR 101 Introduction to Engineering I</td>
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<td>MATH 251 Differential Calculus</td>
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<td>MATH 252 Integral Calculus</td>
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<td>GME 161 Plane Surveying I</td>
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<td>PHY 223 General Physics with Calculus</td>
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<td>MATH 321 Applied Differential Equations I</td>
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<tr>
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<tbody>
<tr>
<td>CIV 315 Principles of Environmental Engineering</td>
<td>3</td>
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</tr>
<tr>
<td>CIV 328 Structural Analysis</td>
<td>4</td>
<td>Fall</td>
</tr>
<tr>
<td>CIV 358 Project Management</td>
<td>3</td>
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<tr>
<td>ENGR 231 Fluid Mechanics</td>
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<tbody>
<tr>
<td>CIV 321 Introduction to Geotechnical Engineering</td>
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<td>Winter</td>
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<td>CIV 331 Reinforced Concrete Design</td>
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<td>CIV 361 Closed Conduit Design</td>
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<tr>
<td>CIV 371 Introduction to Transportation Engineering</td>
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<tr>
<td>CIV 322 Foundation Engineering</td>
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<td>CIV 344 Structural Steel Design</td>
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<tr>
<td>CIV 362 Hydrology and Surface</td>
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<tr>
<td>CIV 375 Highway Engineering</td>
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<tr>
<td>ENGR 355 Thermodynamics</td>
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<tr>
<td>ENGR 236 Fundamentals of Electric Circuits</td>
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<td>Fall</td>
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<tr>
<td>CIV 401/</td>
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<tr>
<td>COM 401 Civil Engineering Project I</td>
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<td>CIV 415 Civil Design Software Applications</td>
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<tr>
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<tr>
<td>PHIL 331 Ethics in the Professions</td>
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<tr>
<td>Civil Engineering elective</td>
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<td></td>
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<tr>
<td>Social Science elective*</td>
<td>3</td>
<td></td>
</tr>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>Civil Engineering elective</td>
<td>3</td>
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<tr>
<td>Humanities elective*</td>
<td>3</td>
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<tr>
<td>Math/Science elective**</td>
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<tr>
<td><strong>Total</strong></td>
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* Humanities courses may not be skill or performance based. Students must take either ANTH 335 The Built Environment or HIST 335 The Engineering Profession as one of their social science electives.

** At least one Math/Science elective must be taken from BIO, GEOG (105 or 115) or GEOL.
Concurrent Degree in Environmental Sciences

Civil Engineering students have the opportunity to earn concurrent degrees in Civil Engineering and Environmental Sciences. The additional degree requires up to 53 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 greatly increases 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 111 Introduction to Environmental Sciences 4
- BIO 211 Principles of Biology 4
- BIO 212 Principles of Biology 4
- BIO 213 Principles of Biology 4
- BIO 225 Riparian Assessment Methods 1
- BIO 327 General Ecology or
- BIO 337 Aquatic Ecology 4
- BIO 434 Data Analysis Methods or
- MATH 362 Statistical Methods II 4
- BIO 484 Sustainable Human Ecology 4
- CHE 223 General Chemistry* 5
- CHE 235 Stream water Chemistry and Sampling 3
- CHE 331 Organic Chemistry I 4
- ENV 314 Environmental Management and Restoration 3
- GEOG 105 Physical Geography* 3
- GME 134 Geographic Information Systems 3
- Chemistry Technical emphasis elective** 3

* CHE 223 and GEOG 105 should be taken as Civil Engineering Math/Science electives.
** This technical emphasis elective must have a CHE prefix; different courses are offered every year.
Communication Department

Kevin Brown, Department Chair
Professors: M. Dyrud, L. Young
Associate Professors: K. Brown, J. Murray, D. Peterson, J. Puckett, M. Schnackenberg
Assistant Professors: V. Ball, J. Knight, M. Search
Instructors: J. Calvo, R. Schwartz

Degree Offered
Bachelor of Science in Communication Studies

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

Minors Offered
Human Communication
Technical Communication

Certificate Offered
Dispute Resolution

Career Opportunities
The Communication Studies Program prepares students for careers in areas such as technical communication, organizational communication, new communication technologies, education, human resources, project management, public relations, sales, and mediation.

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.

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.

Bachelor of Science in Communication Studies Curriculum

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

Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COM 104</td>
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<td>COM 115</td>
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<tr>
<td>PSY 201</td>
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<tr>
<td>WRI 121</td>
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Freshman Year Winter

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<td>HUM 125</td>
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Freshman Year Spring

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<td>MATH 105/111/243</td>
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<tr>
<td>JOUR 211</td>
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<tr>
<td>SPE 321</td>
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<td>WRI 227</td>
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Sophomore Year Winter

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<td>Laboratory Science/Math elective</td>
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(*)Elective means students may choose from approved electives as defined in the catalog.
Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>COM 205 Intercultural Communication</td>
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<tr>
<td>COM 237 Introduction to Visual Communication</td>
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<tr>
<td>COM 255 Communication Ethics</td>
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<tr>
<td>Focused Sequence elective*</td>
<td>3</td>
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<td>Laboratory Science/Math elective</td>
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Junior Year

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<tr>
<td>COM 326 Communication Research</td>
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<tr>
<td>ECO 202 Principles of Economics, Macroeconomics</td>
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<tr>
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<tr>
<td>Focused Sequence elective*</td>
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Junior Year

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<thead>
<tr>
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<tr>
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<td>Major elective**</td>
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<tr>
<td>Major elective**</td>
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<tr>
<td>Major elective (upper-division)**</td>
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Senior Year

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<tr>
<td>Elective (upper-division)</td>
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<tr>
<td>Elective</td>
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Senior Year

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<tr>
<td>COM 422 Senior Project II***</td>
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<tr>
<td>Business elective</td>
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<td>Focused Sequence elective (upper-division)</td>
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<tr>
<td>Social Science elective (upper-division)</td>
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</tr>
<tr>
<td>Elective (upper-division)</td>
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Senior Year

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<tbody>
<tr>
<td>COM 423 Senior Project III***</td>
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<tr>
<td>Focused Sequence elective (upper division)*</td>
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<tr>
<td>Social Science elective (upper)</td>
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<tr>
<td>Social Science elective (upper-division)</td>
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<tr>
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<tr>
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Organizational Communication (6 credits)

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<tbody>
<tr>
<td>COM 256 Public Relations</td>
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<tr>
<td>COM 347 Negotiation and Conflict Resolution</td>
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<tr>
<td>COM 348 Facilitation</td>
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<tr>
<td>COM 437 Communication Training and Development</td>
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<tr>
<td>COM 445 Organizational Communication II</td>
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<tr>
<td>COM 446 Communication and Leadership</td>
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Technical Communication (6 credits)

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<tr>
<th>Course</th>
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<tr>
<td>COM 365 Electronic Communication and Society</td>
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<tr>
<td>WRI 214 Business Correspondence</td>
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<tr>
<td>WRI 327 Advanced Technical Writing</td>
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<tr>
<td>WRI 350 Documentation Development</td>
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<tr>
<td>WRI 410 Proposal and Grant Writing</td>
<td></td>
</tr>
<tr>
<td>WRI 415 Technical Editing</td>
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</tr>
<tr>
<td>WRI 420 Document Design</td>
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</table>

Human Communication Minor

The Human Communication Minor supplements Oregon Tech technical and applied science degrees and provides advanced training in communication skills. The minor offers courses in the analysis and practice of human communication in a variety of areas including interpersonal, intercultural, health, nonverbal and electronic communication. In addition, the minor allows students to practice conflict resolution, negotiation strategies, ethical communication and rhetorical analysis. Students who have performed well in general education communication courses are encouraged to enroll in this minor. For further information on enrollment, contact a member of the Communication Department or the Communication Department chair.

One goal of the Human Communication Minor is to educate students from a variety of majors in the effective practice of human communication skills based on theoretical understandings of communication.

Major Elective Courses

Students will select electives from three categories—Communication, Organizational Communication and Technical Communication—and include two courses (6 credits) from each category, for a total of 18 required credits. A minimum of 12 credits must be upper-division. Please note that some electives require prerequisites.

Communication (6 credits)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>COM 215 Creativity in Communication</td>
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<tr>
<td>COM 216 Essentials of Grammar and Punctuation</td>
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<tr>
<td>COM 226 Nonverbal Communication</td>
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</tr>
<tr>
<td>COM 248 Digital Media Production</td>
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<tr>
<td>COM 320 Advanced Intercultural Communication</td>
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</tr>
<tr>
<td>COM 358 Communication and the Law</td>
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</tr>
<tr>
<td>COM 425 Mediation</td>
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<tr>
<td>COM 426 Mediation Practicum</td>
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<tr>
<td>JOUR 311 Advanced Publications—Student Newspaper</td>
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<tr>
<td>SPE 314 Argumentation</td>
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<tr>
<td>WRI 123 English Composition</td>
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<tr>
<td>WRI 305 Writing for the Marketplace</td>
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<tr>
<td>WRI 328 Technical Journalism</td>
<td></td>
</tr>
</tbody>
</table>

Curriculum notes: To earn the Bachelor of Science degree, students must complete 36 credits in mathematics and science or 45 credits in mathematics, science, and social science. Students must also complete 60 credits of upper-division courses.

The minor requires that students select electives from three categories—Communication, Organizational Communication, and Technical Communication electives (six credits required of each; minimum of 4 credits upper-division; minimum one upper-division writing course which meets general education Communication requirements.)

*** During the senior year, students will complete a capstone project, either a senior project or externship, in which they apply and integrate the skills gained in their courses. The senior project will be completed under the supervision of a faculty advisor and will span the academic year. Externships will be concentrated in one or more terms and will require supervision of a faculty advisor.

**** For senior project students, this focused sequence elective must be upper-division.

Career Opportunities

The Human Communication minor enhances students’ employability and career flexibility. Many employers in many industries seek employees who can work effectively on multi-disciplinary teams, communicate in many (including international) contexts, understand and resolve conflict in the workplace and analyze and create effective messages in a variety of settings.
Requirements of the Human Communication Minor
SPE 321  Small Group and Team Communication
COM 205  Intercultural Communication
COM 225  Interpersonal Communication

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

COM 226  Nonverbal Communication
COM 301  Rhetorical Theory and Application
COM 320  Advanced Intercultural Communication
PHIL 331  Ethics in the Professions
COM 346  Health Communication
COM 347  Negotiation and Conflict Resolution
COM 365  Electronic Communication and Society

Technical Communication Minor
The 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 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 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 Technical Communication Minor may increase job opportunities and professional advancement.

Requirements of the Minor
In addition to the general education requirements in communication, Technical Communication Minor students take four upper-division courses (12 units). Students take two required core courses and choose two electives from the list below. Students must earn a "C" or better in all courses to complete the minor.

Required Courses
COM 301  Rhetorical Theory and Application
WRI 328  Technical Journalism

Elective Courses
COM 365  Electronic Communication and Society
COM 415  Developing Effective Multimedia-based Presentations
WRI 350  Documentation Development
WRI 410  Proposal and Grant Writing
WRI 415  Technical Editing
WRI 420  Document Design

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 Co-requisite Classes
SPE 111  Fundamentals of Speech 3
WRI 121  English Composition 3
WRI 122  English Composition 3

Program Courses
COM 205  Intercultural Communication 3
COM 225  Interpersonal Communication 3
COM 226  Nonverbal Communication 3
COM 345  Organizational Communication I 3
COM 347  Negotiation and Conflict Resolution 3
COM 348  Facilitation 3
COM 425  Mediation 3
COM 426  Mediation Practicum 3
SPE 321  Small Group and Team Communication 3
Computer Systems Engineering Technology Department

Randal Albert, Department Chair
Jay Bockelman, Portland Operations Program Director, Software Engineering Technology and Embedded Systems Engineering Technology
Todd Breedlove, Program Director, Software Engineering Technology
Doug Lynn, Program Director, Computer Engineering Technology
Jim Long, Program Director, Embedded Systems Engineering Technology
Sherry Yang, Curriculum Coordinator, Software Engineering Technology
Phong Nguyen, Curriculum Coordinator, Computer Engineering Technology

Associate Professors: D. Lynn, P. Nguyen

Degrees Offered
Bachelor of Science in Computer Engineering Technology
Bachelor of Science in Software Engineering Technology
Bachelor of Science in Embedded Systems Engineering Technology
Associate of Engineering in Computer Engineering Technology
Associate of Engineering in Software 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

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<tr>
<th>Course</th>
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<td>CST 162</td>
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<td>MATH 111</td>
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Freshman Year

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<td>CST 130</td>
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Freshman Year

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<td>CST 126</td>
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<td>CST 131</td>
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</table>

Computer Engineering Technology

Degrees Offered
Bachelor of Science in Computer Engineering Technology
Associate of Engineering in Computer Engineering Technology

Bachelor of Science and Associate of Engineering Degrees
All students who complete the curriculum requirements in Computer Engineering Technology will be knowledgeable in the theory and applications of both computer hardware and software.

Required Student Equipment
Successful completion of this degree requires intensive, hands-on use of computers. Therefore, all students are required to own their own computer. To ensure compatibility with campus-wide computers and networks, students should consult a department faculty member for a specification sheet. Financial aid may be available to help defray the cost of this equipment. Please consult the Financial Aid Office at Oregon Tech.

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 associate's degree curriculum gives the student a strong foundation in both hardware and software aspects of computing, while also furnishing a solid background in general education subjects including mathematics, physics and communication. The associate degree graduate qualifies as a technician who is productive immediately upon entering the work force. The associate's degree also provides a way for students who obtain degrees in related disciplines to add breadth to their education.

The bachelor's curriculum goes beyond the associate's degree curriculum providing the greater depth and breadth of technical capability necessary for an engineering technologist. 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.

Curriculum 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 Alumni, 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, a profession which is increasingly being driven by advances in technology.

CET Bachelor of Science Program Educational Objectives
Alumni of the Computer Engineering Technology (CET) Bachelor Degree program may be employed in a wide range of high tech industries from industrial manufacturing to consumer electronics where they will be involved in solving problems through the development of hardware, software and embedded applications. Alumni may be involved in product design, testing and qualification, application engineering, customer support, sales, or public relations.

1. Alumni will demonstrate technical competency through success in computer engineering technology positions and/or pursuit of engineering or engineering technology graduate studies if desired.
2. Alumni will demonstrate competencies in communication and teamwork skills by assuming increasing levels of responsibility and/or leadership or managerial roles.
3. Alumni will develop professionally, pursue continued learning and practice responsibly and ethically.

CET Associate Degree Program Education Objectives
Alumni of the Computer Engineering Technology (CET) Associate Degree program may be employed as technicians or in support roles in a wide range of high tech industries from industrial manufacturing to consumer electronics. Alumni may be involved in product testing and qualification, customer support, sales, or public relations.

1. Alumni will demonstrate technical competency through success in computer engineering technician positions.
2. Alumni will demonstrate competencies in communication and teamwork skills through positive contributions to team based engineering projects.
3. Alumni will develop professionally, pursue continued learning and practice responsibly and ethically.

According to current statistics, one third of students who obtain the CET Associate degree also obtain a bachelor degree in related discipline, most often a bachelor degree in Software. In this case, the Associate degree adds breadth to their education. Alumni in this category would be expected to perform at a level consistent with the bachelor degree program educational objectives.

Cooperative Field Experience
The cooperative program includes work experience during the junior and senior years. The co-op period is an employment arrangement with an employer in the area of the student’s major field with normal salary and academic credit. These arrangements are made on an individual basis and the student is under no obligation to accept permanent employment with any previous co-op employer.

A student must have junior standing in Computer Engineering Technology to be considered for this program.

Accreditation
The Computer Engineering Technology Programs are accredited by the Technology Accreditation Commission (TAC) 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.

Degree Requirements
Associate of engineering technology degree students must complete 96 credit hours as prescribed by the curriculum outline. The Bachelor of Science in Computer Engineering Technology degree requires 92 additional credit hours, for a total of 188 credits, as prescribed by the curriculum outline.
### Bachelor of Science in Computer Engineering Technology
#### Curriculum
Required courses and recommended terms during which they should be taken:

<table>
<thead>
<tr>
<th>Freshman Year</th>
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<th>Winter</th>
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<tbody>
<tr>
<td>CST 102</td>
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<td>CST 162</td>
<td>Introduction to Digital Logic</td>
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<td>MATH 111</td>
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<tr>
<td>CST 337</td>
<td>Embedded System Architecture</td>
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<td>CST 335</td>
<td>I/O Device Interfacing Techniques</td>
<td>4</td>
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<td>CST 371</td>
<td>Embedded Systems Development I</td>
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<td>PHY 221</td>
<td>General Physics with Calculus</td>
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<tr>
<td>BUS 304</td>
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<tr>
<td>CST 344</td>
<td>Intermediate Computer Architecture</td>
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<td>CST 441</td>
<td>Logic Synthesis with VHDL*</td>
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<tr>
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<td>CST 451</td>
<td>ASIC Design using FPGA**</td>
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<td>MGT 345</td>
<td>Engineering Economy</td>
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<tr>
<td>ANTH 452</td>
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<tr>
<td>CST 461</td>
<td>Advanced Topics in VLSI Design+</td>
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<tr>
<td>CST 464</td>
<td>RISC-Based Microprocessor Systems</td>
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### Associate of Engineering in Computer Engineering Technology
#### Curriculum
Required courses and recommended terms during which they should be taken:

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<tr>
<th>Freshman Year</th>
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<tr>
<td>CST 102</td>
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<tr>
<td>CST 162</td>
<td>Introduction to Digital Logic</td>
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<th>Sophomore Year</th>
<th>Fall</th>
<th>Winter</th>
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<tbody>
<tr>
<td>CST 116</td>
<td>C++ Programming I</td>
<td>4</td>
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<tr>
<td>CST 130</td>
<td>Computer Organization</td>
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<td>Trigonometry</td>
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<th>Winter</th>
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<tbody>
<tr>
<td>CST 133</td>
<td>Digital Electronics II – Sequential Logic with HDL</td>
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<td>Instrumentation</td>
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<td>Computer Assembly Language</td>
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<td>Integral Calculus</td>
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<tr>
<td>CST 204</td>
<td>Introduction to Microcontrollers</td>
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<td>CST 231</td>
<td>Computer Design with Programmable Logic</td>
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<tr>
<td>ANTH 452</td>
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<td>CST 461</td>
<td>Advanced Topics in VLSI Design+</td>
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<tr>
<td>CST 240</td>
<td>UNIX</td>
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<td>EET 237</td>
<td>AC Circuits, Filters and Signals</td>
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<tr>
<td>EET 238</td>
<td>AC Circuits, Filters and Signals Laboratory</td>
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<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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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.

CST 136 Object-Oriented Programming with C++ 4
CST 211 Data Structures 4
CST 229 Introduction to Grammars 4
CST 236 Software Systems Testing 4
CST 238 Graphical User Interface Programming 4
CST 276 Software Design Patterns 4
CST 320 Compiler Methods 4
CST 324 Database Systems and Design 4
CST 334 Project Proposal 1
CST 352 Operating Systems 4
CST 412 Senior Development Project 3
CST 422 Senior Development Project 3
CST 432 Senior Development Project 2
CST 415 Computer Networks 4
CST Technical electives** 9
MATH 465 Mathematical Statistics 4
WRI 327 Advanced Technical Writing 3
or
WRI 350 Documentation Development 3

Embedded Systems Engineering Technology

Degree Offered
Bachelor of Science in Embedded Systems Engineering Technology

Required Student Equipment
Successful completion of this degree requires intensive, hands-on use of computers. Therefore, all students are required to own their own computer. To ensure compatibility with campus-wide computers and networks, students should consult a department faculty member for a specification sheet. Financial aid may be available to help defray the cost of this equipment. Please consult the Financial Aid Office at Oregon Tech.

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 students’ 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.

If you want to:
• develop skills in design and implementation of firmware for embedded systems,
• expand knowledge and apply new ideas in practical design,
• gain hands-on experience in embedded system design,
• bridge the gap between software and hardware design,
• enhance your career opportunities in a variety of high demand areas of industrial applications, then the Embedded Systems Engineering Technology Program is the place for you.

Objective of the Curriculum
The goal of the Embedded Systems Program is to prepare students with the skills demanded by real-world industrial applications. Key to this process is the direct involvement of the embedded systems industries. Specific areas of preparation include:
• Embedded systems design methods—methods and techniques specific to the creation of an embedded system that integrates both software and hardware to fulfill a set of requirements.
• Software engineering methods—methods specific to development of software for embedded systems, including implementation, maintenance and testing.
• Systems software development—device driver development, multiprocessing control systems, and the software necessary to directly access and manipulate hardware.
• Architectural elements of embedded systems—methods and techniques for designing and implementing hardware components for embedded systems such as application-specific integrated circuits and System-On-a-Chip (SoC) technology.
• Real-time high-reliability and high availability processing—methods and techniques necessary for understanding, evaluating and addressing quality attributes most often associated with embedded systems such as real-time deadlines, high availability, survivability, and safety.
• Data communications—methods and techniques for developing distributed systems within embedded environments that use physical or wireless networking.

Cooperative Field Experience
The cooperative program includes work experience during the junior and senior years. The
co-op period is an employment arrangement with an employer in the area of the student’s major field with normal salary and academic credit. These arrangements are made on an individual basis and the student is under no obligation to accept permanent employment with any previous co-op employer.

Degree Requirements
The Bachelor of Science in Embedded Systems Engineering Technology requires 196 credit hours as prescribed by the curriculum outline.

Bachelor of Science in Embedded Systems Engineering Technology

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

**Freshman Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CST 102 Introduction to Computer Systems</td>
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<td>CST 162 Introduction to Digital Logic</td>
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<td>MATH 111 College Algebra</td>
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<td>PSY 201 Psychology</td>
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**Junior Year**

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<tbody>
<tr>
<td>CST 315 Embedded Sensor Interfacing and I/O</td>
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<tr>
<td>CST 337 Embedded System Architecture</td>
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<td>CST 371 Embedded Systems Development I</td>
<td>4</td>
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<td>PHY 221 General Physics with Calculus</td>
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**Second Year**

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<tr>
<td>CST 116 C++ Programming I</td>
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**Senior Year**

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<tr>
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<tr>
<td>CST 412 Senior Development Project</td>
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<td>CST 455 System On a Chip Design</td>
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<td>BUS 304 Engineering Management</td>
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<td>CST 334 Project Proposal</td>
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<td>CST 347 Real-Time Embedded</td>
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<td>Operating Systems</td>
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<td>CST 373 Embedded Systems Development II</td>
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<td>WRI 350 Documentation Development</td>
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**Fourth Year**

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<td>CST 342 Senior Development Project</td>
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<td>CST 417 Embedded Networking</td>
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<td>CST 456 Embedded System Testing</td>
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<td>MGT 345 Engineering Economy</td>
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<td>Humanities elective</td>
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**Fall**

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<td>CST 126 C++ Programming II</td>
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<td>CST 131 Computer Architecture</td>
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<tr>
<td>MATH 251 Differential Calculus</td>
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<tr>
<td>SPE 111 Fundamentals of Speech</td>
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**Winter**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CST 104 Digital Electronics II–Sequential Logic with HDL</td>
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</tr>
<tr>
<td>CST 134 Instrumentation</td>
<td>1</td>
</tr>
<tr>
<td>CST 136 Object-Oriented Programming with C++</td>
<td>4</td>
</tr>
<tr>
<td>CST 250 Computer Assembly Language</td>
<td>4</td>
</tr>
<tr>
<td>MATH 252 Integral Calculus</td>
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<td><strong>Total</strong></td>
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</table>

**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CST 204 Introduction to Microcontrollers</td>
<td>4</td>
</tr>
<tr>
<td>CST 231 Computer Design with</td>
<td>3</td>
</tr>
<tr>
<td>Programmable Logic</td>
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</tr>
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<td>CST 232 Computer Design with</td>
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<td>Programmable Logic Laboratory</td>
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<tr>
<td>EE 221 Circuits I</td>
<td>4</td>
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<tr>
<td>MATH 254N Vector Calculus I</td>
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<td><strong>Total</strong></td>
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**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CST 211 Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>CST 240 UNIX</td>
<td>3</td>
</tr>
<tr>
<td>CST 276 Software Design Patterns</td>
<td>4</td>
</tr>
<tr>
<td>EET 237 AC Circuits, Filters and Signals</td>
<td>3</td>
</tr>
<tr>
<td>EET 238 AC Circuits, Filters and Signals Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>WRI 227 Technical Report Writing</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</table>
Software Engineering Technology

Degrees Offered
Bachelor of Science in Software Engineering Technology
Associate of Engineering in Software Engineering Technology

Students who complete the curriculum requirements in Software Engineering Technology will be qualified and knowledgeable in the establishment and use of sound engineering principles (methods) in order to create software of all types that is reliable and works on real machines.

Required Student Equipment
Successful completion of this degree requires intensive, hands-on use of computers. Therefore, all students are required to own a computer. To ensure compatibility with campus-wide computers and networks, students should consult a department faculty member for a specification sheet. Financial aid may be available to help defray the cost of this equipment. Please consult the Financial Aid Office at Oregon Tech.

Career Opportunities
Bachelor of Science in Software Engineering Technology degree graduates find employment as software engineers, systems engineers, systems analysts, programmer/analysts, researchers and assistants, consultants, customer engineers, etc., responsible for the application, design, development, and implementation of software in all areas of industry, government and education.

Software engineering technologists’ career paths will be many and varied. They may concentrate on hardware-support activities such as new design/development, testing, customer service and the like. They may concentrate on software specification, design, construction and testing through implementation and maintenance.

Graduates may get involved with administrative or project management by beginning as a member of an applications development team and progressing into management. They may pursue careers in product development, marketing, sales, design, and support. Students completing the requirements for the Associate of Engineering degree should consider themselves as entry-level trainees in the careers mentioned.

High School Preparation
Coursework in computer science, mathematics, and physical science will aid students in their progress in this program.

Bachelor Program 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 alumni, 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 software development environment;
- To expose our students to cross-disciplinary educational programs;
- To provide government and high tech industry employers with graduates in software engineering and related professions.

Bachelor Program Educational Objectives
The Program Educational Objectives of Oregon Tech’s Software Engineering Technology Program are to produce graduates that:

- Use their knowledge of engineering to creatively and innovatively solve difficult computer systems problems;
- Regularly engage in exploring, learning and applying state-of-the-art hardware and software technologies to the solution of computer systems problems;
- Will be an effective software development team member that contributes innovative software design solutions to the resolution of business, scientific or government computer systems problems;
- Will communicate effectively and successfully, both individually and within multi-disciplinary teams.

Associate Program Mission
The mission of the Software Engineering Technology (SET) Associate Degree program within the Computer Systems Engineering Technology (CSET) Department at Oregon Institute of Technology is to prepare our students for entry level careers in the software industry and government by providing applied laboratory based instruction. The program is to serve a constituency consisting of our alumni, our employers and our Industrial Advisory Board. Major components of the SET program’s mission in the CSET Department are:

- To provide a new generation of Software Engineering Technology students with a solid background in computer programming;
- To enable our students to create, develop and apply knowledge within a technical software environment;
- To provide government and high tech industry employers with entry level graduates in computer programming and related professions.

Associate Program Educational Objectives
The Program Educational Objectives of Oregon Tech’s Software Engineering Technology program are to produce graduates that:

- Assist in solving computer systems problems using their knowledge of computer programming;
- Regularly engage in learning and applying state-of-the-art hardware and software technologies to the solution of computer systems problems;
- Will communicate effectively and successfully in the workplace.

Cooperative Field Experience
The cooperative program includes work experience usually during the junior and senior years. The co-op period would be an
employment arrangement with an employer in the area of the student’s major field with normal salary and academic credit. These arrangements are made on an individual basis, and the student is under no obligation to accept permanent employment with any previous cooperating employer. A student must be ready to enter the sophomore year in Software Engineering Technology to be considered for this program.

**Accreditation**

The Software Engineering Technology Programs are accredited by the Technology Accreditation Commission (TAC) 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.

**Degree Requirements**

Associate of Engineering Technology degree students must complete 98 credit hours as prescribed by the curriculum outline. The Bachelor of Science in Software Engineering Technology degree requires 186 credit hours as prescribed by the curriculum outline.

### Bachelor of Science in Software Engineering Technology Curriculum

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

#### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>CST 102</td>
<td>Introduction to Computer Systems 3</td>
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<tr>
<td>CST 162</td>
<td>Introduction to Digital Logic 4</td>
</tr>
<tr>
<td>MATH 111</td>
<td>College Algebra 4</td>
</tr>
<tr>
<td>FYS 201</td>
<td>Psychology 3</td>
</tr>
<tr>
<td>WRI 121</td>
<td>English Composition 3</td>
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<tr>
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#### Freshman Year

<table>
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<tr>
<th>Course</th>
<th>Winter Credits</th>
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<tr>
<td>CST 116</td>
<td>C++ Programming I 4</td>
</tr>
<tr>
<td>CST 130</td>
<td>Computer Organization 3</td>
</tr>
<tr>
<td>MATH 112</td>
<td>Trigonometry 4</td>
</tr>
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<td>WRI 122</td>
<td>English Composition 3</td>
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#### Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Fall Credits</th>
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<tbody>
<tr>
<td>CST 105</td>
<td>Introduction to Computer Systems III 1</td>
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<tr>
<td>CST 126</td>
<td>C++ Programming II 4</td>
</tr>
<tr>
<td>CST 131</td>
<td>Computer Architecture 3</td>
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<td>Fundamentals of Speech 3</td>
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#### Sophomore Year

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CST 136</td>
<td>Object-Oriented Programming With C++ 4</td>
</tr>
<tr>
<td>CST 250</td>
<td>Computer Assembly Language 4</td>
</tr>
<tr>
<td>MATH 252</td>
<td>Integral Calculus 4</td>
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<tr>
<td>WRI 227</td>
<td>Technical Report Writing 3</td>
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#### Junior Year

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CST 229</td>
<td>Introduction to Grammars 3</td>
</tr>
<tr>
<td>CST 316</td>
<td>Software Process Management 4</td>
</tr>
<tr>
<td>CST 324</td>
<td>Database Systems and Design 4</td>
</tr>
<tr>
<td>PHY 221</td>
<td>General Physics with Calculus 4</td>
</tr>
<tr>
<td>SPE 321</td>
<td>Small Group and Team Communication 3</td>
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<tr>
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### Junior Year

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CST 320</td>
<td>Compiler Methods 4</td>
</tr>
<tr>
<td>CST 326</td>
<td>Software Design and Implementation I 4</td>
</tr>
<tr>
<td>PHY 222</td>
<td>General Physics with Calculus 4</td>
</tr>
<tr>
<td>WRI 350</td>
<td>Documentation Development 3</td>
</tr>
<tr>
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#### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>CST 334</td>
<td>Project Proposal 1</td>
</tr>
<tr>
<td>CST 336</td>
<td>Software Design and Implementation II 4</td>
</tr>
<tr>
<td>CST 352</td>
<td>Operating Systems 4</td>
</tr>
<tr>
<td>PHY 223</td>
<td>General Physics with Calculus 4</td>
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#### Senior Year

<table>
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<tbody>
<tr>
<td>BUS 304</td>
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<tr>
<td>CST 412</td>
<td>Senior Development Project 3</td>
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<tr>
<td>CST 415</td>
<td>Computer Networks 4</td>
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#### Senior Year

<table>
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<th>Winter Credits</th>
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<tbody>
<tr>
<td>CST 422</td>
<td>Senior Development Project 3</td>
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<tr>
<td>MATH 465</td>
<td>Mathematical Statistics 4</td>
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#### Senior Year

<table>
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<tr>
<th>Course</th>
<th>Spring Credits</th>
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<tbody>
<tr>
<td>ANTH 452</td>
<td>Globalization 3</td>
</tr>
<tr>
<td>CST 432</td>
<td>Senior Development Project 2</td>
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<tr>
<td>MGT 345</td>
<td>Engineering Economy 3</td>
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</table>

* Three technical elective courses (two upper division) chosen from the following list are required. Two electives must also be CST courses (excluding CST 390 and CST 490).

The acceptable courses are: CST 204 Introduction to Microcontrollers • CST 311 Advanced Data Structures and Algorithm Analysis • CST 328 Computer Graphics • CST 338 Computer Modeling and Simulation • CST 340 Advanced UNIX • CST 405 Directed Study • CST 407 Seminar • CST 418 Data Communications and Networks • CST 420 Effective C++ and STL • CST 425 Advanced Networks and Telecommunications • CST 426 Introduction to Artificial Intelligence • CST 436 Robotics • CST 442 Advanced Computer Architecture • CST 462 Real-Time Operating Systems • CST 490 Co-op Field Practice • MATH 253N Sequences and Series • MATH 321 Applied Differential Equations I • MATH 322 Applied Differential Equations II • MATH 341 Linear Algebra I • MATH 342 Linear Algebra II • MATH 451 Numerical Methods I
**Associate of Engineering in Software Engineering Technology Curriculum**

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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>CST 102</td>
<td>Introduction to Computer Systems 3</td>
<td></td>
</tr>
<tr>
<td>CST 162</td>
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<tr>
<td>MATH 111</td>
<td>College Algebra 4</td>
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</tr>
<tr>
<td>PSY 201</td>
<td>Psychology 3</td>
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<tr>
<td>WRI 121</td>
<td>English Composition 3</td>
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</tr>
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<td><strong>Total</strong></td>
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<td>17</td>
</tr>
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| Freshman Year | Spring    |  |
|---------------|-----------| |
| CST 105       | Introduction to Computer Systems III 1 | |
| CST 126       | C++ Programming II 4 | |
| CST 131       | Computer Architecture 3 | |
| MATH 251      | Differential Calculus 4 | |
| SPE 111       | Fundamentals of Speech 3 | |
| **Total**     | 15        |  |

| Sophomore Year | Fall       |  |
|---------------|------------| |
| CST 136       | Object-Oriented Programming With C++ 4 | |
| MATH 252      | Integral Calculus 4 | |
| WRI 227       | Technical Report Writing 3 | |
| WRI 122       | Technical elective* 3 | |
| **Total**     | 17         | |

| Sophomore Year | Winter      |  |
|---------------|-------------| |
| CST 211       | Data Structures 4 | |
| CST 240       | UNIX 3 | |
| CST 276       | Software Design Patterns 4 | |
| PHY 221       | General Physics with Calculus 4 | |
| **Total**     | 15         | |

| Sophomore Year | Spring     |  |
|---------------|------------| |
| CST 223       | Concepts of Programming Languages 3 | |
| CST 236       | Software Systems Testing 4 | |
| CST 238       | Graphical User Interface Programming 4 | |
|                | Social Science elective 3 | |
|                | Elective 3 | |
| **Total**     | 17         | |

* See your advisor for acceptable elective classes.
Dental Hygiene Department

Janita Cope, Department Chair
Professor: J. Schultz
Associate Professor: J. Cope
Assistant Professors: C. Devens, P. Gates, E. Gordon S. Hopper, V. Points, P. Russell
Instructors: K. Clarke, H. Denton, P. Hendrix

Degrees Offered
Bachelor of Science in Dental Hygiene
Associate of Applied Science in Dental Hygiene

A Bachelor of Science in Dental Hygiene is offered on the Oregon Tech Klamath Falls campus and on the Chemeketa Community College campus in Salem. An Associate of Applied Science in Dental Hygiene is offered at ODS College of Dental Sciences in La Grande.

The Dental Hygiene Programs prepare students for entry into the dental hygiene profession. Upon successful completion of the program, the graduate is eligible to apply for examination and state licensure.

Accreditation
The dental hygiene curriculum is fully accredited by the American Dental Association Commission on Dental Accreditation, a specialized accrediting body recognized by the Council for Higher Education and/or the Secretary of the U.S. Department of Education. The program is recognized by the Oregon Board of Dentistry, Oregon Dental Association and the Oregon Dental Hygienists’ Association.

Program Purpose
The purpose of each program is to prepare the student for entry into the profession as a clinical dental hygienist. The Bachelor of Science Program explores expanded careers in dental hygiene in the areas of public health, research, education and administration. The bachelor degree graduate will be prepared for entry into master degree programs in dental hygiene and other related programs.

Career Opportunities
Dental hygienists are most commonly employed in private dental offices but may provide oral health care services in hospitals, nursing homes and schools. A bachelor’s degree provides additional preparation for career options such as research, public health, education, or administration. Employment opportunities exist abroad with governmental agencies, companies or in private practice.

Student Preparation
A science background is beneficial to those entering any health sciences profession. It is recommended that the student considering a career in dental hygiene 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). A limited number of seats are available in the professional courses (sophomore, junior, and senior years). Students are selected to enter the professional program through an application process.

The application deadline is April 15 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 acceptance into the dental hygiene program.

2. Applicants must have successfully completed or be in progress of completing all freshmen pre-dental hygiene courses. Completion of Introduction to Dental Hygiene (DH 100 on campus or DHE 100 online) is required by the end of spring term. All other prerequisite (freshman) courses must be completed by the end of summer term.

3. Applicants must have a minimum cumulative 2.50 GPA in previous college work.

4. Applicants must submit a Dental Hygiene Application for Admission, related forms and $75 non-refundable application fee directly to the Dental Hygiene Department by April 15 of the calendar year of enrollment. Detailed information and forms can be found on the Oregon Tech Dental Hygiene Program web page, www.oit.edu/dentalhygiene.

Program Requirements
Dental hygiene students admitted to the Dental Hygiene Program (sophomore, junior, senior years) are required to purchase background checks and drug testing. Dental hygiene students must purchase instruments and other supplies to be used during clinical practice and pay additional fees associated with dental hygiene courses.
Bachelor of Science in Dental Hygiene Curriculum

The following are required courses and recommended terms for students attending on the Klamath Falls campus. Please visit 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.

Pre-Dental Hygiene

**Freshman Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIO 200</td>
<td>Medical Terminology</td>
<td>2</td>
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<tr>
<td>BIO 231</td>
<td>Human Anatomy and Physiology I</td>
<td>4</td>
</tr>
<tr>
<td>CHE 101</td>
<td>Elementary Chemistry</td>
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<tr>
<td>CHE 104</td>
<td>Elementary Chemistry Laboratory</td>
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<tr>
<td>DH 100</td>
<td>Introduction to Dental Hygiene</td>
<td>2</td>
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<tr>
<td>MATH 111</td>
<td>College Algebra</td>
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<tr>
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**Fall**

<table>
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<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CHE 360</td>
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<tr>
<td>DH 221</td>
<td>Dental Hygiene Clinical Practice and Seminar I</td>
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</tr>
<tr>
<td>DH 225</td>
<td>Head and Neck Anatomy, Histology and Embryology</td>
<td>3</td>
</tr>
<tr>
<td>DH 240</td>
<td>Prevention I</td>
<td>3</td>
</tr>
<tr>
<td>SPE 321</td>
<td>Small Group and Team</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
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**Winter**

<table>
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<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>DH 222</td>
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<tr>
<td>DH 241</td>
<td>Prevention II</td>
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</tr>
<tr>
<td>DH 244</td>
<td>General and Oral Pathology</td>
<td>3</td>
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<td>DH 252</td>
<td>Oral Radiology I</td>
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<tr>
<td>DH 275</td>
<td>Dental Ethics</td>
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<td>DH 366</td>
<td>Dental Anatomy</td>
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**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH 223</td>
<td>Dental Hygiene Clinical Practice and Seminar III</td>
<td>3</td>
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<tr>
<td>DH 242</td>
<td>Prevention III</td>
<td>3</td>
</tr>
<tr>
<td>DH 253</td>
<td>Oral Radiology II</td>
<td>2</td>
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<tr>
<td>DH 254</td>
<td>Introduction to Periodontology</td>
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<td>DH 267</td>
<td>Emergency Procedures</td>
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<tr>
<td>DH 380</td>
<td>Community Dental Health I</td>
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**Fall**

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<tr>
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<td>Dental Hygiene Clinical Practice and Seminar IV</td>
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<td>DH 340</td>
<td>Prevention IV</td>
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<tr>
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<td>Periodontology</td>
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**Winter**

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<tbody>
<tr>
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<td>DH 341</td>
<td>Prevention V</td>
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<tr>
<td>DH 351</td>
<td>Pain Management I</td>
<td>2</td>
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<tr>
<td>DH 382</td>
<td>Community Dental Health III</td>
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<tr>
<td>WRI 227</td>
<td>Technical Report Writing</td>
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**Spring**

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<tbody>
<tr>
<td>DH 323</td>
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<td>DH 344</td>
<td>Advanced General and Oral Pathology</td>
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<td>DH 352</td>
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<td>DH 363</td>
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<td>DH 370</td>
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<td>DH 421</td>
<td>Dental Hygiene Clinical Practice and Seminar VII</td>
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<td>DH 461</td>
<td>Restorative Dentistry I</td>
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<td>DH 475</td>
<td>Dental Hygiene Research Methods I</td>
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<tr>
<td>MATH 243</td>
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<td>DH 463</td>
<td>Restorative Dentistry III (optional)</td>
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<td>DH 477</td>
<td>Dental Hygiene Research Methods III</td>
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**Winter**

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<td>DH 463</td>
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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, 197; Associate of Applied Science, 154. 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 professional courses (DH and DHE), communication courses and clinical pharmacology (CHE 360) to continue in the program.
### Associate of Applied Science in Dental Hygiene Curriculum

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

#### Pre-Dental Hygiene

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<tr>
<td>BIO 200</td>
<td>Medical Terminology</td>
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<tr>
<td>BIO 231</td>
<td>Human Anatomy and Physiology I</td>
<td>4</td>
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<tr>
<td>CHE 101</td>
<td>Elementary Chemistry</td>
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<tr>
<td>CHE 104</td>
<td>Elementary Chemistry Laboratory</td>
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<tr>
<td>DHE 100</td>
<td>Introduction to Dental Hygiene I</td>
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<tr>
<td>MATH 105</td>
<td>Collegiate Mathematics</td>
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<tr>
<td>or</td>
<td>MATH 111 College Algebra</td>
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<td>BIO 105</td>
<td>Microbiology</td>
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<td>Human Anatomy and Physiology II</td>
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<td>CHE 102</td>
<td>Elementary Chemistry</td>
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<td>CHE 105</td>
<td>Elementary Chemistry Laboratory</td>
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<td>SPE 111</td>
<td>Fundamentals of Speech</td>
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<tr>
<td>WRI 121</td>
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<tr>
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<td>Nutrition</td>
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<td>Human Anatomy and Physiology III</td>
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<tr>
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<td>CHE 106</td>
<td>Elementary Chemistry Laboratory</td>
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<tr>
<td>SOC 204</td>
<td>Introduction to Sociology</td>
<td>3</td>
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#### Professional Courses

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<td>Professions</td>
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<td>DHE 211</td>
<td>Principles of Dental Hygiene I</td>
<td>2</td>
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<tr>
<td>DHE 221</td>
<td>Dental Hygiene Clinical Practice I</td>
<td>3</td>
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<tr>
<td>DHE 225</td>
<td>Head and Neck Anatomy, Histology and Embryology</td>
<td>3</td>
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<td>DHE 252</td>
<td>Oral Radiology I</td>
<td>3</td>
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<tr>
<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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<tr>
<td>DHE 212</td>
<td>Principles of Dental Hygiene II</td>
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<td>DHE 222</td>
<td>Dental Hygiene Clinical Practice II</td>
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<tr>
<td>DHE 244</td>
<td>General and Oral Pathology</td>
<td>3</td>
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<td>DHE 253</td>
<td>Oral Radiology II</td>
<td>2</td>
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<td>DHE 275</td>
<td>Dental Ethics</td>
<td>2</td>
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<tr>
<td>DHE 282</td>
<td>Medical and Dental Emergency Procedures</td>
<td>3</td>
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<td>DHE 366</td>
<td>Dental Anatomy</td>
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<td>Dental Hygiene Clinical Practice III</td>
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<tr>
<td>DHE 233</td>
<td>Periodontology</td>
<td>3</td>
</tr>
<tr>
<td>DHE 261</td>
<td>Dental Health Education</td>
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<td>DHE 344</td>
<td>Advanced General and Oral Pathology</td>
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<tbody>
<tr>
<td>DHE 311</td>
<td>Principles of Dental Hygiene IV</td>
<td>3</td>
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<td>DHE 321</td>
<td>Dental Hygiene Clinical Practice IV</td>
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<td>DHE 333</td>
<td>Periodontal Therapy</td>
<td>3</td>
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<tr>
<td>DHE 351</td>
<td>Dental Analgesia</td>
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<td>DHE 380</td>
<td>Oral Health Planning and Care I</td>
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<td>DHE 312</td>
<td>Principles of Dental Hygiene V</td>
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<tr>
<td>DHE 320</td>
<td>Dental Materials and Chairside Assisting</td>
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<tr>
<td>DHE 322</td>
<td>Dental Hygiene Clinical Practice V</td>
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<td>DHE 381</td>
<td>Oral Health Planning and Care II</td>
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<td>DHE 323</td>
<td>Dental Hygiene Clinical Practice VI</td>
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<td>Technical Report Writing</td>
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<td>Psychology elective</td>
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<td>DHE 324</td>
<td>Dental Hygiene Clinical Practice V</td>
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<td>WRI 227</td>
<td>Technical Report Writing</td>
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### Bachelor’s Degree Completion Outreach Program

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 an online web-based distance learning program.

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.

#### Admission Procedures

1. Complete the Distance Education Application for Admission. Enclose a check for $100 payable to Oregon Institute of Technology.
3. Mail your application, check, and copy of board results to the Distance Education Office.
4. Mail official transcripts from all colleges you have attended directly to the Distance Education Office. Transfer courses will be evaluated to determine course equivalency of professional, science, and general education courses.

To apply, go to [www.oit.edu/dist](http://www.oit.edu/dist), print the Distance Education Application for Admission and Check Sheet, and submit all required information to the Distance Education Department.
Courses Granted for Licensure

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<tr>
<td>DH 100</td>
<td>Introduction to Dental Hygiene</td>
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<tr>
<td>DH 221/222/223</td>
<td>Dental Hygiene Clinical Practice and Seminar I, II, and III</td>
<td>11</td>
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<tr>
<td>DH 225</td>
<td>Head and Neck Anatomy, Histology And Embryology</td>
<td>3</td>
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<tr>
<td>DH 240/241/242</td>
<td>Prevention I, II, and III</td>
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<tr>
<td>DH 244</td>
<td>General and Oral Pathology</td>
<td>3</td>
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<tr>
<td>DH 252/253</td>
<td>Oral Radiology I and II</td>
<td>5</td>
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<tr>
<td>DH 254</td>
<td>Introduction to Periodontology</td>
<td>1</td>
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<tr>
<td>DH 267</td>
<td>Emergency Procedures</td>
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<tr>
<td>DH 275</td>
<td>Dental Ethics</td>
<td>2</td>
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<td>DH 321/322/323</td>
<td>Dental Hygiene Clinical Practice and Seminar IV, V, and VI</td>
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<td>DH 340/341</td>
<td>Prevention IV and V</td>
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<td>DH 344</td>
<td>Advanced General and Oral Pathology</td>
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<td>DH 354</td>
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<tr>
<td>DH 363</td>
<td>Dental Materials</td>
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<tr>
<td>DH 366</td>
<td>Dental Anatomy</td>
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<td>DH 380/381</td>
<td>Community Dental Health I, II</td>
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<td>DH 421/422/423</td>
<td>Dental Hygiene Clinical Practice and Seminar VII, VIII, IX</td>
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Additional required courses (Transfer or Oregon Tech)

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<td>BIO 205</td>
<td>Nutrition</td>
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<td>BIO 231</td>
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<tr>
<td>BIO 232</td>
<td>Anatomy and Physiology II</td>
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<td>Anatomy and Physiology III</td>
<td>4</td>
</tr>
<tr>
<td>CHE 101/104</td>
<td>Elementary Chemistry/Laboratory</td>
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<tr>
<td>CHE 102/105</td>
<td>Elementary Chemistry/Laboratory</td>
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</tr>
<tr>
<td>CHE 103/106</td>
<td>Elementary Chemistry/Laboratory</td>
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<tr>
<td>CHE 360</td>
<td>Clinical Pharmacology for the Health Professions</td>
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<tr>
<td>MATH 105</td>
<td>Collegiate Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 111</td>
<td>College Algebra</td>
<td>4</td>
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<tr>
<td>SOC 204</td>
<td>Introduction to Sociology</td>
<td>3</td>
</tr>
<tr>
<td>SPE 111</td>
<td>Fundamentals of Speech</td>
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<tr>
<td>WRI 121</td>
<td>English Composition</td>
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<tr>
<td>WRI 122</td>
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<tr>
<td>WRI 123</td>
<td>English Composition</td>
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<tr>
<td>SPE 227</td>
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* Credits may be granted for additional specialty licensure exams.

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 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.

Oregon Tech Degree Completion Courses

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<td>BUS 317</td>
<td>Health Care Management</td>
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<tr>
<td>BUS 331</td>
<td>Personal Finance</td>
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<tr>
<td>DH 351</td>
<td>Pain Management I*</td>
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<tr>
<td>DH 352</td>
<td>Pain Management II*</td>
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<tr>
<td>DH 401</td>
<td>Overview of Advanced Dental Hygiene</td>
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<tr>
<td>DH 453</td>
<td>Current Issues in Dental Hygiene</td>
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<td>MATH 243</td>
<td>Introductory Statistics</td>
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<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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<td>Elective approved by advisor</td>
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</tr>
</tbody>
</table>
Electrical Engineering and Renewable Energy Department

Cristina Crespo, Department Chair
Bruce Barnes, Program Director, Electrical Engineering in Klamath Falls
Cristina Crespo, Program Director, Electronics Engineering Technology in Wilsonville & Portland Westside
Frank Rytkonen, Program Director, Renewable Energy Engineering in Wilsonville

Jamie Zipay, Program Director, Renewable Energy Engineering in Klamath Falls
Professor: J. Zipay
Associate Professors: M. Aboy, P. Dingman, S. Petrovic

Electrical Engineering

Degrees Offered
Bachelor of Science in Electrical Engineering (Klamath Falls)
Bachelor of Science in Electrical Engineering and Bachelor of Science in Renewable Energy Engineering (Concurrent Degree)

Career Opportunities
Jobs for electrical engineers are some of the most prevalent worldwide in the discipline of engineering. This demand is forecast to continue. Consider the wide range of items that are produced by electrical and electronics engineers, including computers, digital cameras, cell phones, iPods, TVs, stereos, global positioning sensors, laser range finders, microwave ovens, night-vision sensors, electronic fuel injection, avionics, robotics, biomedical instruments, wireless telecommunications, and much more. An electrical engineer designs, builds, analyzes, tests, integrates, markets, and field services all of these products.

Electrical engineering at Oregon Tech is concerned with theory, concepts, and practices of applied electrical and electronics engineering. Emphasis is placed on the practical application of engineering knowledge. As a result, the electrical engineering graduate possesses a combination of theoretical and practical understanding and requires minimal on-the-job training. The Oregon Tech BSEE graduate is also well prepared to attend graduate school. Graduates of the Electrical Engineering Program fulfill a wide range of functions within industry. Bachelor degree graduates are currently placed in positions such as component and system design, field engineering, manufacturing engineering, sales or market engineering, test engineering, and quality control engineering.

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, semiconductor companies, and automated electronic-controlled processing companies.

Objectives
The objectives of the Electrical Engineering Program are:
1. To provide graduates that possess the engineering design and laboratory skills needed in careers within broad-based electrical, electronics, computer, semiconductor, optoelectronic, renewable energy and biomedical fields.
2. To provide graduates that are technically competent for careers in the field of electrical engineering. They will have the ability to solve engineering problems in new and emerging disciplines by applying principles of mathematics, science and engineering.
3. To provide graduates that possess the analytical skills, written and oral communication skills, critical thinking and problem-solving abilities so that they may enjoy both vertical and horizontal career mobility in engineering fields.
4. To provide graduates that appreciate the need of continuing education in electrical engineering, optoelectronics, biomedical engineering, and related disciplines after graduation and have an awareness of professional and ethical responsibilities of their career disciplines.

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 very helpful.

Students entering the Electrical Engineering Program by transfer are requested to contact the department concerning transfer of technical coursework. Those community college students completing the electrical engineering transfer program should receive full credit for the first two years of EE courses. Those students with an Associate Degree in Electronics Engineering Technology will most likely have to take two or more “bridging” courses and EE 225 (Circuits III-Laplace Transforms and Applications) in order to have all the lower-division requirements of the EE Program completed.

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.
Degree Requirements
A rigorous curriculum in Electrical Engineering requires 183 term hours of credit, taking approximately four years to complete. Students in the EE Program must earn a grade of “C” or better in all EE courses that are prerequisites for another EE course.

Engineering Electives for Specific Emphases within BSEE Curriculum
Students may choose from the following list for their 9 credits of engineering elective courses in a specific emphasis. Transfer students may use other courses to satisfy an engineering elective. All engineering electives require the approval of a student’s academic advisor. All courses may not be offered every year.

Renewable Energy Emphasis
REE 243 Electrical Power 4
REE 412 Photovoltaic Systems 3
REE 413 Electric Power Conversions Systems 3
Advisor Approved REE Courses 3/4

Electrical Power Emphasis
REE 243 Electrical Power 4
REE 453 Power System Analysis 3
REE 454 Power System Protection and Control 3
Advisor Approved REE Courses 3/4

General EE Electives
EE 307 Seminar 3/4
EE 407 Seminar 3/4
EE 419 Power Electronics 4
EE 421 Analog Integrated-Circuit Design 5
EE 425 Wireless Communication 4
EE 456 Control System Design 4

Bachelor of Science in Electrical Engineering Curriculum

| Freshman Year | Fall | | Winter |
|---------------|------|-------------------------------|
| CHE 201       | General Chemistry            | 3 |  |
| CHE 204       | General Chemistry Laboratory | 1 |  |
| ENGR 101      | Introduction to Engineering I | 2 |  |
| MATH 251      | Differential Calculus        | 4 |  |
| WRI 121       | English Composition          | 3 |  |
| **Total**     | **13**                      | | |
| Freshman Year | Spring                      | |  |
| EE 131        | Digital Electronics I        | 4 |  |
| MATH 254N     | Vector Calculus I            | 4 |  |
| PHY 222       | General Physics with Calculus| 4 |  |
| SPE 111       | Fundamentals of Speech       | 3 |  |
| **Total**     | **15**                      | | |
| Sophomore Year | Fall | | Winter |
| EE 133        | Digital Electronics II       | 4 |  |
| EE 221        | Circuits I                   | 4 |  |
| PHY 223       | General Physics with Calculus| 4 |  |
| **Total**     | **15**                      | | |
| Sophomore Year | Winter | |  |
| CST 116       | C++ Programming I            | 4 |  |
| EE 223        | Circuits II                  | 4 |  |
| MATH 321      | Applied Differential Equations I | 4 |  |
| MATH 341      | Linear Algebra I             | 3 |  |
| **Total**     | **15**                      | | |
| Sophomore Year | Spring | |  |
| EE 225        | Circuits III                 | 4 |  |
| MATH 253N     | Sequences and Series         | 4 |  |
| WRI 227       | Technical Report Writing     | 3 |  |
| **Total**     | **17**                      | | |
| Junior Year   | Fall | | Winter |
| EE 321        | Electronics I                | 5 |  |
| EE 331        | Digital System Design with HDL| 4 |  |
| EE 341        | Electricity and Magnetism with Transmission Lines | 4 |  |
| MGT 345       | Engineering Economy          | 3 |  |
| **Total**     | **16**                      | | |

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

| Junior Year | Fall | | Winter |
|-------------|------|-------------------------------|
| EE 323      | Electronics II               | 5 |  |
| EE 333      | Microcontroller Engineering  | 4 |  |
| EE 343      | Solid-State Electronic Devices | 3 |  |
| WRI 327     | Advanced Technical Writing   | 3 |  |
| **Total**   | **15**                      | | |
| Senior Year | Fall | | Winter |
| EE 411      | Senior Project I             | 2 |  |
| EE 431      | Digital Signal Processing    | 3 |  |
| SPE 321     | Small Group and Team         | 3 |  |
| EE 423      | CMOS Digital Integrated Circuit Design | 5 |  |
| MATH 465    | Mathematical Statistics      | 4 |  |
| **Total**   | **14**                      | | |
| Senior Year | Winter                      | |  |
| EE 401      | Communication Systems        | 5 |  |
| EE 413      | Senior Project III           | 2 |  |
| **Total**   | **13**                      | | |

* Or advisor approved 4 credit Math/Science Elective.
** Requires Advisor Approval
Bachelor of Science in Electrical Engineering (Post-Baccalaureate)

Oregon Tech Bachelor of Science in Electronics Engineering Technology graduates may complete 37 additional credits to receive a Bachelor of Science in Electrical Engineering (post-baccalaureate). Students who have completed an ABET accredited bachelor's in Electronics Engineering Technology from another institution must complete a minimum of 45 Oregon Tech credits to receive the BS in Electrical Engineering from Oregon Tech.

Mathematics and Science
- MATH 253N Series and Sequences 4
- MATH 341 Linear Algebra I 3
- MATH 465 Mathematical Statistics 4
- CHE 201 General Chemistry 3
- CHE 204 General Chemistry Laboratory 1

Required Electrical Engineering
- EE 341 Electricity and Magnetism with Transmission Lines 4
- EE 343 Solid-State Electronic Devices 3
- EE 431 Digital Signal Processing 3

Mathematics or Engineering Technical Elective
- Technical elective (MATH, EE, REE) 3

Engineering Technical Electives
- Technical elective (EE, REE)* 3
- Technical elective (EE, REE)* 3
- Technical elective (EE, REE)* 3

Total if prior BSEE degree awarded by Oregon Tech 37

Additional credits needed for students who completed a BSEE degree from another institution:
- Technical elective (EE, REE)* 4
- Technical elective (EE, REE)* 4
- Total 45

* Advisor approval required. Approved technical electives can be EE (Electrical Engineering) or REE (Renewable Energy Engineering) courses for students wanting a BSEE degree with an emphasis in Energy Engineering.

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 dual 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 BSEE degree program (or 4.5 years total by taking courses in Summer term). 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.

- CHE 202/205 General Chemistry* 4
- MECH 323 Heat Transfer I 3
- ENGR 26X Programming for Engineers 3
- ENGR 211 Statics 4
- ENGR 355 Thermodynamics 3
- MECH 318 Fluid Mechanics 4
- REE 243 Electrical Power** 4
- REE 253 Electromech. Energy Conv. 3
- REE 3XX REE Elective 3
- REE 3XX REE Elective 3
- REE 412 Photovoltaic Systems 3
- REE 463 Energy System Instrumentation 3
- REE 4XX REE Elective 3
- EE 419 Power Electronics** 4
- EE 456 Control System Design** 4
- HIST 356 History of Energy or
- HIST 357 History of the Electric Grid 3

* Math/Science elective
** EE Elective

Total credit hours are 55 with 16 credit hours that can be applied as EE elective choices.
Electronics Engineering Technology

Degrees Offered
Bachelor of Science in Electronics Engineering Technology (Wilsonville Campus & Portland Westside)

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.

Career Opportunities
The program is designed to prepare graduates and lifelong learning by engaging in professional and/or graduate education in order to stay current in their field and achieve continued professional growth.

Student Preparation
Oregon Tech's Portland campus offers a degree program 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 B.S. degree in Electronics Engineering Technology program by transfer are requested to contact the EET Program Director concerning transfer of technical coursework.

Our BSEET program has articulation and transfer agreements with the Electronics, Microelectronics, and Renewable Energy Technology programs at Portland Community College, Clackamas Community College, Chemeketa Community College, and Columbia Gorge Community College. 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 that students have completed Calculus II prior to transferring to the BSEET program at Oregon Tech, since Integral Calculus is a pre-requisite for most upper-division BSEET courses.

We encourage students to start the advising process with Oregon Tech right after they complete the first year of their AAS degree.

Objectives
The objectives of the Electronics Engineering Technology Program are:
1. The graduates of the program will possess a strong technical background as well as analytical and problem solving skills, and will contribute in a variety of technical roles within the electronics and high-tech industry. BSEET graduates are expected to be employed as test engineers, characterization engineers, applications engineers, field engineers, hardware engineers, process engineers, and similar engineering technology positions within this industry.
2. The graduates of the program will be working as effective team members with excellent oral and written communication skills, assuming technical and managerial leadership roles throughout their career.
3. The graduates of the program will be committed to professional development and lifelong learning by engaging in professional and/or graduate education in order to stay current in their field and achieve continued professional growth.

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, TriQuint, MSE and Intel.

Accreditation
The Electronics Engineering Technology program is accredited by the Technology Accreditation Commission (TAC) 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.

Degree Requirements
A rigorous curriculum in Electronics Engineering Technology requires 187 credit hours, taking a full-time student approximately four years to complete.
Bachelor of Science in Electronics Engineering Technology 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 EET program director for a customized curriculum tailored to their individual circumstances.

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 Portland Community College, Clackamas Community College, Chemeketa Community College and Columbia Gorge Community College. 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 must 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. The minimum requirements to start the upper-division sequence at Oregon Tech are completion of the AAS degree and MATH 252.

Below is a list of courses to satisfy the requirements for the first two years of the degree.

### Communication (12 credits)
- SPE 111 Fundamentals of Speech 3
- WRI 121 English Composition 3
- WRI 122 English Composition 3
- WRI 227 Technical Report Writing 3

### General Education (12 credits)
- Humanities elective 6
- Social Science elective 6

### Mathematics and Science (31 credits)
- MATH 111 College Algebra 4
- MATH 112 Trigonometry 4
- MATH 251 Differential Calculus 4
- MATH 252 Integral Calculus 4
- PHY 221 General Physics with Calculus 4
- PHY 222 General Physics with Calculus 4
- PHY 223 General Physics with Calculus 4
- Math/Science elective 3

### Electronics (36 credits)
- EET 215 Digital Circuits I 4
- EET 216 Digital Circuits II 4
- EET 217 Electric Circuits I 4
- EET 218 Electric Circuits II 4
- EET 219 Semiconductor Devices and Amplifiers 4
- 200-level Technical electives* 16

### Programming (4 credits)
- CST 116 C++ Programming I 4

### Program Courses

#### Sophomore Year

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<tr>
<th>Course</th>
<th>Credits</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>MATH 254N Vector Calculus I</td>
<td>4</td>
<td>Summer</td>
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<tr>
<td>MATH 321 Applied Differential Equations I</td>
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<thead>
<tr>
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<tr>
<td>EE 320 Advanced Circuit and Systems Analysis</td>
<td>5</td>
<td>Fall</td>
</tr>
<tr>
<td>EE 321 Electronics I</td>
<td>5</td>
<td>Total 13</td>
</tr>
<tr>
<td>MGT 345 Engineering Economy</td>
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<thead>
<tr>
<th>Course</th>
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<tr>
<td>EE 323 Electronics II</td>
<td>5</td>
<td>Winter</td>
</tr>
<tr>
<td>EE 333 Microcontroller Engineering</td>
<td>4</td>
<td>Total 12</td>
</tr>
<tr>
<td>ENGR 267 Engineering Programming</td>
<td>3</td>
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<th>Term</th>
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<td>EE 325 Electronics III</td>
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<tr>
<td>EE 335 Advanced Microcontroller Engineering</td>
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<th>Course</th>
<th>Credits</th>
<th>Term</th>
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<tbody>
<tr>
<td>EE 331 Digital System Design with HDL</td>
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<td>Fall</td>
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<tr>
<td>ENGR 465 Capstone Project</td>
<td>2</td>
<td>Total 12</td>
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<tr>
<td>Technical elective *</td>
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<td></td>
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<tr>
<td>Social Science elective</td>
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<tr>
<th>Course</th>
<th>Credits</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 430 Linear Systems and Digital Signal Processing</td>
<td>5</td>
<td>Winter</td>
</tr>
<tr>
<td>EE 432 Advanced Digital System Design with HDL</td>
<td>4</td>
<td>Total 14</td>
</tr>
<tr>
<td>ENGR 465 Capstone Project</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Humanities elective</td>
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<tr>
<th>Course</th>
<th>Credits</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>EE 401 Communication Systems</td>
<td>5</td>
<td>Spring</td>
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<tr>
<td>ENGR 465 Capstone Project</td>
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<td>Total 13</td>
</tr>
<tr>
<td>Social Science elective</td>
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<td></td>
</tr>
<tr>
<td>Elective</td>
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</table>

* See an advisor or the program director for a list of appropriate courses.
Renewable Energy Engineering

Degree Offered
Bachelor of Science in Renewable Energy Engineering
Master of Science in Renewable Energy Engineering

Program Educational Objectives
The department offers a bachelor’s degree in renewable energy engineering. Graduates from this program will:
1. Excel as professionals in the various fields of energy engineering.
2. Be known for their commitment to lifelong learning, social responsibility, and professional and ethical responsibilities in implementing sustainable engineering solutions.
3. Excel in critical thinking, problem solving and effective communication.

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, ClearEdge Power, Jacobs Engineering, Power Engineers, and Iberdrola Renewables.

Bachelor of Science
A Bachelor of Science in Renewable Energy Engineering, BSREE, is offered by both Oregon Institute of Technology’s Wilsonville and Klamath Falls campuses. A program that accommodates both full-time and part-time students is offered in Wilsonville. A conventional four-year, day-time delivery program is offered in Klamath Falls.

The baccalaureate renewable energy engineering degree program prepares students for the challenges of designing, promoting and implementing sustainable energy engineering in society’s 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 tradition resources, societies have been forced to re-think and re-develop their energy infrastructures. Renewable energy resources include solar thermal collectors, photovoltaics, ground-source heat pumps, geothermal resources, hydro-electric power, wind power, tidal and wave power, biofuels and fuel cells. Oregon Tech’s Bachelor of Science in Renewable Energy Engineering prepares students for success in these rapidly developing fields.

The baccalaureate renewable energy engineering degree 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.

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

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.

Degree Requirements
The Bachelor of Science in Renewable Energy Engineering is a rigorous curriculum that requires approximately four years to complete. See the general education requirements for a bachelor’s degree listed in the Academic Policies section of the catalog.

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.

A minimum of 182 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 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.
## Bachelor of Science in Renewable Energy Engineering Curriculum

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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
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<tbody>
<tr>
<td>CHE 201</td>
<td>General Chemistry</td>
</tr>
<tr>
<td>CHE 204</td>
<td>General Chemistry Laboratory</td>
</tr>
<tr>
<td>ENGR 102</td>
<td>Introduction to Engineering I*</td>
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<tr>
<td>MATH 251</td>
<td>Differential Calculus</td>
</tr>
<tr>
<td>WRI 121</td>
<td>English Composition</td>
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<td><strong>Total</strong></td>
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**Sophomore Year**

<table>
<thead>
<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>CHE 202</td>
</tr>
<tr>
<td>CHE 205</td>
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<tr>
<td>ENGR 102</td>
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<tr>
<td>MATH 252</td>
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<tr>
<td>PHY 221</td>
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<td>WRI 122</td>
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**Junior Year**

<table>
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<tr>
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<tbody>
<tr>
<td>EE 321</td>
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<td>MATH 361</td>
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<td>MECH 318</td>
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**Senior Year**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>EE 343</td>
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<tr>
<td>ENGR 355</td>
</tr>
<tr>
<td>WRI 327</td>
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<table>
<thead>
<tr>
<th>Winter</th>
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<tbody>
<tr>
<td>MECH 323</td>
</tr>
<tr>
<td>REE 331</td>
</tr>
<tr>
<td>SPE 321</td>
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**Freshman Year**

<table>
<thead>
<tr>
<th>Winter</th>
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</thead>
<tbody>
<tr>
<td>CHE 260</td>
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<tr>
<td>EE 221</td>
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<tr>
<td>MATH 321</td>
</tr>
<tr>
<td>PHY 223</td>
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**Sophomore Year**

<table>
<thead>
<tr>
<th>Winter</th>
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<tbody>
<tr>
<td>EE 223</td>
</tr>
<tr>
<td>ENGR 211</td>
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<tr>
<td>ENGR 266</td>
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<td>HIST 356</td>
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**Junior Year**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>REE 439</td>
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<td>REE 421</td>
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**Senior Year**

<table>
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<tr>
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<tbody>
<tr>
<td>EE 456</td>
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<tr>
<td>REE 413</td>
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<tr>
<td>REE 455</td>
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<tr>
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</tr>
</tbody>
</table>

### Renewable Energy Engineering Electives

- **EE 347** Digital Logic
- **REE 344** Nuclear Energy
- **REE 345** Wind Power
- **REE 346** Biofuels and Biomass
- **REE 347** Hydroelectric Power
- **REE 348** Solar Thermal Energy Systems
- **REE 307/407** Independent Study/Special Topics
- **REE 451** Geothermal Energy and Ground-Source Heat Pumps
- **REE 465** Renewable Energy Transportation Systems

* With advisor approval students may take REE 201 in place of ENGR 101 and ENGR 102.
** Advisor approval required

### Concurrent Degree in Environmental Sciences

Renewable Energy Engineering students have the opportunity to earn concurrent degrees in Renewable Energy Engineering and Environmental Sciences. The additional degree requires 49 credits in Environmental Sciences courses, which can be taken concurrent to Renewable Energy Engineering courses or 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. 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.

- **BIO 111** Introduction to Environmental Sciences | 4
- **BIO 211** Principles of Biology | 4
- **BIO 212** Principles of Biology | 4
- **BIO 213** Principles of Biology | 4
- **ENV 225** Riparian Assessment Methods | 1
- **BIO 327** General Ecology | 4
- **BIO 434** Data Analysis Methods | 4
- **MATH 362** Statistical Methods II | 4
- **BIO 484** Sustainable Human Ecology | 4
- **CHE 223** General Chemistry* | 5
- **CHE 235** Streamwater Chemistry and Sampling | 3
- **CHE 331** Organic Chemistry I | 4
- **ENV 314** Environmental Management and Restoration | 3
**The Master of Science in Renewable Energy Engineering (MSREE)**

The Master of Science in Renewable Energy Engineering (MSREE) program is offered at Oregon Tech-Wilsonville campus. 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.

**Student Preparation**

Students should be prepared to start graduate academic work. Typically, this means the successful new student has:

1. A baccalaureate degree in engineering, the physical sciences (e.g., physics, chemistry), or a related technical discipline
2. Evidence of 1) potential for graduate academic work, 2) success or potential for success in industry, and 3) 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.

**Master of Science 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.
Geomatics Department

Jack Walker, Department Chair
Professors: J. Ritter, J. Walker
Assistant Professor: M. Marker
Instructor: M. Duryea

Degree Offered
Bachelor of Science in Geomatics with options in:
Surveying
Geographic Information Systems

Minor Offered
Geographic Information Systems
Surveying

Geomatics is the modern scientific term referring to an integrated approach to the measurement, analysis and management of spatial data. Geomatics employs advanced technologies such as Geographic Information Systems (GIS), the Global Positioning System (GPS), digital photogrammetry, digital total stations, and satellite remote sensing to create a detailed but understandable picture of the Earth's physical features and the built environment. Geomatics encompasses disciplines that depend on geo-referenced spatial data, including surveying, engineering, cartography, land information management, geodesy, and remote sensing.

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 Objectives
The bachelor in Geomatics Program options have the following objectives:
1. Provide students with a broad foundation in major geomatics disciplines.
2. Prepare students to function effectively on multidisciplinary teams.
3. Prepare graduates to enter into professional practice.
4. Prepare graduates to become licensed or certified professionals.

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. Students lacking this preparation typically require additional time for degree completion.

Degree Requirements
A minimum of 177 term hours must be completed for the Surveying option, of which 77 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.

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 sufficient 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. The program rigor is similar to a traditional engineering program; however, geomatics courses replace the traditional engineering core subjects.

Cooperative Education
Geomatics students may, upon completion of the freshman year, apply for student career experience programs (SCEP) with the U.S. Bureau of Land Management, Bonneville Power Administration, U.S. Forest Service, or other appropriate 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 (CE-COP), 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 CLSA, PLSO, LSAW, WESTFED, ACSM, and other organizations. BLM SCEP students may be eligible for additional funding to cover books and tuition.

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. Geomatics provides the opportunity to work primarily outdoors, exclusively in an office, or in some combination of the two. Geomatics attracts individuals who enjoy working indoors with computers, advanced technology, and high-tech instruments.

Accreditation
The Geomatics Program (surveying option) is accredited by the Applied Science Accreditation Commission (ASAC) 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, Surveying Option
Curriculum
Required courses and recommended terms during which they should be taken:

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>GME 161</td>
<td>Plane Surveying I</td>
</tr>
<tr>
<td>MATH 112</td>
<td>Trigonometry</td>
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<tr>
<td>WRI 121</td>
<td>English Composition</td>
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<td>Social Science elective</td>
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<table>
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<tbody>
<tr>
<td>CIV 112</td>
<td>Engineering Graphics</td>
</tr>
<tr>
<td>GME 175</td>
<td>Computations and Plating</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Differential Calculus</td>
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<tbody>
<tr>
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<td>Geographic Information Systems</td>
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<tr>
<td>GME 162</td>
<td>Plane Surveying II</td>
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<tr>
<td>MATH 252</td>
<td>Integral Calculus</td>
</tr>
<tr>
<td>SPE 111</td>
<td>Fundamentals of Speech</td>
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<table>
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<tr>
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<tbody>
<tr>
<td>GME 163</td>
<td>Route Surveying</td>
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<tr>
<td>GME 241</td>
<td>Boundary Law I</td>
</tr>
<tr>
<td>MATH 254N</td>
<td>Vector Calculus I</td>
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<td>PHY 221</td>
<td>General Physics with Calculus</td>
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<table>
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<tbody>
<tr>
<td>GME 242</td>
<td>Land Descriptions and Cadastre</td>
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<tr>
<td>GME 264</td>
<td>Digital Design for Surveying</td>
</tr>
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<td>PHY 222</td>
<td>General Physics with Calculus</td>
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<tbody>
<tr>
<td>GME 372</td>
<td>Subdivision Planning and Plating</td>
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<td>MATH 361</td>
<td>Statistical Methods I</td>
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<td>MIS 275</td>
<td>Introduction to Relational Databases</td>
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<td>PHY 223</td>
<td>General Physics with Calculus</td>
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<tbody>
<tr>
<td>GME 343</td>
<td>Boundary Surveys</td>
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<tr>
<td>MIS 118</td>
<td>Programming Fundamentals</td>
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<td>WRI 327</td>
<td>Advanced Technical Writing</td>
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<td>Science elective</td>
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<table>
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<tr>
<th>Junior Year</th>
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<tbody>
<tr>
<td>GME 316</td>
<td>Geospatial Vector Analysis I</td>
</tr>
<tr>
<td>GME 466</td>
<td>Boundary Law II</td>
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<tr>
<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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<td>GME/GIS elective</td>
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<td>Math elective*</td>
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<tbody>
<tr>
<td>BUS 226</td>
<td>Business Law</td>
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<tr>
<td>GME 351</td>
<td>Construction and Engineering Surveying</td>
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<tr>
<td>GME 444</td>
<td>Adjustment by Least Squares</td>
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<tr>
<td>MGT 345</td>
<td>Engineering Economics</td>
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<tbody>
<tr>
<td>GME 425</td>
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<td>GME 451</td>
<td>Geodesy</td>
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<tbody>
<tr>
<td>GME 434</td>
<td>Advanced Geographic Information Systems</td>
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<tr>
<td>GME 452</td>
<td>Map Projections</td>
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<td>GME 454</td>
<td>GNSS Surveying</td>
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<th>Spring</th>
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<tbody>
<tr>
<td>GME 468</td>
<td>Geomatics Practicum</td>
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<td>Social Science elective</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

* 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.
** BUS 304 or BUS 356 recommended.

Note: Humanities and Social Science electives must be approved by the department.

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 geographic information. Although the management of such information often times requires the application of advanced RDBMS techniques, the ability to see a project through to completion requires fundamental project management skills as well. The analysis of geodatasets is predicated on a firm understanding of spatial reference/coordinate systems, topological relationships, and statistical methods. Techniques for displaying geographic information take various forms such as maps, geographic datasets, and data models. Students graduating from this course of study will understand how to manipulate geographically based data in order to solve geospatial problems.

Students learn in a project-based environment how 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 has been, and 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 spatial 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.

Bachelor of Science in Geomatics, Geographic Information Systems (GIS) Option
Curriculum
Required courses and recommended terms during which they should be taken:

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Junior Year</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS 105</td>
<td>The Digital Earth</td>
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<td>GIS 205</td>
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<tr>
<td>GME 161</td>
<td>Plane Surveying I</td>
<td>4</td>
<td>GIS 352</td>
</tr>
<tr>
<td>MATH 111</td>
<td>College Algebra</td>
<td>4</td>
<td>SPE 321</td>
</tr>
<tr>
<td>WRI 121</td>
<td>English Composition</td>
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<td>Math elective*</td>
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<th>Winter</th>
<th>Junior Year</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>CIV 112</td>
<td>Engineering Graphics</td>
<td>2</td>
<td>BUS 226</td>
</tr>
<tr>
<td>GIS 105</td>
<td>Map and Compass/GPS</td>
<td>1</td>
<td>GIS 452</td>
</tr>
<tr>
<td>GME 175</td>
<td>Computations and Plotting</td>
<td>4</td>
<td>MGT 345</td>
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<tr>
<td>MATH 112</td>
<td>Trigonometry</td>
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<td>WRI 122</td>
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<td><strong>Total</strong></td>
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<th>Fall</th>
<th>Senior Year</th>
<th>Fall</th>
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</thead>
<tbody>
<tr>
<td>GIS 306</td>
<td>Geospatial Raster Analysis</td>
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<td>GME 425</td>
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<td>GME 241</td>
<td>Boundary Law I</td>
<td>3</td>
<td>GME 451</td>
</tr>
<tr>
<td>MATH 252</td>
<td>Integral Calculus</td>
<td>4</td>
<td>WRI 327</td>
</tr>
<tr>
<td>PHY 221</td>
<td>General Physics with Calculus</td>
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<td>Humanities elective</td>
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<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td>Social Science elective</td>
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<thead>
<tr>
<th>Sophomore Year</th>
<th>Winter</th>
<th>Senior Year</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>GME 242</td>
<td>Land Descriptions and Cadastre</td>
<td>3</td>
<td>GME 456</td>
</tr>
<tr>
<td>GIS 316</td>
<td>Geospatial Vector Analysis I</td>
<td>4</td>
<td>GME 452</td>
</tr>
<tr>
<td>MATH 254</td>
<td>Vector Calculus I</td>
<td>4</td>
<td>GME 455</td>
</tr>
<tr>
<td>PHY 222</td>
<td>General Physics with Calculus</td>
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<td>Humanities elective</td>
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<th>Sophomore Year</th>
<th>Spring</th>
<th>Senior Year</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS 426</td>
<td>Geospatial Vector Analysis II</td>
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<td>GME 468</td>
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<tr>
<td>MATH 361</td>
<td>Statistical Methods I</td>
<td>4</td>
<td>Business elective (upper-division)*</td>
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<td>MIS 275</td>
<td>Introduction to Relational Databases</td>
<td>3</td>
<td>Humanities elective</td>
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<td>PHY 223</td>
<td>General Physics with Calculus</td>
<td>4</td>
<td>Science elective</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>Total</strong></td>
<td>14</td>
</tr>
</tbody>
</table>

* 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.
** BUS 304 or BUS 356 recommended.

Note: Humanities and Social Science electives must be approved by the department.
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 21 credits taken from the following GIS course listing.

Requirements of Minor
GIS 103 The Digital Earth 2
GME 134 Geographic Information Systems 3

Elective Courses: 16 credits required
GIS 306 Geospatial Raster Analysis 4
GIS 316 Geospatial Vector Analysis I 4
GIS 332 Customizing the GIS Environment I 4
GIS 407 GIS Practicum 4
GIS 426 Geospatial Vector Analysis II 4
GIS 432 Customizing the GIS Environment II 4
GIS 446 GIS Database Development 4

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
GME 134 Geographic Information Systems 3
GME 162 Plane Surveying 4
GME 241 Boundary Law 3
GME 242 Legal Descriptions & Cadastre 3
GME 264 Digital Design for Surveying 2
GME 343 Boundary Surveys 4

Elective Courses: 8 credits required
GME 163 Route Surveying 5
GME 351 Construction and Engineering Surveying 4
GME 372 Subdivision Planning and Platting 4
GME 425 Remote Sensing 4
GME 444 Adjustment by Least Squares 4
GME 451 Geodesy 4
GME 452 Map Projections 3
GME 455 GNSS Surveying 4
GME 466 Boundary Law II 2

Notes:
1 CIV 415 will substitute for GME 264.
2 CIV 371 will substitute for the GME 163 prerequisite.
3 Required course for GIS majors.
4 MATH 221 will substitute for the GME 175 prerequisite.
Humanities and Social Sciences Department

Lynda Baker, Department Chair
Alishia Huntoon, Program Director and Curriculum Coordinator, Applied Psychology
Maria Lynn Kessler, Extern Coordinator, Applied Psychology
Lynda Baker, Curriculum Coordinator, Humanities and Social Sciences

Professors: L. Baker, M. Clark, M. Kessler, R. Luppi, M. Neupert
Associate Professor: A. Huntoon, L. Dubray
Assistant Professors: J. Becnel, R. Madden, J. Neighbours

Degrees Offered
Bachelor of Science in Applied Psychology

Minors Offered
International Relations Psychology

Module Offered
Oregon Transfer (OTM)

The Humanities and Social Sciences Department offers a wide variety of classes 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.

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.

International Relations Minor
The International Relations Minor provides an interdisciplinary grounding in the political, economic, and cultural factors that influence human activities across national boundaries in today's changing global environment. The minor offers integrated courses in social science, humanities, business, and communications.

This Oregon Tech offering is based upon certain academic studies and employer recommendations for the basic preparation of students seeking careers with multinational corporations, banking, the U.S. government, international organizations, and the media. The minor prepares students, both technical and non-technical, for positions that require a basic understanding of international politics and business, intercultural communication, and global cultural diversity.

Enrollment in the minor is through the Humanities and Social Sciences Department. For more information, contact the department chair or your advisor.

Requirements of the Minor

Required lower-division courses (6 credits):
- COM 205 Intercultural Communication
- PSCI 250 Introduction to World Politics

Lower-division electives (3 credits)
Select one of the following:
- GEOG 106 Cultural Geography I
- GEOG 107 Cultural Geography II
- GEOG 108 Cultural Geography III

Required upper-division courses (9 credits)
- PSCI 326 World Politics in Transition
- PSCI 355 International Conflict in the 20th Century
- PSCI 497 United States Foreign Policy

Upper-division electives (6 credits)
Select any two of the following:
- ANTH 452 Globalization
- BUS 308 Principles of International Business
- COM 320 Advanced Intercultural Communication
- ENG 381 Contemporary World Literature
- HIST 392 Modern Asia

All courses must be completed with grade “C” or better.

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):
     - 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
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.
Applied Psychology

Alishia Huntoon, Program Director
Alishia Huntoon, Externship Coordinator
Participating Faculty: A. Huntoon, M. Kessler, J. Neighbours

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 a variety of diverse settings. Three emphasis areas are provided. The human services emphasis focuses on preparing students for working with human service agencies and related fields. An emphasis on psychology applied to business (organizational development) focuses on issues relative to management within organizations, management of organizational change and organizational development. The third emphasis area is pre-education. Students in this emphasis are prepared through the careful selection of courses, to enter graduate programs in education. They may choose to focus on elementary, secondary education with an emphasis in social sciences. Students should consult with their advisor about their interests. Students in the program share a common experience in courses offered the first two years. Then they branch out into courses tailored to the emphasis they wish to pursue. Through the use of seminars, externships and senior projects, students may prepare themselves for exciting and rewarding careers in the applied psychology field, or for additional coursework in graduate programs.

Mission Statement
The mission of the Applied Psychology Program is to enable students to apply general knowledge of psychology and in depth knowledge and skill 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.

Objectives
Objectives of the Applied Psychology Program are:
1. To produce graduates with effective interpersonal skills that can work in a variety of practical settings.
2. To enable students to obtain the knowledge and skills necessary for immediate employment and/or graduate study in psychology and related areas.
3. 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.
4. To serve as a minor to complement other programs on campus.

Applied Psychology Program

Student Learning Outcomes
1. Students will be able to demonstrate an understanding of the major theoretical approaches, findings, and trends in psychology.
2. Students will demonstrate an understanding of and be able to use major research methodologies in psychology, including design, data analysis, and interpretation.
3. Students will demonstrate an understanding of applications of psychology to personal, social, and organizational, problems and issues.
4. Students will demonstrate knowledge and understanding of relevant ethical issues including a general understanding of the relevant codes of ethics.

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 eventually work in counseling, education, social service, management, public relations, personnel, sales, 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 the Klamath Basin. About two-thirds work in human services. Human service employers include county and state agencies, as well as a wide range of private, non-profit agencies. Human service graduates benefit from the unique focus of Oregon Tech's Applied Psychology Program with its emphasis on hands-on applied training. Other graduates complete the Master of Arts in Teaching (MAT) Program and pursue careers in education. Most pursue teaching in the K-6th grades, but some have pursued careers in school counseling, special education, or secondary teaching. Graduates have also been employed in industry and are following management training programs. Finally, graduates have also pursued various master's and doctoral programs in psychology (e.g., counseling, management, organization development, behavior analysis and human services) and related fields (e.g., chiropractic and social work).

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 Applied Psychology. A total of 181 credits are required for the degree. Students must complete a core program consisting of 33 credits; these core courses are PSY 201, PSY 202, PSY 203, PSY 215, PSY 216, PSY 301, PSY 313, PSY 330, PSY 331, and MATH 243 or MATH 361. In addition, students must complete an emphasis area (listed below). 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.

Emphasis Requirements
Students completing the Human Services emphasis must complete the following courses:
PSY 220 Community Psychology
PSY 334 Behavior Modification I
PSY 335 Behavior Modification II
PSY 339 Biopsychology
PSY 341 Psychoactive Drugs I: Psychiatric Drugs
PSY 342 Psychoactive Drugs II: Abused Drugs
Plus four credits of psychology or sociology electives by advisement.

Students completing the Organizational Development track must complete the following courses:
PSY 347 Organizational Behavior
PSY 360 Organizational Psychology
PSY 361 Industrial Psychology
PSY 410 Organizational Change and Development
Plus twelve credits of psychology, business, or technology electives by advisement.
Students completing the Pre-Education track must complete the following courses:

- PSY 311 Human Growth and Development I
- PSY 312 Human Growth and Development II
- PSY 334 Behavior Modification I
- PSY 335 Behavior Modification II
- PSY 416 Abnormal Behavior of Children and Adolescents

Plus seven credits of psychology electives by advisement.

Students in the Pre-Education track must consult closely with their advisor in the selection of elective courses to complete prerequisite courses for their desired endorsement area.

### Bachelor of Science in Applied Psychology Curriculum

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

#### Freshman Year

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PSY 201</td>
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<td>WRI 121</td>
<td>English Composition</td>
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<td>MATH 105</td>
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<tr>
<td>or</td>
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<tr>
<td>MATH 111</td>
<td>College Algebra</td>
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<td>PSY 202</td>
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<td>SPE 321</td>
<td>Small Group and Team</td>
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<td>PSY 216</td>
<td>Abnormal Psychology II</td>
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<td>MATH 361</td>
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<td>PSY 313</td>
<td>Psychological Research Methods I</td>
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#### Senior Year

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</table>

* See advisor for appropriate courses.
** To complete their emphasis, students must take courses from the appropriate list that follows. Credits taken for externship or senior project do not count as emphasis electives.
*** No more than 32 credits of externship allowed for graduation without departmental approval.

### Emphasis Electives

#### Human services emphasis:

PSY 220, PSY 334, PSY 335, PSY 339, PSY 341, PSY 342, plus four credits of psychology or sociology electives by advisement.

#### Organization development emphasis:

PSY 347, PSY 360, PSY 361, PSY 410, plus twelve credits of psychology, business, or technology electives by advisement.

#### Pre-Education emphasis:

PSY 311, PSY 312, PSY 334, PSY 335, PSY 416, plus seven credits of psychology electives by advisement.
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
WR1 121 English Composition (3)
WR1 122 English Composition (3)
WR1 123 English Composition (3)
WR1 227 Technical Report Writing (3)

Oral Communication
One course of Fundamentals of Speech or communication
SPE 111 Fundamentals of Speech (3)

Mathematics
One course of College level Math
MATH 105 Collegiate Mathematics (4)
MATH 111 College Algebra (4)
MATH 111A / MATH111B College Algebra (4)
MATH 112 Trigonometry (4)
MATH 211 Fundamentals of Elementary Mathematics I (4)
MATH 212 Fundamentals of Elementary Mathematics II (4)
MATH 213 Fundamentals of Elementary Mathematics III (4)
MATH 243 Introductory Statistics (4)
MATH 251 Differential Calculus (4)
MATH 252 Integral Calculus (4)
MATH 253N Sequences and Series (4)
MATH 254N Vector Calculus I (4)
MATH 261 Introduction to Linear Algebra (3)

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

ART courses
ENG 104 Introduction to Literature
ENG 105 Introduction to Literature
ENG 106 Introduction to Literature
ENG 107, ENG 207, ENG 307, ENG 407 Seminar
ENG 235 American Multicultural Literature
ENG 246 Reading for Fiction Writers
ENG 253 American Literature I
ENG 254 American Literature II
ENG 255 American Literature III
ENG 266 Native American Literature and Film
ENG 367 Art and Trash in Contemporary Fiction
ENG 373 British Culture and Literature: Romanticism to the Present
ENG 381 Contemporary World Literature
ENG 456 Topics in Film
HUM 125 Introduction to Technology, Society and Values
HUM 147 Introduction to Humanities I
HUM 148 Introduction to Humanities II
HUM 149 Introduction to Humanities III
HUM 107, HUM 207, HUM 307, HUM 407 Seminar
HUM 225 Contemporary Theater: Ashland Plays
HUM 366 Engineering, Business and the Holocaust
PHIL 311 Ethics in the Professions
PHIL 342 Business Ethics
MUS 107, MUS 207, MUS 307, MUS 407 Seminar
MUS 195 Band
MUS 197 Chorus

Science/Math/Computer Science
5 courses, including at least one biological or physical science with a laboratory

BIO 101 General Biology
BIO 102 General Biology
BIO 103 General Biology
BIO 105 Microbiology
BIO 111 Introduction to Environmental Sciences
BIO 112 Introduction to Data Analysis
BIO 200 Medical Terminology
BIO 205 Nutrition
BIO 208 Current Research Topics in Medical Science I
BIO 211 Principles of Biology
BIO 212 Principles of Biology
BIO 213 Principles of Biology
BIO 216 Introduction to Veterinary Medicine
BIO 220 Cardiovascular Physiology
ENV 225 Riparian Assessment Methods
BIO 226 Introduction to Wildlife Rehabilitation
BIO 227 Introduction to Forensic Science
BIO 231 Human Anatomy and Physiology I
BIO 232 Human Anatomy and Physiology II
BIO 233 Human Anatomy and Physiology III
BIO 235 Human Genetics
BIO 313 Botany
BIO 317 Invertebrate Biology
BIO 325 Applied Aquatic Botany
BIO 327 General Ecology
BIO 331 Human Anatomy and Physiology I
BIO 332 Human Anatomy and Physiology II
BIO 333 Human Anatomy and Physiology III
BIO 335 Cross-Sectional Anatomy
BIO 336 Essentials of Pathophysiology
BIO 337 Aquatic Ecology
BIO 341 Medical Genetics
BIO 342 Cell Biology
BIO 345 Medical Microbiology
BIO 346 Pathophysiology I
BIO 347 Pathophysiology II
BIO 351 Vertebrate Biology
BIO 352 Developmental Biology
BIO 357 Introduction to Neuroscience
BIO 409 Current Research Topics in Medical Science II
BIO 426 Evolutionary Biology
BIO 428 Animal Behavior
BIO 434 Data Analysis Methods
BIO 436 Immunology
BIO 461, BIO 462 Human Cadaver Dissection
BIO 485 Klamath Bioregional Studies
CHE 101 Elementary Chemistry
CHE 102 Elementary Chemistry
CHE 103 Elementary Chemistry
CHE 104 Elementary Chemistry Laboratory
CHE 105 Elementary Chemistry Laboratory
CHE 106 Elementary Chemistry Laboratory
CHE 107, CHE 108, CHE 109, CHE 110 Seminar
CHE 201 General Chemistry
CHE 202 General Chemistry
CHE 203 General Chemistry
CHE 204 General Chemistry Laboratory
CHE 205 General Chemistry Laboratory
CHE 206 General Chemistry Laboratory
CHE 210 Clinical Pharmacology
CHE 221 General Chemistry
CHE 222 General Chemistry
CHE 223 General Chemistry
CHE 235 Streamwater Chemistry and Sampling
CHE 260 Electrochemistry for Renewable Energy Applications
CHE 315 Environmental Chemistry and Toxicology
CHE 325 Soil Science
CHE 331 Organic Chemistry I
CHE 332 Organic Chemistry II
CHE 335 Organic Chemistry III
CHE 341 Instrumental Methods/Data Acquisition I
CHE 342 Instrumental Methods/Data Acquisition II
CHE 345 Corrosion Chemistry
CHE 346 Corrosion Chemistry Laboratory
CHE 350 Clinical Pharmacology for Nuclear Medicine
CHE 360 Clinical Pharmacology for the Health Professions
CHE 450 Biochemistry I
Management Department

Marla Miller, Department Chair
Grant Kirby, Program Director and Curriculum Coordinator, Information Technology
Hallie Neupert, Program Director and Curriculum Coordinator, Entrepreneurship/Small Business Management and Marketing
Pat Schaeffer, Program Director and Curriculum Coordinator, Operations Management
Maureen Sevigny, Program Director, Management Distance Education. Program Director and Curriculum Coordinator, BAS Technology and Management
Richard Bailey, Curriculum Coordinator, Accounting

Professors: R. Bailey, C. Jones, M. Miller, H. Neupert, M. Sevigny
Associate Professors: G. Kirby, C. Morgan
Assistant Professors: M. Ahalt, S. Bailey, D. DaSaro, J. Jackson, M. Kirshner, P. Schaeffer
Instructor: J. Dickson

Degrees Offered
Bachelor of Science in Allied Health Management
Bachelor of Science in Information Technology, with options in:
  Accounting
  Applications Development
  Business/Systems Analysis
  Health Informatics
Bachelor of Science in Management, with options in:
  Accounting
  Entrepreneurship/Small Business Management
  Marketing
Bachelor of Science in Operations Management
Bachelor of Applied Science in Technology and Management

Minors Offered
Business
International Business
Information Technology

Specializations Offered
Accounting
Entrepreneurship/Small Business Management
Marketing
Travel and Tourism

Certificate Offered
Accounting (post baccalaureate)

Emphasis Offered
Six Sigma Green Belt Certification
Renewable Energy Emphasis

The Management Department prepares students to take their place as leaders and managers in contemporary public and private organizations. Faculty in this department 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 a fundamental core of courses including management, marketing, accounting, finance, information systems, economics, ethics, organizational behavior, business law and presentations. These courses, along with program-specific courses, prepare students for their senior year which includes a senior project sequence and a capstone course.

As a result of this unique combination of resources and coursework, the Management Degree Programs remain vital and up-to-date, providing students with the technical tools of management and interpersonal skills that employers most desire. Equally important, each graduate will be ready to perform as an effective citizen in a culturally diverse, global work place.

Degree Completion and Co-enrollment at Community Colleges
The Management Department has worked with many Oregon community colleges to develop Joint Enrollment, Transfer Credit (Articulation) Agreements and course sequences so that students can complete a degree with coursework taken from multiple institutions. See the general education requirements section of this catalog, the Oregon Tech Registrar’s Web site, or a management advisor for additional information. Coursework is delivered in a traditional classroom/computer lab setting at the Klamath Falls and Portland campuses. A capstone Senior Project provides management students with an opportunity to integrate their educational experience in the context of a “real world” business problem or project.

Distance Education
Many of the core management courses are available online to facilitate the needs of degree completion students. Web courses are particularly appropriate for students capable of self-directed educational activities. These online degrees are offered utilizing Internet delivery and collaborative learning. Degrees available online are: BS in Allied Health Management, BS in Operations Management, BS in Information Technology Applications Development Option, BAS in Technology and Management.

Distance education applications are required to submit the Distance Education Application for Admission to the Distance Education department at Oregon Tech, accompanied by a $100 non-refundable fee and official transcripts of each college or university attended.

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. To ensure compatibility with campus-wide computers and networks, students should consult a department faculty
member for a specification sheet. Financial aid may be available to help defray the cost of this equipment. Please consult the Financial Aid Office at Oregon Tech.

Allied Health Management

Degree Offered
Bachelor of Science in Allied Health Management

This program bridges two disciplines: Allied Health and Management. The Bachelor of Science in Allied Health Management requires a current state and/or national registry, license or certificate in an approved allied health field. The BS degree in Allied Health Management is offered in Klamath Falls and online.

Career Opportunities
Graduates with a BS degree in Allied Health Management are prepared for mid-level management positions within hospital departments, outpatient facilities, clinics, and labs. The combination of the allied health care background and the management education make graduates uniquely qualified to manage the business aspects of labs and clinics and to supervise other technologists and technicians.

Student Preparation and Admissions
To be eligible for admission to the Allied Health Management Program, students must meet the following criteria:

1. Meet the Oregon Tech general admissions requirements.
2. 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.

Accreditation
Oregon Tech has received specialized accreditation for its business programs through the International Assembly for Collegiate Business Education (IACBE).

Program Note
Students graduating with a Management degree are required to take a standardized exit exam in their last year.

Bachelor of Science in Allied Health Management

Curriculum
Freshman Year
44 transfer credits from approved Registry, License, or Certificate.

Sophomore Year
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<tbody>
<tr>
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Information Technology

Degree Offered
Bachelor of Science in Information Technology with options in:
- Accounting
- Applications Development
- Business/Systems Analysis
- Health Informatics

Objectives
The Bachelor of Science in Information Technology with its four options offers a challenging, state-of-the-art education for those interested in learning the dynamic and growing field of information technology. The field is interdisciplinary, with applications to all aspects of the economy. Graduating students are prepared to bridge the technology and management disciplines in their organizations. Core business disciplines taught include analytical skills and problem solving, business organization and management, project management, leadership, teams, and communications. In addition to the core business disciplines students choose an information technology focus in one of four options: applications development, business/systems analysis, health informatics or accounting. Each option is designed to produce graduates with the competencies necessary to succeed in the workplace or pursue further graduate level education.

Career Opportunities
The Oregon Tech Information Technology degree with four options 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 as vendor representatives for both hardware and software firms. Information Technology graduates are currently employed at firms including Consolidated Freightways, Hewlett-Packard, Microsoft and Intel. Through a combination of technical skills and business understanding, Information Technology graduates are uniquely prepared for faster advancement than many of their contemporaries.

Graduation Requirements
Graduation requirements for the Bachelor of Science Degree in Information Technology include 181 credit hours for the Accounting Option, 181 credit hours for the Applications Development option, 181 credit hours for the Business/Systems Analysis option, and 182 credits for the Health Informatics option.
Accounting Option
The Information Technology Accounting Option combines coursework in accounting and information technology. Students will acquire both technical and accounting skills needed to prepare them for successful careers in accounting and accounting information systems. This unique program meets the needs of accounting students entering today’s technology-oriented marketplace. Students entering this program will receive exposure and preparation in information systems. In addition, they will develop the skills and tools required to analyze, design, and implement different types of accounting systems.

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. This program prepares students for a variety of careers in accounting, financial management, management advisory services, and information technology.

Bachelor of Science in Information Technology, Accounting Option Curriculum
Required courses and recommended terms during which they should be taken:

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<td>Hardware/Software Integration</td>
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<td>Systems Analysis I</td>
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<td>Relational Database Design I</td>
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* Any MIS course that is not already required.
Applications Development Option
The Information Technology, Applications Development Option focuses on the acquisition of theory and technical competencies to prepare students for successful careers as applications programmers. The curriculum is designed to produce graduates with the competencies, skills and attitudes necessary for success in the workplace or further graduate education. The management components include analytical skills and problem solving; business organization and management; project management; leadership, teams, and communications. Information technology skill areas include database development, applications development, Web development, technical support, telecommunications and additional technical electives. The BS in Information Technology, Applications Development Option is offered in Klamath Falls, Portland and online.

Bachelor of Science in Information Technology, Applications Development Option Curriculum
Required courses and recommended terms during which they should be taken:

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* Any MIS or CST class approved by your advisor which is not required in your program excepting CST 101 and CST 102. Alternatively, ACC 405 or any appropriate GIS course approved by your advisor.
**Business/Systems Analysis Option**  
The Information Technology Business/Systems Analysis Option integrates technical, business, and interpersonal skills to prepare students for successful careers as business/systems analysts. The curriculum is designed to produce graduates with the competencies, skills and aptitudes necessary for success in the workplace or further graduate education. The management components include analytical skills and problem solving; business organization and management; project management; leadership, teams, and communications. Students gain theoretical and practical experience with systems analysis and design, project management, personal computers, operating systems, applications, networks, Web page design and development and databases.

**Bachelor of Science in Information Technology, Business/Systems Analysis Option Curriculum**  
Required courses and recommended terms during which they should be taken:

### Freshman Year

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 111</td>
<td>College Algebra</td>
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<tr>
<td>MIS 118</td>
<td>Programming Fundamentals</td>
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<tr>
<td>MIS 275</td>
<td>Introduction to Relational, Databases</td>
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### Freshman Year

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<td>MIS 102</td>
<td>Spreadsheet Software Laboratory</td>
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<td>MIS 256</td>
<td>Hardware/Software Integration</td>
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<td>SPE 111</td>
<td>Fundamentals of Speech, Laboratory Science</td>
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<td>BUS 215</td>
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<td>Fundamentals of Networking II</td>
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<tr>
<td>ACC 203</td>
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<td>Statistical Methods I</td>
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<td>Introduction to Systems Analysis</td>
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<td>Organizational Behavior</td>
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<td>MGT 461</td>
<td>Lean/Six Sigma Management I</td>
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<td>MIS 496</td>
<td>Senior Project Management</td>
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### Senior Year

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<td>PSCI 326</td>
<td>World Politics in Transition</td>
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### Senior Year

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<td>MIS 479</td>
<td>Current Topics in Information Technology</td>
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* Any MIS or CST class approved by your advisor which is not required in your program excepting CST 101 and CST 102. Alternatively, ACC 405 or any appropriate GIS course approved by your advisor.
Health Informatics Option
Objectives and Career Opportunities

The U.S. health care system is in the midst of a technology transformation, moving from paper-based records to integrated electronic health information systems. Technology transformation, specifically electronic health records, data warehouses and integrated health information systems, is changing the face of health care organizations and the delivery of care. One of the key factors in assuring a successful transformation is meeting the needs for highly qualified health informatics professionals and specialists.

The new roles for health informatics professionals are the result of the convergence of information management and information technologies. Health informatics professionals work in operational and management positions throughout the health care industry in such locales as hospitals, clinics, managed care organizations, software vendors and government agencies. Health informatics professionals are being called upon to design and use emerging information technologies with the goal of helping providers and patients access and utilize key information in both clinical and business management.

Health Informatics provides support in areas such as clinical decision making, research, financial and revenue cycle management, and personal health management.

Degree Requirements

The Health Informatics option requires 182 term hours. Required course work is outlined in the curriculum section. Transfer students should consult with the Registrar's Office and the Management Department to determine which of their courses will satisfy Oregon Tech course requirements.

Bachelor of Science in Information Technology, Health Informatics Option
Curriculum

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

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<th>Freshman Year</th>
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<td>MIS 255</td>
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<td>MIS 273</td>
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<tr>
<td>BUS 316</td>
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</table>

* Any BUS, CST, MGT or MIS class approved by your advisor which is not required in your program, excepting CST 101 and CST 102. Alternatively, any appropriate GIS course approved by your advisor.
Accounting, Entrepreneurship/Small Business, and Marketing Programs

**Degrees Offered**
Bachelor of Science in Management, with options in:
- Accounting
- Entrepreneurship/Small Business Management
- Marketing

**Objectives**
The Management curriculum integrates a solid core of business/management courses with the unique benefits of one of the country's leading institutes of technology. Degree options include accounting, entrepreneurship/small business management, and marketing. The mission of the Management Department is to prepare 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. Students will also be prepared for graduate level education, such as the Master's in Business Administration (MBA) degree.

**Career Opportunities**
The Management Department is known for producing "user-friendly" graduates. Graduate placement rate is among the best in the state.

Recruiters from industry and government agencies regularly visit the campus in search of Management Department bachelor degree candidates. Initial job titles include staff accountant, cost analyst, business unit manager, supervisor, marketing specialist, and sales manager.

**Graduation Requirements**
Graduation requirements for the Bachelor of Science degree in Management include 181 credit hours for the Entrepreneurship/Small Business Management option, 181 credit hours for the Marketing option, and 182 credit hours for the Accounting option.
### Accounting Option

The accounting option 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.

### Bachelor of Science in Management, Accounting Option Curriculum

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

#### Freshman Year

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<th>Term</th>
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<th>Credits</th>
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<tr>
<td>Fall</td>
<td>MATH 111</td>
<td>College Algebra</td>
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<td>PSY 201</td>
<td>Psychology</td>
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<td>WRI 121</td>
<td>English Composition</td>
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<td>ECON 201</td>
<td>Principles of Economics, Microeconomics</td>
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<td>MIS 102</td>
<td>Spreadsheet Software Laboratory</td>
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<td>SPE 111</td>
<td>Fundamentals of Speech</td>
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<td>Introduction to Relational Databases</td>
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<td>MATH 361</td>
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#### Junior Year

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<td>Intermediate Accounting III</td>
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#### Senior Year

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<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>ACC 411</td>
<td>Income Tax Procedures</td>
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<td>ACC 435</td>
<td>Auditing</td>
<td>4</td>
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<td></td>
<td>ACC 497</td>
<td>Senior Project</td>
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#### Senior Year

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<tr>
<td>Winter</td>
<td>ACC 412</td>
<td>Corporate Taxation</td>
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<tr>
<td></td>
<td>ACC 431</td>
<td>Advanced Accounting I</td>
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<td>Senior Project</td>
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#### Senior Year

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<td>ACC 465</td>
<td>Case Studies in Accounting</td>
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<td>PSY 347</td>
<td>Organizational Behavior</td>
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Entrepreneurship/Small Business Management Option

Students selecting the entrepreneurship/small business management option should equip themselves to be managers with complete understanding of all aspects of a business - either a small business or a business unit manager in a larger business. The focus is on the unique demands placed on this type of manager. Skills in writing business plans, starting and operating a business, cash flow management, costing and pricing products and global opportunities are emphasized and developed.

Bachelor of Science in Management, Entrepreneurship/Small Business Management Option

Curriculum

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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
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<tr>
<td></td>
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<tr>
<td></td>
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<td>ECO 201 Principles of Economics, Microeconomics 3</td>
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<td>SPE 111 Fundamentals of Speech 3</td>
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<tr>
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<td>WRI 122 English Composition 3</td>
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<table>
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<td>MATH 361 Statistical Methods I 4</td>
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<td></td>
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<td>BUS 349 Human Resource Management I 3</td>
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<td></td>
<td>MATH 371 Finite Mathematics and Calculus I 4</td>
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<td>PHIL 351 Ethics in the Professions or</td>
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<tr>
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<td></td>
<td>BUS 397 Human Resource Management II 3</td>
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<td>MIS 225 Business on the Internet 4</td>
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Marketing Option
The marketing option provides students with a broad background in business management with a strong emphasis in modern marketing concepts and practices. Marketing graduates enjoy careers in management, advertising, research, consulting, distribution, sales and entrepreneurial enterprises. This program provides the student with a core of management courses, in-depth business computer applications, detailed marketing courses, experience on individual and team projects, and preparation for entry into a master's program.

Management, Marketing Option Curriculum
Required courses and recommended terms during which they should be taken:

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<th>Freshman Year</th>
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<td>BUS 447</td>
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<td>BUS 478</td>
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Operations Management

Degree Offered
Bachelor of Science in Operations Management

Objectives
The Operations Management program prepares students for leadership positions in the production and service industries. Students should develop mastery of concepts, tools, and skills in management sciences and specialties. Particular emphasis is directed toward developing the ability to contribute significantly to the improvement of productivity in a quality oriented environment and to manage effectively in a team based work environment. Students will also be prepared for graduate level education, such as the Master’s in Business Administration degree. The BS in Operations Management is offered in Klamath Falls, Portland and online.

Career Opportunities
Recruiters from industry and government agencies regularly visit the campus in search of bachelor’s degree candidates in operations management. 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.

Students selecting the Operations Management degree will equip themselves to be managers in the challenging environment of modern manufacturing and service industries. Upon graduation they 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.

Graduation Requirements
As prescribed by the Management Department, graduation requirements for the Bachelor of Science degree in Operations Management include 180 credit hours.

Bachelor of Science in Operations Management Curriculum
Required courses and recommended terms during which they should be taken:

| Freshman Year | Fall | Bus 215 Principles of Management 3 | Psy 201 Psychology 3 | Wri 121 English Composition 3 | Humanities elective 3 | Total 15 |
| Freshman Year | Winter | Math 111 College Algebra 4 | Mis 102 Spreadsheet Software Laboratory 1 | Spe 111 Fundamentals of Speech 3 | Wri 122 English Composition 3 | Elective 3 | Total 14 |
| Sophomore Year | Fall | Acc 201 Principles of Accounting I 4 | Math 361 Statistical Methods I 4 | Mis 275 Introduction to Relational Databases 3 | Math/Science/Social Science elective 3 | Elective 3 | Total 17 |
| Sophomore Year | Spring | Acc 203 Principles of Managerial Accounting 4 | Bus 356 Business Presentations 4 | Bus 456 Business Research Methods 3 | Spe 321 Small Group and Team Communication 3 | Total 14 |
| Junior Year | Fall | Acc 325 Finance 4 | Bus 457 Business Research Methods II 3 | Mgt 321 Operations Management I 3 | Mgt 461 Lean/Six Sigma Management I 3 | Math/Science/Social Science elective 3 | Total 16 |
| Junior Year | Winter | Mgt 322 Operations Management II 3 | Mgt 462 Lean/Six Sigma Management II 3 | Wri 327 Advanced Technical Writing 3 | Math/Science/Social Science elective 3 | Elective 3 | Total 15 |
| Junior Year | Spring | Mgt 323 Operations Management III 3 | Mgt 445 Project Management 3 | Mgt 463 Lean/Six Sigma Management III 3 | Mis 375 Decision Support Systems 3 | Elective 3 | Total 15 |
| Senior Year | Fall | Bus 467 Service Management 3 | Bus 420 Applied Management Internship or Bus 496 Senior Project 3 | Lab Science elective 4 | Elective 3 | Elective 3 | Total 16 |
| Senior Year | Winter | Anth 452 Globalization or Psci 326 World Politics in Transition 3 | Bus 497 Senior Project 3 | Phil 331 Ethics in the Professions 3 | Psy 347 Organizational Behavior 3 | Elective 3 | Total 15 |
| Senior Year | Spring | Bus 478 Cases in Strategy and Policy 3 | Math/Science/Social Science elective 3 | Elective 3 | Elective 3 | Elective 3 | Total 12 |
Bachelor of Applied Science in Technology and Management

The Bachelor of Applied Science (BAS) in Technology and Management degree is designed specifically for students who have completed a technical Associate of Applied Science (AAS) or Associate of Science (AS) degree 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 two-term capstone senior project to enable the student to demonstrate successful integration of the technical and managerial coursework. The BAS in Technology and Management is offered in Klamath Falls, Portland, and online.

Depending on the specific AAS or AS degree, a student entering the BAS program should have completed at least 60 CTE credits and some additional credits that would apply to general education or lower-division major requirements.

Graduation Requirements

The BAS in Technology and Management requires 180 credits including 62 upper-division credits and 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, nine credits in humanities and 16 credits of math and science including four credits of mathematics with a prerequisite of intermediate algebra or higher and four credits of laboratory science.

Bachelor of Applied Science in Technology and Management

Curriculum

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

Freshman Year

60 Career Technical Elective credits

Sophomore Year

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Sophomore Year

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<tbody>
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Junior Year

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Junior Year

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Junior Year

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Senior Year

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Senior Year

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Senior Year

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</table>

* Technical electives include upper-division courses in ACC, BUS, MGT, MIS, GIS, or PSY.

Note: The BAS degree specifies 62 upper-division courses. 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 courses required for the BAS degree.
Business Minor
The Minor in Business recognizes the achievement of 23 credits in business courses, some of which can be 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 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 IT.

Requirements of Minor:
ACC 201 Principles of Accounting I 4
ACC 203 Principles of Managerial Accounting 4
BUS 215 Principles of Management 3
or BUS 304 Engineering Management 3
or BUS 317 Health Care Management 3
BUS 223 Marketing I 3
or PSY 347 Organizational Behavior 3

And two courses chosen from upper-division BUS or MGT courses not on the required list, or MIS 311 or PSY 410.

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.

Information Technology Minor
The Information Technology (IT) Minor recognizes the achievement of 29 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 students who wish to demonstrate that they have additional skills in management information system and information technology areas. It may enhance employability and improve graduate school possibilities. The minor is open to all majors except IT.

Requirements of Minor:
MIS 115 Visual BASIC Programming 4
MIS 215 Business Application Programming 4
or Programming elective
MIS 275 Introduction to Relational Databases 3
or MIS 311 Introduction to Systems Analysis 3
MIS 312 Systems Analysis I 4
MIS 341 Relational Database Design I 4
MIS 342 Relational Database Design II 4
MIS 375 Decision Support Systems 3

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. It may enhance employability and improve graduate school possibilities. This minor is open to all majors and is especially recommended for students with an interest in management and/or global affairs.

Requirements of Minor:
BUS 308 Principles of International Business 3
COM 205 Intercultural Communication 3
BUS 387 International Human Resource Management or PSCI 326 World Politics in Transition
or PSCI 497 United States Foreign Policy 3
or BUS 434 Global Marketing 3
or ECO 367 International Economics and Finance Management 4
MIS 311 Introduction to Systems Analysis 3
PSCI 250 Introduction to World Politics 3
Total 22

Suggested Social Science Electives
GEOG 106 Cultural Geography I 3
HIST 103 History of Western Civilization 3
PSCI 326 World Politics in Transitions 3
PSCI 497 United States Foreign Policy 3

Suggested Humanities Electives
Any second year foreign language sequence 4-4-4

Strongly Recommended Study Abroad Program—1 semester/2 terms 4-4-4

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 advisor to schedule courses.

Specialization Programs
Oregon Tech offers four specializations as a complement to the three Bachelor of Science degree options in Management. These are Accounting, Entrepreneurship and Small Business, Marketing, and Travel and Tourism. The courses in the Accounting, Entrepreneurship and Small Business, and Marketing specializations have been selected from the curricular content of the three corresponding degree options. The courses in the Travel and Tourism specialization have been developed specifically for this specialization. They are online courses offered by the Department of Management through Distance Education.

Accounting
Oregon Tech’s specialization in Accounting prepares the student for a wide range of accounting related positions in modern technological industries, financial institutions and other service-oriented businesses. The program includes training in computer software essential to accounting functions. This hands-on exposure can qualify the student for work in many high technology industries which utilize computer accounting applications.

Required Courses
ACC 201 Principles of Accounting I 4
ACC 202 Principles of Accounting II 4
ACC 203 Principles of Managerial Accounting 4
ACC 205 Computerized Accounting 3
MIS 101 Word Processing Software Laboratory 1
MIS 102 Spreadsheet Software Laboratory 1
MIS 103 Presentation Graphic Software Laboratory 1

Entrepreneurship and Small Business Management
Oregon Tech’s specialization in Entrepreneurship/Small Business provides the student with foundational skills and background in business management emphasizing entrepreneurship. The student should learn skills needed to start a business successfully, gain the knowledge required to run small businesses, and develop the entrepreneurship skills to make big companies run like small companies.

Required Courses
BUS 215 Principles of Management 3
BUS 223 Marketing I 3
BUS 314 Entrepreneurship I 3
BUS 335 Entrepreneurship II 3
BUS 434 Global Marketing 3
BUS 447 Controversial Issues in Management 3
Marketting
Oregon Tech’s specialization in Marketing provides the student with a foundational background in business management with an emphasis in modern marketing concepts and practices. Upon completion, the student should be better qualified for a career in management, advertising, consulting, distribution or sales.

**Required Courses**
- BUS 215 Principles of Management 3
- BUS 223 Marketing I 3
- BUS 318 Marketing II 3
- BUS 319 Integrated Marketing Communication 3
- BUS 326 Sales and Sales Management 3

Travel and Tourism
Oregon Tech’s 15 credit online specialization in Travel and Tourism provides students with a broad foundational background in the hospitality and tourism industries. The information contained in these courses is important for anyone interested in learning more about the travel industry or who likes to travel. This specialization also gives students the knowledge necessary to obtain entry level positions in the hospitality and tourism industries.

**Required Courses**
- BUS 209 Introduction to Tourism 3
- BUS 347 Geography of Travel and Tourism 3
- BUS 350 Hospitality Management 3
- BUS 358 Marketing for Hospitality and Tourism 3
- or BUS 399 Marketing Special Topics: Marketing Tourism 3
- BUS 385 Ecotourism 3

Six Sigma Green Belt Emphasis
The Management Department offers students the opportunity to earn a Six Sigma Green Belt certification. The Green Belt certification is an emphasis under the Bachelor of Science in Management, Entrepreneurship/Small Business Management option, Management, Marketing option or the Operations Management degree program. In addition to the fundamental management curriculum, the emphasis requires the completion of a Lean/Six Sigma Senior project. Those attaining the emphasis will be well-positioned to work in companies that deploy Six Sigma.

Additionally, employees of companies that deploy Six Sigma may complete the course work and project to obtain their certification.

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.

- BUS 457 Business Research Methods II 3
- MGT 445 Project Management 3
- MGT 461 Lean/Six Sigma Management I 3
- MGT 462 Lean/Six Sigma Management II 3
- MGT 463 Lean/Six Sigma Management III 3
- BUS 496 Senior Project 3
- BUS 497 Senior Project 3

It should be noted that for OM majors, all of these courses are currently in the curriculum map. No additional coursework is required with the exception that the Senior Project series must be a Six Sigma project.

Renewable Energy Management Emphasis
The Management Department offers students the opportunity to complete a Renewable Energy Management emphasis under the Bachelor of Science in Management, Entrepreneurship/Small Business Management option or the Operations Management degree program. In addition to the fundamental management curriculum, the emphasis requires additional coursework in chemistry, management information systems, humanities, history, economics and management. 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 3
- CHE 204 General Chemistry Laboratory 1
- or PHY 201 General Physics 4
- MATH 112 Trigonometry 4
- ECO 357 Energy Economics and Policy 3
- HIST 356 A History of Energy 3
- HUM 125 Introduction to Technology, Society and Values 3
- REE 201 Introduction to Renewable Energy 3
- MIS 115 Visual BASIC Programming 4
- MGT 212 Fundamentals of Renewable Energy Management 3

Post Baccalaureate Certificate in Accounting
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 4
- ACC 331 Intermediate Accounting I 4
- ACC 332 Intermediate Accounting II 4
- ACC 333 Intermediate Accounting III 4
- ACC 405 Accounting Information Systems 4
- ACC 411 Income Tax Procedures 4
- ACC 431 Advanced Accounting I 4
- ACC 435 Auditing 4

**Elective Courses (Choose at least 15 credits from the following courses)**
- ACC 321 Cost Accounting II 4
- ACC 325 Finance 4
- ACC 412 Corporate Taxation 4
- ACC 432 Advanced Accounting II 4
- ACC 465 Case Studies in Accounting 4
- BUS 226 Business Law 3
- BUS 345 Fraud Examination 3
- MIS 312 Systems Analysis I 4

Note: At least 36 credits must be taken at Oregon Tech. Manufacturing and Mechanical Engineering Department.
Manufacturing and Mechanical Engineering and Technology Department

Brian Moravec, Department Chair
Joe Stuart, Program Director, Undergraduate Manufacturing Engineering Technology
Wangping Sun, Program Director, Graduate Manufacturing Engineering Technology
Hugh Currin, Program Director, Mechanical Engineering
David Culler, Program Director, Mechanical Engineering Technology
Geoffrey Peter, Program Director, Portland Programs
John Bridge, Program Director, Oregon Tech–Seattle

Professors: H. Currin, R. Shih, B. Moravec, L. Wolf
Associate Professors: J. Bridge, D. Culler, J. Hayen, N. Mead, J. Stuart, W. Sun
Assistant Professors: I. Demeshko-Prosnik, G. Peter, S. Sloan.

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 Educational Objectives
Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve. The Program Educational Objectives of Oregon Tech's Manufacturing Engineering Technology Program are to produce graduates who:

- are able to analyze and design practical mechanical and manufacturing systems.
- communicate effectively and work well on team-based engineering projects.
- succeed in entry-level manufacturing engineering positions.
- pursue continued professional development.

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.
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 have the opportunity to participate in the state-wide MECOP internship program. For information, see the following Web site: http://mecop.ous.edu.

Accreditation
The Bachelor of Science in Manufacturing Engineering Technology is accredited by the Technology Accreditation Commission (TAC) 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.

Degree Requirements—Master of Science
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

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.

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. In order to satisfy the engineering science elective, the student must complete one of the following courses: Dynamics (ENGR 212), Fluid Mechanics (MET 218), or Thermodynamics (ENGR 355). In order to satisfy the business/management restricted elective the student must complete one of the following courses: BUS 226, BUS 304, BUS 335, MGT 321, MGT 461, or MGT 462.
# Bachelor of Science in Manufacturing Engineering Technology Curriculum

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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 111 College Algebra</td>
<td>4</td>
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<tr>
<td>MET 111 Orientation I</td>
<td>2</td>
</tr>
<tr>
<td>WRI 121 English Composition</td>
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</tr>
<tr>
<td>Humanities/Social Science elective*</td>
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<tr>
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<tr>
<th>Freshman Year</th>
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<tbody>
<tr>
<td>CHE 101 Elementary Chemistry</td>
<td>3</td>
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<tr>
<td>CHE 104 Elementary Chemistry Laboratory</td>
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<tr>
<td>MFG 120 Manufacturing Processes I</td>
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<tr>
<td>MATH 112 Trigonometry</td>
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</tr>
<tr>
<td>MET 112 Orientation II</td>
<td>2</td>
</tr>
<tr>
<td>WRI 122 English Composition</td>
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<thead>
<tr>
<th>Sophomore Year</th>
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<tbody>
<tr>
<td>MFG 103 Introductory Welding Processes</td>
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</tr>
<tr>
<td>MATH 251 Differential Calculus</td>
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</tr>
<tr>
<td>MET 241 CAD for Mechanical Design I</td>
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<tr>
<td>SPE 111 Fundamentals of Speech</td>
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<tbody>
<tr>
<td>ENGR 211 Statics**</td>
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<td>MFG 112 Introduction to Manufacturing Processes</td>
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<tr>
<td>MATH 361 Statistical Methods I</td>
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</tr>
<tr>
<td>PHY 201/221 General Physics</td>
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<table>
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<tr>
<th>Junior Year</th>
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<tbody>
<tr>
<td>MFG 313 Manufacturing Analysis and Planning</td>
<td>3</td>
</tr>
<tr>
<td>MFG 341 Numeric Control Programming</td>
<td>3</td>
</tr>
<tr>
<td>MET 315 Machine Design I</td>
<td>3</td>
</tr>
<tr>
<td>MET 375 Solid Modeling</td>
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</tr>
<tr>
<td>MET 360 Materials II</td>
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<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Winter</th>
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<tbody>
<tr>
<td>MFG 333 Statistical Methods for Quality Improvement</td>
<td>3</td>
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<tr>
<td>MFG 342 Computer Aided Machining</td>
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<tr>
<td>MFG 343 Manufacturing Tool Design</td>
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<tr>
<td>MET 316 Machine Design II</td>
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<td>MET 326 Electric Power Systems</td>
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<th>Junior Year</th>
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<tr>
<td>MGT 345 Engineering Economy</td>
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<td>MFG 331 Industrial Controls</td>
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<td>MFG 344 Design of Manufacturing Tooling</td>
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<tr>
<td>SPE 321 Small Group and Team Communication</td>
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<tr>
<th>Senior Year</th>
<th>Fall</th>
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<tbody>
<tr>
<td>ANHT 452 Globalization</td>
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<tr>
<td>MFG 453 Automation and Robotics in Manufacturing</td>
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<tr>
<td>MFG 454 Thermal Systems for Manufacturing</td>
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<tr>
<td>MFG 461 Senior Project I</td>
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<tr>
<td>WRI 327 Advanced Technical Writing</td>
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<tr>
<td>Engineering Science elective***</td>
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<table>
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<th>Senior Year</th>
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<tbody>
<tr>
<td>MFG 462 Senior Project II</td>
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<tr>
<td>BUS/MGT restricted elective*****</td>
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<tr>
<td>Humanities/Social Science elective*</td>
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<tr>
<td>Manufacturing elective****</td>
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<tr>
<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 485 Fundamentals of Engineering Exam</td>
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<tr>
<td>ENGT 415 Occupational Safety</td>
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</tr>
<tr>
<td>MFG 447 Lean Manufacturing</td>
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</tr>
<tr>
<td>MFG 463 Senior Project III</td>
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<tr>
<td>Humanities/Social Science elective*</td>
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<tr>
<td>Manufacturing elective****</td>
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<tr>
<td><strong>Total</strong></td>
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</tr>
</tbody>
</table>

* Humanities/Social Science requirements: 9 credits of Humanities electives and 9 credits of Social Science electives. ANTH 452 Globalization counts as 3 Social Science credits.
** ENGT 230, ENGT 231, ENGT 232 sequence may be substituted for the ENGR 211, ENGR 213 sequence.
*** Engineering Science elective: complete one of the following courses: Dynamics (ENGR 212), Fluid Mechanics (MET 218), or Thermodynamics (ENGR 355).
**** Manufacturing electives: selected Manufacturing and/or Mechanical Engineering Technology courses. Consult with your advisor for a list of approved courses.
***** Business/Management restricted elective: complete one of the following courses: BUS 226, BUS 304, BUS 335, MGT 321, MGT 461, or MGT 462.
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.

Degree Offered
Bachelor of Science in Mechanical Engineering

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 students for further study in graduate school.

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.

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.

Objectives of the Program

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
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</thead>
<tbody>
<tr>
<td>MFG 313 Manufacturing Analysis and Planning</td>
<td>ENGT 415 Occupational Safety</td>
</tr>
<tr>
<td>MFG 341 Numerical Control Programming</td>
<td>MFG 344 Design of Manufacturing Tooling</td>
</tr>
<tr>
<td>MFG 453 Automation and Robotics in Manufacturing</td>
<td>MFG 428 Manufacturing Engineering</td>
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<tr>
<td>BUS/MGT Restricted elective*</td>
<td>MFG/MGT Certification</td>
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<tr>
<td>Manufacturing elective***</td>
<td>MFG 447 Lean Manufacturing</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>15</td>
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Winter

<table>
<thead>
<tr>
<th>Winter</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MFG 112 Introduction to Manufacturing Processes**</td>
<td>MFG 112 Introduction to Manufacturing Processes**</td>
</tr>
<tr>
<td>MFG 333 Statistical Methods for Quality Improvement</td>
<td>MFG 333 Statistical Methods for Quality Improvement</td>
</tr>
<tr>
<td>MFG 342 Computer Aided Machining</td>
<td>MFG 342 Computer Aided Machining</td>
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<tr>
<td>MFG 343 Manufacturing Tool Design</td>
<td>MFG 343 Manufacturing Tool Design</td>
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<tr>
<td>BUS/MGT Restricted elective*</td>
<td>BUS/MGT Restricted elective*</td>
</tr>
<tr>
<td>Manufacturing elective*</td>
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<td><strong>Total</strong></td>
</tr>
<tr>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

* Restricted elective from the following courses: BUS 226, BUS 304, BUS 335, MGT 321, MGT 461 or MGT 462.
** This course is already required for the BSME degree.
*** 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.

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.

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 have the opportunity to participate in the state-wide MECOP internship program. For information, see the following Web site: http://mecop.ous.edu.

Accreditation
The Mechanical Engineering 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.
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 193 credit hours as prescribed in the following curriculum outline.

Bachelor of Science in Mechanical Engineering

Curriculum

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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 221</td>
<td>General Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>MET 111</td>
<td>Orientation I</td>
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</tr>
<tr>
<td>WRI 121</td>
<td>English Composition</td>
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</tr>
<tr>
<td></td>
<td>Humanities/Social Science elective*</td>
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<tr>
<td><strong>Total</strong></td>
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<table>
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<tr>
<th>Freshman Year</th>
<th>Winter</th>
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<tbody>
<tr>
<td>CHE 222</td>
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<tr>
<td>MATH 251</td>
<td>Differential Calculus</td>
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<td>MFG 120</td>
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<td>MET 241</td>
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<tr>
<td>ENGR 211</td>
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<td>MATH 254N</td>
<td>Vector Calculus I</td>
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<tr>
<td>MATH 361</td>
<td>Statistical Methods I</td>
<td>4</td>
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<tr>
<td>or MATH 465</td>
<td>Mathematical Statistics</td>
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<td>PHY 221</td>
<td>General Physics with Calculus</td>
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<td>ENGR 213</td>
<td>Strength of Materials</td>
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<tr>
<td>ENGR 236</td>
<td>Fundamentals of Electric Circuits</td>
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<tr>
<td>MATH 321</td>
<td>Applied Differential Equations I</td>
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<td>PHY 223</td>
<td>General Physics with Calculus</td>
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<td>Fluid Mechanics I</td>
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<td>Instrumentation</td>
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<td>MET 375</td>
<td>Solid Modeling</td>
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<tr>
<td>ENGR 212</td>
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<td>ENGR 355</td>
<td>Thermodynamics</td>
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<td>MECH 315</td>
<td>Machine Design I</td>
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<td>MECH 360</td>
<td>Materials II</td>
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<td>MET 326</td>
<td>Electric Power Systems</td>
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<tr>
<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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<tr>
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<td>MECH 351</td>
<td>Finite Element Analysis</td>
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<tr>
<td>MECH 490</td>
<td>Senior Projects I</td>
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<td>WRI 327</td>
<td>Advanced Technical Writing</td>
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<tr>
<td>MECH elective</td>
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<tbody>
<tr>
<td>MECH 417</td>
<td>Fluid Mechanics II</td>
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<tr>
<td>MECH 437</td>
<td>Heat Transfer II</td>
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<tr>
<td>MECH 480</td>
<td>Vibrations</td>
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<td>MECH 491</td>
<td>Senior Projects II</td>
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<tr>
<td>PHIL 331</td>
<td>Ethics in the Professions</td>
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<tr>
<td>Humanities/Social Science elective*</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

* In addition to HUM 125, PHIL 331 and the Economics elective students must take 3 credits of Humanities and 9 credits of Social Science. Activity or performing based Humanities courses are not accepted.
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.

Program Educational Objectives
Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve. The Program Educational Objectives of Oregon Tech’s Mechanical Engineering Technology Program are to produce graduates who:
- are able to analyze and design practical mechanical systems.
- communicate effectively and work well on team-based engineering projects.
- succeed in entry-level mechanical and manufacturing engineering positions.
- pursue continued professional development.

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.

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 have the opportunity to participate in the state-wide MECOP internship program. For information, see the following Web site: http://mecop.ous.edu.

Accreditation
The Mechanical Engineering Technology 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.

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 190 credit hours as prescribed in the following curriculum outline.
# Bachelor of Science in Mechanical Engineering Technology Curriculum

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

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
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</thead>
</table>
| CHE 101/201 Chemistry | 3  
| CHE 104/204 Chemistry Laboratory | 1  
| MATH 111 College Algebra | 4  
| MET 111 Orientation I | 2  
| WRI 121 English Composition | 3  
| Psychology elective* | 3  
| **Total** | **16**  
<p>|</p>
<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Winter</th>
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</table>
| MATH 112 Trigonometry | 4  
| MET 112 Orientation II | 2  
| MFG 103 Introductory Welding Processes | 3  
| WRI 122 English Composition | 3  
| Social Science elective | 3  
| **Total** | **15**  
<p>|</p>
<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Spring</th>
</tr>
</thead>
</table>
| MATH 251 Differential Calculus | 4  
| MFG 120 Manufacturing Processes I | 4  
| SPE 111 Fundamentals of Speech | 3  
| Economics elective | 3  
| Humanities elective | 3  
| **Total** | **17**  
<p>|</p>
<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Fall</th>
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</thead>
</table>
| MATH 252 Integral Calculus | 4  
| MET 160 Materials I | 3  
| MET 241 CAD for Mechanical Design I | 2  
| PHY 201/221 General Physics | 4  
| WRI 227 Technical Report Writing | 3  
| **Total** | **16**  
<p>|</p>
<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Winter</th>
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</thead>
</table>
| ENGR 211 Statics** | 4  
| MATH 254N Vector Calculus I | 4  
| MET 242 CAD for Mechanical Design II | 2  
| MFG 112 Introduction to Manufacturing Processes | 3  
| PHY 202/222 General Physics | 4  
| **Total** | **17**  
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<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Spring</th>
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</thead>
</table>
| ENGR 213 Strength of Materials** | 4  
| MATH 361 Statistical Methods I | 4  
| MET 218 Fluid Mechanics | 4  
| PHY 203/223 General Physics | 4  
| **Total** | **16**  
<p>|</p>
<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Fall</th>
</tr>
</thead>
</table>
| ENGR 236 Fundamentals of Electric Circuits | 3  
| ENGR 266 Computer Programming for Engineers | 3  
| MET 315 Machine Design I | 3  
| MET 360 Materials II | 3  
| MET 363 Instrumentation | 3  
| **Total** | **15**  
<p>|</p>
<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Winter</th>
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</thead>
</table>
| ENGR 212 Dynamics | 5  
| ENGR 355 Thermodynamics*** | 3  
| MET 316 Machine Design II | 3  
| MET 375 Solid Modeling | 3  
| **Social Science elective** | **3**  
| **Total** | **15**  
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<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Spring</th>
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</table>
| MET 313 Applied Thermodynamics | 3  
| MET 415 Design Project | 3  
| MET 351 Finite Element Analysis | 3  
| MFG 314 Geometric Dimensioning and Tolerancing | 3  
| Humanities elective | 3  
| **Total** | **15**  
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<thead>
<tr>
<th>Senior Year</th>
<th>Fall</th>
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</table>
| MGT 345 Engineering Economy | 3  
| MET 323 Heat Transfer I | 3  
| MET 326 Electric Power Systems | 3  
| MET 490 Senior Projects I | 3  
| MET elective | 3  
| **Total** | **15**  
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<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Winter</th>
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</thead>
</table>
| MET 426 Fluid Power Systems | 3  
| MET 437 Heat Transfer II | 2  
| MET 491 Senior Projects II | 3  
| SPE 321 Small Group and Team Communication | 3  
| WRI 327 Advanced Technical Writing | 3  
| MET elective | 3  
| **Total** | **17**  
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<tr>
<th>Senior Year</th>
<th>Spring</th>
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</table>
| MET 492 Senior Projects III | 3  
| MFG 331 Industrial Controls | 3  
| Engineering Exam**** | 1  
| Humanities elective | 3  
| MET elective | 3  
| MET elective | 3  
| **Total** | **16**  
|  
|  
|  

* PSY 201 Recommended

** ENGT 230, ENGT 231, ENGT 232 sequence may be substituted for the ENGR 211, ENGR 213 sequence

*** MET 232 Thermodynamics may be substituted for ENGR 355 Thermodynamics

**** Engineering Exam to be selected from:
- ENGR 485 Fundamentals of Engineering Exam
- MFG 428 Manufacturing Engineering Certification
Mathematics Department

Cristina Negoita, Department Chair
Jim Ballard, Scheduling Coordinator
Tiernan Fogarty, Advising Coordinator

Professors: B. Cornelius, J. Fischer, T. Thompson
Associate Professors: J. Ballard, T. Fogarty, C. Negoita, G. Waterman
Assistant Professors: R. Paul, J. Reid, T. Torres

General Education
Courses offered by the Department of 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.

Degree Offered
Bachelor of Science in Applied Mathematics

Minor Offered
Applied Mathematics

Program Objectives
Coursework for the bachelor’s degree is intended to provide a solid foundation of mathematical theory and a broad selection of applied work both in and outside mathematics. The prospective major will complete coursework in calculus, differential equations and numerical methods. Students also take a sequence of introductory physics courses and a further sequence in a technical field outside mathematics.

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 sufficient background 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.

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 181. 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 Introduction to Computational Software
MATH 251 - MATH 254N Calculus Sequence

Upper-Division Core Requirements
(43 credits)
MATH 311 Introduction to Real Analysis
MATH 327 Discrete Mathematics
MATH 321-322 Applied Differential Equations I, II
MATH 341 Linear Algebra I
MATH 354 Vector Calculus II
MATH 361 Statistical Methods I
MATH 421 Applied Partial Differential Equations I
MATH 451 Numerical Methods I

Plus two additional courses chosen from:
MATH 422 Applied Partial Differential Equations II
MATH 423 Applied Partial Differential Equations III
MATH 452 Numerical Methods II
MATH 453 Numerical Methods III

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, 126, 223 Programming Languages
• CHE 221, 222, 223 General Chemistry
• ENGR 211, 212, 213 Statics, Dynamics, Strength of Materials
• PHY 311, 312, 313 Introduction to Modern Physics

Examples of Focused Electives
• CST 313 Computer Software Techniques
• CHE 331, 332, 333 Organic Chemistry
• EET 371 LaPlace Transforms and Applications
• ENGR 231 Fluid Dynamics
• ENGR 236 Fundamentals of Electric Circuits
• PSY 361 Industrial Psychology
• RDSC 356 Magnetic Resonance

Notes:
1. Some of the above courses have an additional lab requirement.
2. PHY 221, 222, 223 may not be used as focused electives.
## Bachelor of Science in Applied Mathematics Curriculum

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

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<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
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<td>MATH 251</td>
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<tr>
<td>SPE 111</td>
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<td>Social Science</td>
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<td>PHY 221</td>
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<td>PHY 222</td>
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<tbody>
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<td>MATH 354</td>
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<tr>
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<tbody>
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<td>SPE 321</td>
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<td>Communication</td>
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<td>Elective (upper-division)</td>
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<td>MATH 451</td>
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<td>Elective</td>
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<tr>
<td>Elective (upper-division)</td>
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<table>
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</table>

* 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.

** Students will choose 2 upper-division courses from mathematics or physics with the approval of a mathematics advisor.

### 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

1. Required courses: MATH 251, MATH 252, MATH 253N, MATH 254N and MATH 341, plus 10 additional upper-division mathematics credits selected from the list below.

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

3. At least 12 credits must be taken at Oregon Tech.

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.

### Upper-Division Electives:

- MATH 311 Introduction to Real Analysis
- MATH 321 Applied Differential Equations I
- MATH 322 Applied Differential Equations II
- MATH 341 Linear Algebra I
- MATH 342 Linear Algebra II
- MATH 346 Number Theory
- MATH 347 Fundamentals of Abstract Algebra
- MATH 354 Vector Calculus II
- MATH 356 Statistical Methods II
- MATH 421 Applied Partial Differential Equations
- MATH 422 Applied Partial Differential Equations II
- MATH 423 Applied Partial Differential Equations III
- MATH 425 Vector Analysis
- MATH 451 Numerical Methods I
- MATH 452 Numerical Methods II
- MATH 453 Numerical Methods III
- MATH 465 Mathematical Statistics

Note: Not all courses are offered every term or every year.
Medical Imaging Technology Department

LeAnn Maupin, Department Chair

Robyn Cole, Diagnostic Medical Sonography Program Director and Clinical Coordinator

Barry Canaday, Echocardiography Program Director and Clinical Coordinator

Richard Hoylman, Nuclear Medicine Technology Program Director and Clinical Coordinator

Jenny Kellstrom, Radiologic Science Program Director and Clinical Coordinator

Chris Caster, Vascular Technology Program Director and Clinical Coordinator

Janette Isaacson, Vascular Technology and Echocardiography Degree Completion Program Director

Professors: D. McCollam, J. Kellstrom, T. McVay, S. Schultz, G. Zimmerman

Associate Professors: C. Caster, L. Maupin

Assistant Professors: B. Canaday, R. Cole, R. Hoylman


Participating Faculty: J. Isaacson (Distance Education)

Degrees Offered
Bachelor of Science in Diagnostic Medical Sonography
Bachelor of Science in Echocardiography
Bachelor of Science in Nuclear Medicine Technology
Bachelor of Science in Radiologic Science
Bachelor of Science in Vascular Technology

Specialization Offered
Picture Archiving and Communication Systems (PACS)

Department Objectives
The objectives of the Medical Imaging Technology Department are:
1. To prepare students to become effective participants in the medical imaging professions.
2. To provide the residents of Oregon and the Pacific Northwest with Bachelor of Science degrees in Medical Imaging Technology.
3. To prepare students for professions that require critical-thinking and problem solving skills.
4. To instill an effective influence of professional character, the knowledge and experience to pass the National Registry exams.
5. To instill lifelong learning.

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.

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.

Echocardiography
Echocardiography is a safe method of obtaining ultrasound images for diagnosis of cardiac pathology in adult and pediatric patient populations. Echocardiographers conduct patient interviews, compile health histories and determine risk assessments pertaining to cardiovascular disease. The echocardiographer reports pertinent findings to the physician as part of the diagnostic process.

Nuclear Medicine Technology
Nuclear medicine is an imaging science that demonstrates pathology through physiologic processes, as opposed to detailed anatomic images. This branch of imaging science has been in existence for over four decades, and provides unique diagnostic information obtained by the patient's ingestion, inhalation, or being injected with a radioactive isotope. 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 (CITT), Quality Assurance, and imaging department management.

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.

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.

All imaging students must have a current American Heart CPR card during the entire extern year. The imaging department will provide an opportunity for the student to receive this certification during the junior year. There is an additional fee for this certification.

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 will be required to pass a drug test prior to acceptance by the externship site.
3. Students must complete a request for criminal history which is required by many of the sites for persons providing care to children or the developmentally disabled.
4. Students will be required to carry group health insurance coverage during the entire externship year.

**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**

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 2.75 weighted GPA (though a 3.0 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 and Physiology I
   - BIO 232 Human Anatomy and Physiology II
   - BIO 233 Human Anatomy and Physiology III
   - CHE 101 Elementary Chemistry
   - CHE 104 Elementary Chemistry
   - MATH 112 Trigonometry
   - MIT 103 Introduction to Medical 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.

2. All applicants must attend an Oregon Tech hosted selection event on a specific date during spring term. Several activities are conducted during this event to allow students to demonstrate communication skills, team skills, writing skills, problem solving skills and professionalism. Faculty from the MIT Department, industry leaders and other Oregon Tech department members are present at the selection event to evaluate those skills.

**Application Requirements**

Applications are available on the MIT website at www.oit.edu/mit.

A copy of transcripts (unofficial) must be attached to the application. Incomplete applications will not be accepted. There are no refunds of the application fee. Repeat applicants must follow the same procedures as first-time applicants. Contact the selection chairman for a new application.

The application form allows ranking of programs by choice (first and second) and only one application per student will be accepted. If multiple applications are received, they will be returned along with the application fees.

For current selection information refer to the Oregon Tech Medical Imaging Technology (MIT) website at www.oit.edu/mit.

**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 Introduction to Medical 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 form is included in the MIT 103 course. Transfer students must apply to both Oregon Tech and MIT using two separate application processes. For more information on this distance course, contact Diana Evans at (541) 885-1676.

**Graduation Requirements**

All credits listed in the curriculum for the catalog year a student begins a program must be fulfilled. Total credits required for graduation are: Diagnostic Medical Sonography 195, Echocardiography 198, Nuclear Medicine Technology 196, Radiologic Science 202 and Vascular Technology 200.

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), 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 a professional program as a sophomore.

When a student unsuccessfully attempts an imaging course, progress in the professional curriculum is curtailed until that course is successfully completed the following year, pending reinstatement. However, if the student has an unsuccessful attempt fall term, sophomore year, they must reapply to the program. If the student has an unsuccessful attempt after 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 letter must be submitted at least one term prior to re-admittance. Re-admittance may also depend upon other requirements such as auditing courses, attending labs, and/or remedial work as specified by the program director.

When students attempt unsuccessfully a second time the same or a different imaging course, they are terminated from that program. Additionally, if a student receives a “D,” “F” or “W” in two or more imaging courses in one term, they will be dismissed from that program. Students may apply for admittance to a second imaging program under the same application criteria as all other applicants. After two unsuccessful attempts to complete two different programs, students 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.

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**Bachelor of Science Diagnostic Medical Sonography Curriculum**

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

### Pre-Medical Imaging Technology

#### Freshman Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Course</th>
<th>Credits</th>
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<tr>
<td>Fall</td>
<td>BIO 231 Human Anatomy and Physiology I</td>
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<tr>
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<td>CHE 101 Elementary Chemistry</td>
<td>3</td>
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<td>CHE 104 Elementary Chemistry Laboratory</td>
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<td>MATH 111 College Algebra</td>
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#### Freshman Year

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<tr>
<td>Winter</td>
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<tr>
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<td>MATH 112 Trigonometry</td>
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#### Sophomore Year

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<td>BIO 233 Human Anatomy and Physiology III</td>
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<td>PSY Psychology (PSY 201, PSY 202 or PSY 203)</td>
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<tr>
<td></td>
<td>SPE 111 Fundamentals of Speech</td>
<td>3</td>
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<tr>
<td></td>
<td>WRI 122 English Composition</td>
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#### Professional Courses

##### Sophomore Year

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<td>BIO 335 Cross-Sectional Anatomy *</td>
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<td>DMS 223 Applications of Abdominal Sonography I *</td>
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<td>DMS 252 Sophomore Laboratory I *</td>
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<td>PHY 217 Physics of Medical Imaging</td>
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#### Sophomore Year

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<td>DMS 224 Applications of Abdominal Sonography II *</td>
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<td>DMS 235 Pelvic Sonography *</td>
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<td>DMS 253 Sophomore Laboratory II *</td>
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<td>MIT 231 Sonographic Principles and Instrumentation I *</td>
<td>4</td>
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<td>WRI 227 Technical Report Writing</td>
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<td>BUS 317 Health Care Management</td>
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<td>DMS 315 Sonographic Superficial Structures *</td>
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<td>DMS 365 Sonographic Pathology *</td>
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<td>DMS 371 Obstetrical Sonography First Trimester *</td>
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<td>SPE 321 Small Group and Team Communication</td>
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##### Junior Year

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<td>BUS 316 Total Quality in Health Care</td>
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<td>DMS 316 Survey of Vascular Technology</td>
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<td>DMS 342 Survey of Adult Echocardiography</td>
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<td></td>
<td>DMS 353 Junior Laboratory II *</td>
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<td>DMS 372 Obstetrical Sonography Second/Third Trimester *</td>
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##### Junior Year

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<th>Term</th>
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<tr>
<td>Spring</td>
<td>DMS 343 Fetal Echo, Neonatal, and Pediatric Sonography *</td>
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<td>DMS 354 Junior Laboratory III *</td>
<td>1</td>
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<tr>
<td></td>
<td>DMS 373 Obstetrical Pathology *</td>
<td>3</td>
</tr>
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<td></td>
<td>DMS 388 Externship Preparation *</td>
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##### Senior Year

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##### Senior Year

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<td>DMS 430 Diagnostic Medical Sonography Externship *</td>
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##### Senior Year

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<th>Credits</th>
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<td>DMS 430 Diagnostic Medical Sonography Externship *</td>
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##### Senior Year

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<th>Term</th>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Spring</td>
<td>DMS 430 Diagnostic Medical Sonography Externship *</td>
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*Core Imaging Courses

**Courses listed under Communication requirements for General Education.
Bachelor of Science in Echocardiography Technology

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

### Pre-Medical Imaging Technology

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<thead>
<tr>
<th>Curriculum</th>
<th>Freshman Year</th>
<th>Fall</th>
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<tbody>
<tr>
<td>BIO 231</td>
<td>Human Anatomy and Physiology I</td>
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<td></td>
</tr>
<tr>
<td>CHE 101</td>
<td>Elementary Chemistry</td>
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<td>CHE 104</td>
<td>Elementary Chemistry Laboratory</td>
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</tr>
<tr>
<td>MATH 111</td>
<td>College Algebra</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MIT 103</td>
<td>Introduction to Medical Imaging</td>
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<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Spring</th>
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<tbody>
<tr>
<td>BIO 200</td>
<td>Medical Terminology</td>
</tr>
<tr>
<td>BIO 233</td>
<td>Human Anatomy and Physiology III</td>
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<td>PSY</td>
<td>Psychology (PSY 201, PSY 202 or PSY 203)</td>
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<tr>
<td>SPE 111</td>
<td>Fundamentals of Speech</td>
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<td>WRI 122</td>
<td>English Composition</td>
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### Professional Courses

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<tbody>
<tr>
<td>BIO 220</td>
<td>Cardiovascular Physiology*</td>
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<td>ECHO 320</td>
<td>Cardiographic Methods*</td>
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<td>PHY 217</td>
<td>Physics of Medical Imaging*</td>
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<td>WRI 227</td>
<td>Technical Report Writing</td>
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<table>
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<tr>
<th>Sophomore Year</th>
<th>Winter</th>
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<tbody>
<tr>
<td>BIO 346</td>
<td>Pathophysiology I*</td>
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<td>ECHO 231</td>
<td>Echocardiography I*</td>
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<td>Sonographic Principles and Instrumentation I*</td>
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<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Spring</th>
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<tbody>
<tr>
<td>BIO 347</td>
<td>Pathophysiology II*</td>
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<td>ECHO 225</td>
<td>Cardiopulmonary Patient Management Practices*</td>
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<td>ECHO 232</td>
<td>Echocardiography II*</td>
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<td>ECHO 332</td>
<td>Invasive Cardiology*</td>
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<td>MIT 232</td>
<td>Sonographic Principles and Instrumentation II</td>
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### Bachelor of Science in Nuclear Medicine Technology

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

### Pre-Medical Imaging Technology

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### Bachelor of Science in Radiologic Science Curriculum

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

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* Core Imaging Courses
** Courses listed under Communication requirement for General Education.
Bachelor of Science in Vascular Technology
Curriculum
Required courses and recommended terms during which they should be taken:

Pre-Medical Imaging Technology

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Professional Courses

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* Core Imaging courses
** Courses listed under Communication requirement for General Education.

Picture Archiving and Communication Systems (PACS) Specialization

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 specialization in Picture Archiving and Communication Systems (PACS) is available for motivated students to pursue this opportunity.

Requirements of the Specialization

<table>
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<tr>
<th>Term</th>
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<td>Winter</td>
<td>MIT 333 HIPAA for PACS/HI</td>
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<td>Fall</td>
<td>MIT 361 Advanced PACS</td>
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<td>Winter</td>
<td>MIT 362 PACS Networking</td>
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<tr>
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<td>MIT 363 PACS DBMS</td>
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<td>Spring</td>
<td>MIT 374 Quality Assurance of Medical Images</td>
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Students must earn a “C” or better in all courses to be awarded the specialization.

Degree Completion Programs

The Echocardiography, Radiologic Science and Vascular Technology and Diagnostic Medical Sonography 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.

Bachelor’s Degree

Completion Diagnostic Medical Sonography

Admission Procedures

1. Complete the Distance Education Application for Admission and the appropriate Statement of Acknowledgment for this program.
2. Mail your application, a copy of your registry certificate, a check for $100 (payable to Oregon Institute of Technology) and the signed Statement...
of Acknowledgement, to the Distance Education Office.
3. Mail official transcripts from all colleges you have attended to the Distance Education Office.
4. Request a letter of good standing from ARDMS be mailed to the Distance Education Office. This letter will enable the University Registrar to grant college credit based on your registry.

Courses granted for Registry

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<td>Applications of Abdominal Sonography II</td>
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<td>DMS 234</td>
<td>Pelvic Sonography</td>
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<td>Diagnostic Medical Sonography Patient Care</td>
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<td>DMS 252</td>
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<td>DMS 253</td>
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<td>DMS 371</td>
<td>Obstetrical Sonography First Trimester</td>
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<td>DMS 372</td>
<td>Obstetrical Sonography Second/Third Trimester</td>
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<td>Externship Preparation (waived)</td>
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<td>MIT 103</td>
<td>Introduction to Medical Imaging</td>
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<td>MIT 231</td>
<td>Sonographic Principles and Instrumentation I</td>
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Oregon Tech Degree Completion Credits

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<td>Sonographic Superficial Structures</td>
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<td>Survey of Vascular Technology *</td>
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<td>DMS 342</td>
<td>Survey of Adult Echocardiography</td>
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<td>DMS 343</td>
<td>Fetal Echo, Neonatal and Pediatric Sonography</td>
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Bachelor’s Degree Completion Radiologic Science Admission Procedures

1. Complete the Distance Education Application for Admission and the appropriate Statement of Acknowledgement for this program.
2. Mail your application, a copy of your registry certificate, a check for $100 (payable to Oregon Institute of Technology) and the signed Statement of Acknowledgment to the Distance Education Office.
3. Mail official transcripts from all colleges you have attended to the Distance Education Office.
4. Request a letter of good standing from ARDMS/CCI be mailed to the Distance Education Office. This letter will enable the University Registrar to grant college credit based on your registry.

Courses granted for Registry

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<td>Pathophysiology I</td>
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<td>ECHO 225</td>
<td>Cardiopulmonary Patient Management Practices</td>
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<td>Echocardiography I</td>
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<td>Cardiographic Methods</td>
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<td>ECHO 321</td>
<td>Stress and Tansesophageal Echo</td>
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Bachelor’s Degree Completion Radiologic Science Admission Procedures

1. Complete the Distance Education Application for Admission and the appropriate Statement of Acknowledgement for this program.
2. Mail your application, an unofficial copy of your ARRT registry card, signed Affiliation Agreement and a check for $100 (payable to Oregon Institute of Technology) and the signed Statement of Acknowledgment to the Distance Education Office.

Transfer Courses

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Oregon Tech Degree Completion Courses

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<td>Echocardiography IV</td>
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<td>Fundamentals of Speech</td>
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<td>WRI 227</td>
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* Credits may be granted for additional specialty registry exams. Please contact Program Director for more information.
Technology) to the Distance Education Office. A copy of your ARRT card must accompany your application for Oregon Tech to begin processing the application. This document verifies your eligibility for admission to the program.

3. Request that official transcripts from all colleges you have attended and an official copy of your ARRT registry documents be sent to the Distance Education Office. Official copies will enable Oregon Tech to grant college credit based on your credentials.

**Courses granted for Registry**

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<td>RDSC 201</td>
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<td>RDSC 202</td>
<td>Imaging Techniques II</td>
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<td>RDSC 205</td>
<td>Patient Care</td>
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<td>RDSC 210</td>
<td>Radiographic Positioning I</td>
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<tr>
<td>RDSC 211</td>
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<td>Contrast Media Procedures</td>
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<td>Equipment Operation and Maintenance</td>
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<td>RDSC 320</td>
<td>Surgical, Trauma and Mobile Radiography</td>
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**Oregon Tech Degree Completion Courses**

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<td>BIO 336</td>
<td>Essentials of Pathophysiology</td>
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<td>BUS 316</td>
<td>Total Quality in Health Care</td>
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<td>BUS 317</td>
<td>Health Care Management</td>
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<td>RDSC 326</td>
<td>Cardiac/Interventional Technology *</td>
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<tr>
<td>RDSC 354</td>
<td>Mammography *</td>
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<td>or</td>
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<tr>
<td>RDSC 365</td>
<td>Advanced Quality Assurance/Quality Control</td>
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</tr>
<tr>
<td>RDSC 355</td>
<td>Computed Tomography</td>
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<td>SPE 321</td>
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* Optional credit may be awarded for additional registries.

**Transfer Courses**

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<td>Human Anatomy and Physiology I</td>
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<tr>
<td>MATH 111</td>
<td>College Algebra</td>
<td>4</td>
</tr>
<tr>
<td>MATH 112</td>
<td>Trigonometry</td>
<td>4</td>
</tr>
<tr>
<td>PSY</td>
<td>Psychology (PSY 201, PSY 202 or PSY 203)</td>
<td>3</td>
</tr>
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<td>SPE 111</td>
<td>Fundamentals of Speech</td>
<td>3</td>
</tr>
<tr>
<td>WRI 121</td>
<td>English Composition</td>
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<tr>
<td>WRI 122</td>
<td>English Composition</td>
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<tr>
<td>WRI 227</td>
<td>Technical Report Writing</td>
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</tbody>
</table>

* Optional credit may be awarded for additional registries.

**Bachelor’s Degree Completion Vascular Technology**

**Admission Process**

1. Complete the Distance Education Application for Admission and the appropriate Statement of Acknowledgement for this program.
2. Mail your application, a copy of your registry certificate, a check for $100 (payable to Oregon Institute of Technology) and the signed Statement of Acknowledgement to the Distance Education Office.
3. Request that official transcripts from all colleges you have attended be sent to the Distance Education Office.
4. Request a letter of good standing from the University Registrar to grant college credit based on your credentials.

**Transfer Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
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<td>BIO 231</td>
<td>Human Anatomy and Physiology I</td>
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<td>BIO 232</td>
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<td>WRI 122</td>
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**Courses granted for Registry**

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<tr>
<td>MIT 103</td>
<td>Introduction to Medical Imaging</td>
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<td>MIT 231</td>
<td>Sonographic Principles and Instrumentation I</td>
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<td>Sonographic Principles and Instrumentation II</td>
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<td>PHY 217</td>
<td>Physics of Medical Imaging *</td>
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<tr>
<td>VAS 214</td>
<td>Vascular Anatomy</td>
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<tr>
<td>VAS 225</td>
<td>Patient Management Practices</td>
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<td>VAS 245</td>
<td>Peripheral Venous Disease</td>
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<td>Peripheral Arterial Disease</td>
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<td>VAS 247</td>
<td>Cerebrovascular Disease</td>
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**Oregon Tech Degree Completion Credits**

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<td>Cardiovascular Physiology</td>
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<td>BUS 316</td>
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<tr>
<td>BUS 317</td>
<td>Health Care Management</td>
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<tr>
<td>CHE 360</td>
<td>Clinical Pharmacology for the Health Professions</td>
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<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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<td>VAS 335</td>
<td>Radiographic Vascular Anatomy</td>
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<td>VAS 337</td>
<td>Survey of Echocardiography</td>
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<td>VAS 365</td>
<td>Abdominal Vascular Disease</td>
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<td>VAS 366</td>
<td>Special Circulatory Problems</td>
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<tr>
<td>VAS 375</td>
<td>Survey of Abdominal Sonography *</td>
<td>3</td>
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Natural Sciences Department

Ken Usher, Department Chair


Associate Professors: H.-Y. Li, R. Torres, R. Wilde

Assistant Professors: S. Anthony, M. Beekman, S. Bekker, J. Clark, M. Hughes, R. McClure, G. Pak, L. Parratt

Instructors: M. Begley, T. Hower, N. Kinche-loe, T. Piacenza, L. Taylor

Degrees Offered
Bachelor of Science in Biology
Bachelor of Science in Biology-Health Sciences
Bachelor of Science in Environmental Sciences

Minor Offered
Biology

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 Program

Richard Torres, Program Director

Participating Faculty: S. Anthony, B. Clark, J. Clark, H.-Y. Li, L. Powers, R. Torres

Degree Offered
Bachelor of Science in Biology

Minor Offered
Biology

Objective and Career Opportunities
The Bachelor of Science in Biology is designed to prepare students for entry into graduate careers in the biological sciences and biology education.

A biological sciences curriculum emphasizes field and laboratory training in ecology, evolution, and the biology of organisms. It is designed for students wishing to apply to graduate programs in biology, those seeking careers in the applied biological sciences, and those wishing to pursue graduate teaching credentials with a specialty in biology.

Degree Requirements
The minimum graduation requirement for Oregon Tech is 180 credit hours (term hours). A minimum of 60 credits must be in upper-division (300- and 400-numbered) courses. These requirements include those for general education (stated elsewhere in this catalog) and the prescribed courses required for every student completing a Bachelor of Science in Biology degree.

Biology 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.
# Bachelor of Science in Biology

## Curriculum

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

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<thead>
<tr>
<th>Freshman Year</th>
<th>Fall</th>
<th>Winter</th>
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<tbody>
<tr>
<td>BIO 211</td>
<td>Principles of Biology</td>
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<td>GEOG 105 Phys. Geogrophy: Geomorphology</td>
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<td>CHE 222</td>
<td>General Chemistry</td>
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<td>MATH 252 Integral Calculus</td>
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<td>Vertebrate Biology</td>
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<td>Organic Chemistry</td>
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<td>PHY 221</td>
<td>General Physics with Calculus</td>
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<td>Humanities elective</td>
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<td>BIO 352</td>
<td>Developmental Biology</td>
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<td>CHE 332</td>
<td>Organic Chemistry II</td>
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<td>PHY 222</td>
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<td>BIO 327 General Ecology</td>
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<td>CHE 333 Organic Chemistry III</td>
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<td>PHY 225 General Physics with Calculus</td>
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<table>
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<td>Social Science elective</td>
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<table>
<thead>
<tr>
<th>Senior Year</th>
<th>Spring</th>
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<tbody>
<tr>
<td>BIO 342</td>
<td>Cell Biology</td>
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<tr>
<td>BIO 407</td>
<td>Biology Seminar</td>
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<tr>
<td>CHE 452</td>
<td>Biochemistry III</td>
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<td>Elective</td>
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</table>

When choosing the major 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.

### General and Major Elective Choices:

- **BIO 112** Introduction to Data Analysis | 1
- **BIO 120** Nutrition | 3
- **BIO 121** Introduction to Veterinary Medicine | 4
- **BIO 225** Riparian Assessment Methods | 1
- **BIO 226** Introduction to Wildlife Rehabilitation | 3
- **BIO 227** Introduction to Forensic Science | 4
- **BIO 231** Human Anatomy and Physiology I | 4
- **BIO 232** Human Anatomy and Physiology II | 4
- **BIO 233** Human Anatomy and Physiology III | 4
- **BIO 331** Human Anatomy and Physiology I | 5
- **BIO 332** Human Anatomy and Physiology II | 5
- **BIO 333** Human Anatomy and Physiology III | 5
- **BIO 337** Aquatic Ecology | 7
- **BIO 338** Pathophysiology | 3
- **BIO 347** Pathophysiology II | 3
- **BIO 357** Introduction to Neuroscience | 3
- **BIO 428** Animal Behavior | 3
- **BIO 434** Data Analysis Methods | 4
- **BIO 436** Immunology | 4
- **BIO 471** Senior Project Proposal Research | 1
- **BIO 472** Senior Project Proposal | 1
- **BIO 473** Senior Project Data Collection | 3
- **BIO 474** Senior Project Data Analysis and Presentation | 2
- **CHE 235** Streamwater Chemistry and Sampling | 3
- **CHE 315** Environmental Chemistry and Toxicology | 3
- **CHE 325** Soil Science | 4
- **CHE 360** Clinical Pharmacology for the Health Professions | 3
- **GEOG 115** Physical Geography: Climatography | 4
- **GIS 105** Map and Compass/GIS | 1
- **MATH 362** Statistical Methods II | 4

### Other Major Electives with advisor approval:

1. MATH 243 may be substituted with advisor consent.
2. Offered in alternating years.
3. Offered in alternating years, please see course schedule for each term.
4. PHY 201, PHY 202, PHY 203 may be substituted with advisor consent.
5. Another social science course may be substituted with advisor consent.
6. Students wishing to use Human Anatomy and Physiology should select either the 231-233 or 331-333 sequence. Note credit hour differences and consult with advisor.
7. Either BIO 337 or BIO 428 is required for admission to Southern Oregon University’s MAT program.
Biology-Health Sciences Program

Burton Clark, Program Director
Participating Faculty: S. Bekker, B. Clark, H.-Y. Li, R. McClure, M. O’Shaughnessy, G. Pak, E. Schechtel, R. Swisher, K. Usher

Degree Offered
Bachelor of Science in Biology-Health 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, communication, and mathematics to prepare students for entry into professional programs. The program will meet prerequisite requirements for schools of medicine, dentistry, veterinary medicine, osteopathic medicine, optometry, pharmacy, and podiatry and for graduate programs in physical therapy and occupational therapy. 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. This major can also prepare students for a career in biology education.

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 two to three years of high school mathematics and a minimum of three years of high school science (biology, chemistry, and physics).

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 different health professions and graduate schools differ, some upper-division courses may be substituted for others, with approval of your academic advisor.
# Bachelor of Science in Biology-Health Sciences Curriculum

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

**Freshman Year**

<table>
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<tr>
<th>Fall</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 211 Principles of Biology</td>
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<td>MATH 111 College Algebra</td>
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<td>WRI 121 English Composition</td>
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**Sophomore Year**

<table>
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<tbody>
<tr>
<td>BIO 109 Introduction to the Medical Sciences</td>
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<tr>
<td>BIO 212 Principles of Biology</td>
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<tr>
<td>MATH 112 Trigonometry</td>
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<td>WRI 122 English Composition</td>
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**Junior Year**

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<tbody>
<tr>
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<tr>
<td>CHE 333 Organic Chemistry II</td>
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<tr>
<td>PHY 222 General Physics with Calculus 4</td>
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<td>Humanities elective</td>
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</thead>
<tbody>
<tr>
<td>BIO 450 Biochemistry I</td>
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<tr>
<td>Health Biology elective (upper-division)</td>
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**Senior Year**

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<td>BIO 346 Pathophysiology I</td>
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**Sophomore Year**

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<tbody>
<tr>
<td>CHE 221 General Chemistry</td>
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**Junior Year**

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**Senior Year**

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<tr>
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**Sophomore Year**

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<tr>
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<tbody>
<tr>
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<td>SPE 321 Small Group and Team Communication</td>
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<tbody>
<tr>
<td>CHE 233 General Chemistry</td>
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<td>WRI 227 Technical Report Writing</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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</table>

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.

1. MATH 243 may be substituted with advisor consent.
2. 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.
3. Minimum of 21 credits of upper-division health biology electives must be completed, chosen from the upper-division list above.
4. PHY 201, PHY 202, PHY 203 may be substituted with advisor consent.
5. Advisor approval of all elective choices is required. Additional courses from the health biology lists above, and/or suitable courses from BUS, MATH, PHY or PSY are recommended.
Pre-Professional Program in Dentistry
Rose McClure, Advising Coordinator

The pre-professional program in dentistry prepares the student for entrance into dental school. While the requirements for admission to dental schools vary and some will accept students earlier, a bachelor's degree is highly encouraged for acceptance. In fact, 82% of first-year dental students have completed a four-year baccalaureate degree before starting dental school and 90% have four years of pre-dental college courses before acceptance. The curriculum at Oregon Institute of Technology provides the prerequisite courses for dental school including a full year of general biology, general chemistry, organic chemistry, biochemistry, anatomy & physiology, and physics. All of these have year-long labs. In addition, health-specific courses in cell biology, medical genetics, medical microbiology, nutrition, pathophysiology, and immunology are taken along with calculus, humanities, psychology, and English composition courses.

Because the pre-dental requirements for each dental school vary slightly, it is suggested by sophomore year of college that students look at the requirements for several dental schools along with their dream school. It is also recommended that students do not use AP credit to fill prerequisites for dental school since most do not accept them. There are eight advisors in Oregon Tech's pre-dental program and it is encouraged that students work closely with the advisor they connect best with. Advisors guide students on courses selection, job or volunteer experience, and lead them through the medical school application process. Admission into medical school requires a four-year bachelor's degree with a preference for a science major over a non-science major. Once accepted, dental school then requires approximately four years of education and three to six years of internship and residency. More than 17,000 students enter medical school each year with half of the class being women.

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. It is recommended that students do not use AP credit to fill medical school prerequisites since they often do not accept them. Nonetheless, it is encouraged to take AP courses in high school since the rigor is excellent college preparation.

Students considering a career in medicine should explore the websites of the schools they have interest in as the prerequisites for each may vary. Students are suggested to read the Medical School Admissions Requirements (MSAR) published by the Association of American Medical Colleges. The pre-med program at Oregon Tech includes a full year of general biology, general chemistry, organic chemistry, biochemistry, anatomy & physiology, and physics. All of these have year-long labs. In addition, health-specific courses in cell biology, medical genetics, medical microbiology, nutrition, pathophysiology, and immunology are taken along with calculus, humanities, psychology, and English composition courses.

Completion of this program will lead to a degree in Biology. For complete program requirements and a list of appropriate courses please see the Bachelor of Science in Biology-Health Sciences.

Pre-Professional Program in Medicine
Rose McClure, Advising Coordinator

This program prepares students for entrance into medical school and is often referred to as pre-med. The curriculum at Oregon Institute of Technology provides a pathway to complete all the prerequisites that medical schools like to see and more. There are eight advisors in the pre-med program and students are encouraged to work closely with the advisor they connect best with. Advisors guide students on courses selection, job or volunteer experience, and lead them through the medical school application process. Admission into medical school 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. More than 17,000 students enter medical school each year with half of the class being women.

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. It is recommended that students do not use AP credit to fill medical school prerequisites since they often do not accept them. Nonetheless, it is encouraged to take AP courses in high school since the rigor is excellent college preparation.

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Completion of this program will lead to a degree in Biology. For complete program requirements and a list of appropriate courses please see the Bachelor of Science in Biology-Health Sciences.

Pre-Professional Program in Pharmacy
Rose McClure, Advising Coordinator

A pharmacy degree normally takes four years to complete. Most first-year pharmacy students have completed four years of undergraduate education and possess a bachelor's degree in the sciences. One also must complete the prerequisites for the pharmacy school. The curriculum at Oregon Institute of Technology provides the prerequisite courses including a full year of general biology, general chemistry, organic chemistry, biochemistry, anatomy & physiology, and physics. All of these have year-long labs. Additional courses in cell biology, medical genetics, medical microbiology, nutrition, pathophysiology, and immunology are taken along with calculus, humanities, psychology, statistics and English composition courses.

The pre-professional program in pharmacy at Oregon Tech has eight advisors and students are encouraged to work closely with the advisor they connect best with. 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 recommend 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). Oregon State University and the pharmacy schools in California do not. Admission to school is competitive so a strong undergraduate GPA, community service, and communications and leadership skills will help.

Completion of this program will lead to a degree in Biology. For complete program requirements and a list of appropriate courses please see the Bachelor of Science in Biology-Health Sciences.

**Pre-Professional Program in Veterinary Medicine**

Rose McClure, Advising Coordinator

The pre-professional program in veterinary medicine prepares students for entrance into veterinary school. There are twenty-eight veterinary schools in the United States and it is highly recommended that students visit the websites of the schools they are interested in. The prerequisites for each school vary slightly. There are eight advisors in the program and students should work closely with the advisor they connect best with.

Admission to veterinary school is competitive and requires a good undergraduate GPA in addition toshadowing or working with a veterinarian. Students are encouraged to work in a clinical practice, volunteer in an animal shelter, or work at a zoo or rehabilitation facility while completing their undergraduate courses. Students currently in high school should continue to take sciences courses and, if available, be involved in 4H or FFA. Advisors recommend that students do not use AP credit to fill prerequisites for veterinary school since most do not accept them.

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. If the student's home state does not have a veterinary school, hopefully the state "buys" seats from a veterinary school in a neighboring state for its residents. The WICHE program in the western United States allows out-of-state students to attend the University of Colorado, Oregon State University, Washington State University and University of California at Davis veterinary schools for in-state tuition.

Many veterinary schools require students to take the general test of the Graduate Record Examination (GRE). It is offered monthly and is often taken in the junior year of undergrad. The majority of first-year veterinary student have completed their bachelor's degree at a four-year university.

The program at Oregon Institute of Technology offers the prerequisite courses (and more) for veterinary school including a full year of general biology, general chemistry, organic chemistry, biochemistry, anatomy & physiology, and physics. All of these have year-long labs. In addition, health-specific courses in animal behavior, wildlife rehabilitation, cell biology, medical genetics, medical microbiology, nutrition, pathophysiology, and immunology are taken along with calculus, humanities, psychology, English composition and public speaking courses. Business-related courses are also recommended.

Completion of this program will lead to a degree in Biology. For complete program requirements and a list of appropriate courses please see the Bachelor of Science in Biology-Health Sciences.

**Biology Minor**

The biology minor is open to all majors and 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
- BIO 212 Principles of Biology
- BIO 213 Principles of Biology

And a minimum of 12 credits upper-division course work from the following list:

- BIO 313 Botany*
- BIO 317 Invertebrate Biology
- BIO 327 General Ecology *
- BIO 331 Human Anatomy and Physiology I
- BIO 332 Human Anatomy and Physiology II
- BIO 333 Human Anatomy and Physiology III
- BIO 337 Aquatic Ecology *
- BIO 341 Medical Genetics
- BIO 345 Medical Microbiology
- BIO 531 Vertebrate Biology
- BIO 426 Evolutionary Biology
- BIO 436 Immunology

* Courses offered in alternating years.
Environmental Sciences Program

Michael Hughes, Program Director

Participating Faculty: M. Hughes, L. Parratt, L. Powers, J. Ritter, E. Schechtel, L. Svanevik, D. Thaemert

Degree Offered
Bachelor of Science in Environmental Sciences

The Bachelor of Science degree in Environmental Sciences is a degree in science methodology and applied analysis, focusing on applying state-of-the-art field methods, instrumentation, data analysis and the study of environmental problems. Three technical emphasis areas are available: Watershed Science, Sustainable Technologies and Geographic Information Systems (GIS). The program builds on three cores: an environmental core of six lower-division courses, a basic sciences core consisting of nine courses (one year each of biology, chemistry and physics), and a mathematics core of five courses, including differential and integral calculus and statistics. The program is interdisciplinary in nature and utilizes practical skills and knowledge of faculty from a broad range of backgrounds and experience.

Students may choose to concentrate in one of the technical emphasis areas or, under the direction of an advisor, students may blend offerings from three areas to create a more individually focused curriculum. Courses from other departments including Civil Engineering, Renewable Energy Engineering and Manufacturing and Mechanical Engineering, Mathematics, Chemistry, Health Sciences, Computers, or Communication Studies may be substituted for technical emphasis courses upon approval of your advisor.

Objectives
The objectives of the Environmental Sciences Program are:
1. To provide students with knowledge and training in the practical application of the scientific method utilizing analytical approaches and instrumentation-based methodologies.
2. To prepare students for roles that require critical-thinking and problem-solving skills.
3. To present complex environmental problems from a systems perspective that features diverse data acquisition and manipulation techniques.
4. To allow students to develop team-based problem solving skills by encouraging collaboration, utilizing diverse approaches, and utilizing projects and task-based exercises and assignments.

Student Preparation
The Environmental Sciences curriculum is a demanding instructional program requiring the development and use of quantitative skills. Prospective students for this program are advised to complete two to three years of high school mathematics and science (biology, chemistry, and physics). Students should also be familiar with computer applications. Students transferring from other science or technical programs, including environmental programs at other institutions, are requested to contact the program director for information on program requirements.

Career Opportunities
The Environmental Sciences Program produces graduates who are highly skilled in the methodology and practice of environmental assessment. Students learn to design, implement and interpret the results of scientific studies used to address specific environmental issues and problems. Graduates can expect to find employment in consulting firms, government agencies (regulatory and research), educational institutions and many types of service and industrial firms. Students are also prepared to enter many graduate school programs.

Environmental Science students have been actively recruited by major employers including: U.S. Bureau of Reclamation, Bureau of Land Management, U.S. Fish and Wildlife Service, Oregon State Police Wildlife Enforcement, Klamath County Health Department, Klamath Irrigation District, U.S. Geological Survey, the Nature Conservancy, Klamath County Soil and Water Conservation District and JELD-WEN. Many Environmental Sciences majors find part time or summer employment directly related to their studies.

Degree Requirements
Students must meet the general education requirements, as stated elsewhere in this catalog, and satisfactorily 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 an area of technical expertise based on their own interests. The sophomore project provides an opportunity for independent investigation early in the student’s academic career. Students prepare the groundwork for their senior project at the end of the junior year in BIO 473 - Senior Project Data Collection. The project culminates in BIO 474 Senior Project Data Analysis and Presentation — in fall of senior year.

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, streamwater chemistry and riparian assessment methods.

Bachelor of Science in Environmental Sciences Curriculum

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

### Freshman Year

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<td>BIO 211</td>
<td>Principles of Biology</td>
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<td>GIS 103</td>
<td>The Digital Earth</td>
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<td>MATH 111</td>
<td>College Algebra</td>
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### Freshman Year - Winter

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<td>Introduction to Data Analysis or Mis 102</td>
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<tr>
<td>BIO 212</td>
<td>Principles of Biology</td>
<td>4</td>
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<tr>
<td>GEOG 105</td>
<td>Physical Geography: Geomorphology or GEOG 115</td>
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<tr>
<td>GIS 105</td>
<td>Map and Compass/GPS</td>
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<tr>
<td>MATH 112</td>
<td>Trigonometry</td>
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<td>ENV 225</td>
<td>Ecological Assessment of Riparian Ecosystems</td>
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<td>MATH 251</td>
<td>Differential Calculus</td>
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<tr>
<td>MIS 275</td>
<td>Introduction to Relational Databases**</td>
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<td>SPE 111</td>
<td>Fundamentals of Speech</td>
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### Sophomore Year - Winter

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<td>GIS 205</td>
<td>GIS Data Integration*</td>
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<td>MATH 252</td>
<td>Integral Calculus</td>
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<td>WRI 227</td>
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<td>General Chemistry</td>
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<td>CHE 235</td>
<td>Streamwater Chemistry and Sampling</td>
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<td>CHE 331</td>
<td>Organic Chemistry I</td>
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<td>MATH 361</td>
<td>Statistical Methods I</td>
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<td>PHY 221</td>
<td>General Physics with Calculus</td>
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<td>SPE 321</td>
<td>Small Group and Team Communication</td>
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### Junior Year - Winter

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<td>Data Analysis Methods</td>
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</tr>
<tr>
<td>MATH 362</td>
<td>Statistical Methods II</td>
<td>4</td>
</tr>
<tr>
<td>BIO 472</td>
<td>Senior Project Proposal</td>
<td>1</td>
</tr>
<tr>
<td>ENV 314</td>
<td>Environmental Management and Restoration</td>
<td>3</td>
</tr>
<tr>
<td>PHY 222</td>
<td>General Physics with Calculus</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Junior Year - Spring

<table>
<thead>
<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>BIO 327</td>
<td>General Ecology</td>
<td>4</td>
</tr>
<tr>
<td>BIO 473</td>
<td>Senior Project Data Collection</td>
<td>3</td>
</tr>
<tr>
<td>PHY 223</td>
<td>General Physics with Calculus</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Senior Year

<table>
<thead>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BIO 474</td>
<td>Senior Project Data Analysis and Presentation</td>
<td>2</td>
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<tr>
<td>BIO 484</td>
<td>Sustainable Human Ecology</td>
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### Senior Year - Winter

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>Social Science elective</td>
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<td>3</td>
</tr>
<tr>
<td>Social Science elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Technical Emphasis elective*</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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### Senior Year - Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Technical Emphasis elective*</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Technical Emphasis elective*</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>
May be 3 or 4 credits; a total of 31 credits of "technical emphasis" courses are required. At least one technical emphasis elective must be an upper-division chemistry course.

Algebra-based PHY 201, PHY 202, and PHY 203 or calculus-based PHY 221, PHY 222, and PHY 223 are acceptable.

Must take WRI 327, WRI 328, WRI 350 or WRI 410.

PHIL 331 or 342 recommended.

Sustainable Technologies Emphasis students substitute REE 201 Introduction to Renewable Energy.


Sustainable Technologies Emphasis students substitute MET 160 Materials I.

Select 31 credits from one of the following areas of emphasis:

**Watershed Science Emphasis:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 313</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td>BIO 337</td>
<td>Aquatic Ecology</td>
<td>4</td>
</tr>
<tr>
<td>CHE 315</td>
<td>Environmental Chemistry and Toxicology</td>
<td>3</td>
</tr>
<tr>
<td>CHE 325</td>
<td>Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>CHE 332</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHE 333</td>
<td>Organic Chemistry III</td>
<td>4</td>
</tr>
<tr>
<td>CHE 341</td>
<td>Instrumental Methods/Data Acquisition I</td>
<td>4</td>
</tr>
<tr>
<td>CHE 342</td>
<td>Instrumental Methods/Data Acquisition II</td>
<td>4</td>
</tr>
<tr>
<td>CHE 455</td>
<td>Water Quality Technology</td>
<td>3</td>
</tr>
<tr>
<td>CHE 465</td>
<td>Fate and Transport of Pollutants</td>
<td>4</td>
</tr>
<tr>
<td>CIV 362</td>
<td>Hydrology and Surface Water Management</td>
<td>4</td>
</tr>
<tr>
<td>CIV 466</td>
<td>Solid and Hazardous Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>CIV 467</td>
<td>Groundwater</td>
<td>3</td>
</tr>
<tr>
<td>ENV 325</td>
<td>Environmental Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>ENV 336</td>
<td>Environmental Hydrology</td>
<td>4</td>
</tr>
<tr>
<td>ENV 466</td>
<td>Integrated Watershed Analysis</td>
<td>4</td>
</tr>
<tr>
<td>ENV 469</td>
<td>Treatment Wetlands</td>
<td>3</td>
</tr>
<tr>
<td>ENV</td>
<td>ENV elective *</td>
<td>varies</td>
</tr>
<tr>
<td>GME 161</td>
<td>Plane Surveying I</td>
<td>4</td>
</tr>
</tbody>
</table>

**GIS Emphasis:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENV</td>
<td>ENV elective *</td>
<td>varies</td>
</tr>
<tr>
<td>ENV</td>
<td>ENV elective *</td>
<td>varies</td>
</tr>
<tr>
<td>GIS 306</td>
<td>Geospatial Raster Analysis</td>
<td>4</td>
</tr>
<tr>
<td>GIS 316</td>
<td>Geospatial Vector Analysis I</td>
<td>4</td>
</tr>
<tr>
<td>GIS 332</td>
<td>Customizing the GIS Environment I</td>
<td>4</td>
</tr>
<tr>
<td>GIS 426</td>
<td>Geospatial Vector Analysis II</td>
<td>4</td>
</tr>
<tr>
<td>GIS 432</td>
<td>Customizing the GIS Environment II</td>
<td>4</td>
</tr>
<tr>
<td>GIS 446</td>
<td>GIS Database Development</td>
<td>4</td>
</tr>
<tr>
<td>GIS 456</td>
<td>GIS Management</td>
<td>3</td>
</tr>
<tr>
<td>MIS 115</td>
<td>Visual BASIC Programming</td>
<td>4</td>
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</table>

**Sustainable Technologies Emphasis:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 335</td>
<td>The Built Environment</td>
<td>3</td>
</tr>
<tr>
<td>BUS 304</td>
<td>Engineering Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS 416</td>
<td>Environmental Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**CHE 260** Electrochemistry for Renewable Energy Applications 4

**CIV 315** Principles of Environmental Engineering 4

**CIV 466** Solid and Hazardous Waste Management 3

**CIV 467** Groundwater 3

**MET 160** Materials I 3

**MET 360** Materials II 3

**REE 201** Introduction to Renewable Energy 3

**REE 331** Fuel Cells 3

**REE 344** Nuclear Energy 3

**REE 346** Biofuels and Biomass 3

*ENV 265, ENV 365, ENV 435, advisor approved independent study, or an upper-division elective from another department with advisor approval.
Nursing – Oregon Statewide Integrated Nursing Program

Chris Tanner, R.N., PhD., FAAN, Interim Dean
Terry Ross, R.N., M.S., W.O.C.N., Associate Dean
Associate Professor: T. Ross
Instructors: M. Boham, B. Enos, M. Gran-Moravec, B. Hunter, C. Phelps, T. Rose, W. Zolczynski

This program is offered at Oregon Institute of Technology by the Oregon Health & Science University School of Nursing, in cooperation with Oregon Tech.

Degrees 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 and a proctored essay.

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 2013.

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).

The application process begins October 1 through February 15. The minimum criteria to apply are:

• have 30 credits 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.

Bachelor of Science with a Major in Nursing

Curriculum
Courses and terms during which they may be taken.

Pre-Nursing

Freshman Year

Summer

SPE 111 Fundamentals of Speech† 3
WRI 121 English Composition 3
Humanities elective 3
Social Science elective 3
Elective 3
Total 15

Fall

BIO 231 Human Anatomy and Physiology I 4
CHE 101 Elementary Chemistry† 3
CHE 104 Elementary Chemistry Laboratory† 1
MATH 100 Intermediate Algebra* or MATH 243 Introductory Statistic ** 4
PSY 201 Psychology 3
Total 15

Winter

BIO 232 Human Anatomy and Physiology II 4
CHE 102 Elementary Chemistry* 3
CHE 105 Elementary Chemistry Laboratory* 1
PSY 311 Human Growth and Development I 3
WRI 122 English Composition 3
Total 14

Spring

BIO 205 Nutrition* 3
BIO 233 Human Anatomy and Physiology III 4
CHE 103 Elementary Chemistry* 3
CHE 106 Elementary Chemistry Laboratory* 1
PSY 312 Human Growth and Development II 3
Total 14

* The math competency may be demonstrated by a math placement test or by successful completion of MATH 95/100 Intermediate Algebra or higher.

** Introductory Statistics is a nursing degree requirement.

† SPE 111 is a prerequisite to the third writing (WRI 123 or WRI 227) course which is a degree requirement.

‡ CHE 101 is not a nursing prerequisite but it is a prerequisite to the nutrition course here on the Oregon Tech campus. It is highly recommended.
### Professional Courses

**Sophomore Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NRS 210A</td>
<td>Foundations of Nursing – Health Promotion</td>
<td>4</td>
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<tr>
<td>NRS 210B</td>
<td>Foundations: Practicum</td>
<td>5</td>
</tr>
<tr>
<td>WRI 123</td>
<td>English Composition</td>
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<tr>
<td>or</td>
<td>WRI 227 Technical Report Writing</td>
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<tr>
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**Winter**

<table>
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<th>Course Title</th>
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<tbody>
<tr>
<td>BIO 105</td>
<td>Microbiology</td>
<td>4</td>
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<tr>
<td>NRS 211</td>
<td>Foundations of Nursing in Chronic Illness I</td>
<td>6</td>
</tr>
<tr>
<td>NRS 230</td>
<td>Pharmacology I</td>
<td>3</td>
</tr>
<tr>
<td>NRS 232</td>
<td>Pathophysiology I</td>
<td>3</td>
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**Spring**

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<th>Course Title</th>
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<tbody>
<tr>
<td>NRS 212</td>
<td>Foundations of Nursing in Acute Care I</td>
<td>6</td>
</tr>
<tr>
<td>NRS 231</td>
<td>Pharmacology II</td>
<td>3</td>
</tr>
<tr>
<td>NRS 233</td>
<td>Pathophysiology II</td>
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**Fall**

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<th>Course Title</th>
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<tbody>
<tr>
<td>BIO 235</td>
<td>Human Genetics</td>
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<tr>
<td>NRS 322</td>
<td>Nursing in Acute Care II and End-of-Life</td>
<td>9</td>
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**Winter**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 243</td>
<td>Introductory Statistics*</td>
<td>4</td>
</tr>
<tr>
<td>NRS 321</td>
<td>Nursing in Chronic Illness II and End-of-Life</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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</table>

* MATH 243 may be taken any term.

**Spring**

<table>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NRS 410</td>
<td>Population-Based Chronic Illness and Health Promotion</td>
<td>9</td>
</tr>
<tr>
<td>NRS 411</td>
<td>Epidemiology</td>
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**Fall**

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<tr>
<td>NRS 412</td>
<td>Leadership, Outcome Management in Nursing</td>
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<td><strong>10+</strong></td>
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**Winter**

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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NRS 424</td>
<td>Integrative Practicum I</td>
<td>9</td>
</tr>
<tr>
<td>NRS 424</td>
<td>A-J</td>
<td>1</td>
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<tr>
<td>Elective</td>
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**Spring**

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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NRS 425</td>
<td>Integrative Practicum II</td>
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</tr>
<tr>
<td>NRS 425</td>
<td>A-J</td>
<td>1</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>10+</strong></td>
</tr>
</tbody>
</table>
Respiratory Care and Polysomnography

James Hulse, Department Chair and Program Director, Respiratory Care
Jane Perri, Program Director, Polysomnographic Technology
David Panossian, Medical Director
Jeff Pardy, Respiratory Care Clinical Education Director
Participating Faculty: D. Applegate, J. Beasley, P. Cabrera, K. Christensen, L. McLaughlin, K. Rabe, M. Schwartz, A. Venes

Polysomnographic Technology

Degree Offered
Associate of Applied Science in Polysomnographic Technology

Certificate Offered
Polysomnographic Technology

Certificate in 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 Polysomnographic Technology
Students must successfully complete the courses in the certificate program for Polysomnographic Technology and other primarily general education courses. The degree completion courses can be taken from Oregon Tech or transferred from another college. Successful completion of the two year curriculum leads to eligibility to sit for the national Registered Polysomnographic Technologists examination (RPSGT). Computer and Internet access is required.

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. All applicants are required to submit proof of completion either Cardio Pulmonary Resuscitation (CPR) or Basic Cardiac Life Support (BCLS) prior to admission.

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 exam administered by the Board of Registered Polysomnographic Technologists following the completion of the core courses in the certificate program.

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 of general education courses in critical thinking and writing. Students are recommended to complete courses in intermediate algebra, chemistry and biology.

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 a degree 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 Distance Education Department or in the classroom. Not all of the required courses are available online and must be taken either in the Oregon Tech classroom or a local college and transferred. The writing courses are offered through the distance 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.

Admissions Procedures
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. All applicants are required to submit proof of completion either Cardio Pulmonary Resuscitation (CPR) or Basic Cardiac Life Support (BCLS) prior to admission.
the Distance Education Application for Admission and the appropriate Statement of Acknowledgment for this program to the Distance Education Department, accompanied by a $100 nonrefundable fee and official transcripts from each college or university attended. Acceptance to the Polysomnographic Technology Degree Program is contingent upon acceptance to Oregon Tech. Detailed information and forms can be found on the Oregon Tech Distance Education website.

2. 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 admission.

3. 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.

4. Candidates must submit immunization records prior to their clinical placement.

5. Criminal background clearance is required prior to acceptance and some clinical sites may require drug screening.

**Graduation Requirements**

Minimum graduation requirements for the A.A.S are the successful completion of 48 credit hours of general education courses and 42 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 the Oregon Tech campus in Klamath Falls, 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.

**Polysomnographic Technology Certificate Curriculum**

A certificate will be awarded to students completing 44 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:

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 200</td>
<td>Medical Terminology</td>
<td>2</td>
</tr>
<tr>
<td>ECHO 227</td>
<td>Basic ECG Recognition and Testing</td>
<td>3</td>
</tr>
<tr>
<td>PSG 211</td>
<td>Fundamentals of PSG and Patient Care</td>
<td>3</td>
</tr>
<tr>
<td>PSG 221</td>
<td>Physiology of Sleep</td>
<td>3</td>
</tr>
<tr>
<td>PSG 231</td>
<td>Sleep Disorders Pathology</td>
<td>4</td>
</tr>
<tr>
<td>PSG 246</td>
<td>Sleep Disorders in Women</td>
<td>3</td>
</tr>
<tr>
<td>PSG 264</td>
<td>Pediatric/Neonatal Polysomnography</td>
<td>4</td>
</tr>
<tr>
<td>PSG 272</td>
<td>Clinical Polysomnographic Technology I</td>
<td>9</td>
</tr>
<tr>
<td>PSG 273</td>
<td>Clinical Polysomnographic Technology II</td>
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<tr>
<td>RCP 120</td>
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</table>

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 two 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.

**Associate of Applied Science in Polysomnographic Technology Curriculum**

All courses in the Certificate Program and all courses listed below are required to earn the A.A.S. degree:

### Course # | Title                                                      | Credits |
<table>
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<tr>
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<tbody>
<tr>
<td>BIO 231</td>
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<tr>
<td>WRI 122</td>
<td>English Composition</td>
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</tr>
<tr>
<td>WRI 227</td>
<td>Technical Report Writing</td>
<td>3</td>
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<td>SPE 111</td>
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<tr>
<td>WRI 121</td>
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<tr>
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**Total Credit Hours for A.A.S. Degree in Polysomnography**

Polysomnographic Technology Certificate Courses | 44
Additional Courses                              | 46
**Total Credit Hours**                          | **90**
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 holds the RRT credential and 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), 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 Objectives
Upon completion of the program, graduates will demonstrate:
1. Professional behavior consistent with employer expectations as advanced level respiratory therapists (affective domain).
2. The ability to comprehend, apply and evaluate clinical information relevant to their roles as advanced-level respiratory therapists (cognitive domain).
3. The technical proficiency in all the skills necessary to fulfill their roles as advanced level respiratory therapists (psychomotor domain).

Expected 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 in the health care setting as a member of the healthcare 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 Commission on Accreditation for Respiratory Care does not accredit degree completion programs. The program is offered externally, utilizing mail, e-mail, fax and Internet delivery, 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 SAE examinations and take and pass the CRT and RRT examinations as a condition of BS degree completion.
# Bachelor of Science in Respiratory Care

## Curriculum

Required courses and terms during which they may be taken.

### Pre-Respiratory Care

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### Professional Courses

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<td>RCP 336</td>
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<td>RCP 389</td>
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# Bachelor's Degree Completion Respiratory Care

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.

## Admission Procedures

1. Complete the Distance Education Application for Admission.
2. Mail your application, a copy of your registry certificate, a check for $100 (payable to Oregon Institute of Technology) and a signed Statement of Acknowledgement to the Distance Education Office.
3. Request official transcripts from all colleges you have attended to the Distance Education Office.
4. If you are a Registered Respiratory Therapist, request a letter of good standing from NBRC be mailed to the Oregon Tech Distance Education Office. This letter will enable the University Registrar to grant college credit based on your registry.

## Courses granted for Registered Respiratory Therapist (RRT)

- RCP 100 Introduction to Respiratory Care (waived)
- RCP 221 Introduction to Patient Assessment
- RCP 223 Emergent Chest Radiographic Interpretation
- RCP 231 Pulmonary Physiology
- RCP 235 Arterial Blood Gases
- RCP 236 Cardiopulmonary Dynamics
- RCP 241 Respiratory Gas Therapeutics
- RCP 335 Pulmonary Pathology
- RCP 351 Mechanical Ventilation I
- RCP 352 Mechanical Ventilation II
- RCP 353 Mechanical Ventilation III
- RCP 386 Critical Care I
- RCP 400 Case Management/Credentials I
- RCP 401 Clinical Care I
- RCP 402 Clinical Care II
- RCP 403 Clinical Care III
Oregon Tech Degree Completion Courses

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<td>CHE 360</td>
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Prerequisite/Transfer Courses

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<tr>
<td>BIO 105</td>
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<td>BIO 200</td>
<td>Medical Terminology</td>
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</tr>
<tr>
<td>BIO 231</td>
<td>Human Anatomy and Physiology I</td>
<td>4</td>
</tr>
<tr>
<td>BIO 232</td>
<td>Human Anatomy and Physiology II</td>
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<td>BIO 233</td>
<td>Human Anatomy and Physiology III</td>
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<td>CHE 101</td>
<td>Elementary Chemistry</td>
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<td>CHE 104</td>
<td>Elementary Chemistry Laboratory</td>
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<td>MATH 111</td>
<td>College Algebra or MATH 243 Introductory Statistics</td>
<td>4</td>
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<td>PSY</td>
<td>Psychology 201, 202, or 203</td>
<td>3</td>
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<tr>
<td>SPE 111</td>
<td>Fundamentals of Speech</td>
<td>3</td>
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<td>WRI 121</td>
<td>English Composition</td>
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Selected Courses in 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 center, weight lifting and aerobics activities, archery, ice skating, golf, rugby, recreational basketball, tai chi, zumba, yoga, karate, aikido, kickboxing, core strength & balance, pilates, rowing, belly dance, scuba, varsity sports, major sports seminars in varsity sports offered at Oregon Tech, and sports officiating.

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.
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 business and industry. Graduate education at OIT maintains a hands-on focus. Our mission is to integrate theory and practice.

Admission
The Office of Admissions, in conjunction with the Provost’s Office and 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.
• Some programs may require qualifying examinations.

Unusual circumstances may warrant exceptions to these criteria.

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 OIT or who graduated from OIT within the previous two years.
• Official transcripts from each postsecondary 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
OIT 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 550 paper-based TOEFL, 213 computer-based TOEFL, 79 Internet-based TOEFL, or 6.5 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 OIT, 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:

1. Submit the graduate application for admission with the $50 (U.S.) application fee.
2. 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.
3. Provide evidence of ability to meet educational expenses at OIT. The Statement of Financial Responsibility form must be completed and submitted with documentation such as official bank statements and tax returns.
4. Official academic transcripts of all university course work sent to OIT.
5. 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.
6. Proof of proficiency in the English language. OIT requires that international graduate students 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 550 paper-based TOEFL, 213 computer-based TOEFL, 79 Internet-based TOEFL, or 6.5 IELTS is required for consideration. This requirement may be waived for some students whose primary language is English.
7. 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
OIT encourages all prospective students to submit graduate application materials six to nine months in advance of the planned enrollment date. However, applications will be accepted any time before the deadlines listed below. The recommended enrollment date is fall term.

- Fall Term: July 1
- Winter Term: October 1
- Spring Term: January 1

Social Security Number Disclosure and Consent Statement
U.S. nationals are requested to voluntarily provide your Social Security Number to assist OUS (and organizations conducting studies for or on behalf of OUS) in developing, validating, or administering predictive tests and assessments; improving instruction; internal identification of students; collection of student debts; or comparing student educational experiences with subsequent work force experiences. When conducting studies, OUS will disclose your Social Security Number only in a manner that does not permit personal identification of you by individuals other than representatives of OUS (or the organization conducting the study for OUS) and only if the information is destroyed when no longer needed for the purposes for which the study was conducted. By providing your Social Security Number, you are consenting to the uses identified above. This request is made pursuant to ORS 351.070 and 351.085. Provision of your Social Security Number and consent to its use is not required and, if you choose not to do so, you will not be denied any right, benefit, or privilege provided by law. You may revoke your consent for the use of your Social Security Number at any time by writing to: University Registrar, Oregon Institute of Technology, 3201 Campus Drive, Klamath Falls, OR 97601.

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 early summer, 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 at OIT 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. TAs are only awarded for nine-month periods during the academic year. If you are interested in a TA, contact the individual department to determine availability.

Assistantship Offer
Assistantship contracts are awarded annually and renewal is dependent upon competent performance of assistantship duties, adequate academic progress and the availability of funds. Assistantship appointments are for two academic years; however, under special circumstances, appointments may continue for a third and final year.

Assistantships may include a tuition waiver as well as a monthly stipend based upon a percentage of a full-time equivalent (FTE) salary. Graduate student stipends are not subject to Social Security (FICA) taxes but are subject to income taxes and should be reported on your tax return.

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 OIT. Other academic policies and procedures are described and/or defined in the general policies of OIT.

Student Rights and Responsibilities
OIT 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. OIT 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
OIT’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 OIT’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 dishonesty.

OIT 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 to obtain graduate credit.

### 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 “conditionally 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:** Students who have served one term on academic probation and have not raised their graduate cumulative GPA to 3.0 in the next term will be placed on academic suspension. 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 OIT catalog. A successful appeal results in probation status.

### Transfer Credits

Students may petition to transfer up to 12 graduate term hours earned at other accredited institutions and apply those credits toward an OIT 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

OIT 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.

### Withdrawals

Students may withdraw from a course during the first 10 days of class with no entry on the permanent academic record, except for complete withdrawal from all classes. After this date and through Friday of the seventh week, students who withdraw from a class will receive a W, which is not included in the grade point average. After Friday of the seventh week, students will receive a letter grade assigned by the instructor. A complete withdrawal from all courses is possible at any time during the term until the last day of class by filing the proper forms with the Registrar’s Office. Specific deadlines are published in the quarterly class schedule. While it is the student’s responsibility to properly withdraw from a class, an instructor may administratively withdraw a student for non-attendance.

### Academic 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. The student must then submit the proposed program to the graduate program director for approval.
**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

**Right of Appeal**

Students have the right to appeal academic policies or requirements. Grade appeals should be initiated through the instructor, graduate program coordinator, and the dean. For appeals regarding specific degree requirements, students should consult their graduate advisor, the graduate program coordinator, and the Graduate Council. Students should submit all other academic policy appeals in writing to the Graduate Council through the Provost’s Office.
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. Absence of an (F, W, or S) does not necessarily mean the course is 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.

Even or Odd:
When accompanying a course description, these terms indicate that a given course is offered during the designated term or terms every other year only. For example:

MATH 355 Graphical Analysis (F, Even) means that this course is offered only in even numbered years during the fall term.

Lecture, Lab, Credit Hours:
The three numbers following the course title. For example:
CST 101 Introduction to Personal Computing
(3-3-4) = weekly lecture hours – lab hours – total credits
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.

Quarter Credit: 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.).

(ACAD) Academic Success
ACAD 101 Student Success Seminar
(Variable Credit)
A course to facilitate the success of first year students at Oregon Tech. 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 107, ACAD 207, ACAD 307, ACAD 407 Seminar
(Hours to be arranged each term.)

ACAD 105 Achieving Academic Success
(2-0-2)
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.

(AC) Accounting
ACC 101 Introduction to Accounting
(3-0-3)
The principles of elementary accounting systems for small businesses.

ACC 107, ACC 207, ACC 307, ACC 407 Seminar
(Hours to be arranged each term.)

ACC 115 Basic Income Tax Preparation
(2-4-3)
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
(3-0-3)
Business math such as decimals, percents, markups, proration and interest. Emphasis on operational techniques of electronic calculators for problem solving.

ACC 201 Principles of Accounting I
(4-0-4)
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 Principles of Accounting II
(4-0-4)
A continuation of ACC 201 with emphasis on corporate accounting. Prerequisite: ACC 201 with grade “C” or better.

ACC 203 Principles of Managerial Accounting
(4-0-4)
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.
Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

ACC 205 Computerized Accounting
(2-3-3)
Spreadsheet software used to solve accounting problems, model-building techniques. Integrated accounting software introduced. Prerequisite: ACC 201.

ACC 245 Payroll Accounting
(3-0-3)
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
(Hours to be arranged each term.)

ACC 298 Reading and Conference
(Hours to be arranged each term.)

ACC 299 Laboratory Practice
(Hours to be arranged each term.)

ACC 320 Cost Accounting I
(4-0-4)
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
(4-0-4)
Continuation of Cost Accounting I. Strategic planning and financial budgeting. Cost measurement, planning, control and performance evaluation and behavioral issues. The role of responsibility accounting for revenue, cost, contribution and profit centers will be investigated. Prerequisite: ACC 320 with grade “C” or better.

ACC 325 Finance
(4-0-4)
Emphasis on working capital management, long-term finance and capital structure. Prerequisites: ACC 203, and MATH 105 or MATH 111.

ACC 331 Intermediate Accounting I
(4-0-4)
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 Intermediate Accounting II
(4-0-4)
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 Intermediate Accounting III
(4-0-4)
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 334 Income Tax Procedures
(3-0-3)
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, ACC 405, both with grade “C” or better.

ACC 411 Income Tax Procedures Laboratory
(0-6-2)
Lab accompanying class content in ACC 411.

ACC 431 Advanced Accounting I
(4-0-4)
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
(4-0-4)
Analysis of problems facing small, medium and large companies, with emphasis upon an integrated and concurrent decision making methodology applying economics, finance, organizational theory, quantitative analysis and accounting and tax theory. Prerequisite: ACC 431 with grade “C” or better.

ACC 435 Auditing
(4-0-4)
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, ACC 405, both with grade “C” or better.

ACC 465 Case Studies in Accounting
(4-0-4)
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, ACC 496, all with grade “C” or better.

ACC 496, ACC 497 Senior Project
(3-0-3)
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.
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33

(AHED) Allied Health Education
AHED 107, AHED 207, AHED 307, AHED 407 Seminar
(Hours to be arranged each term.)

AHED 450 Instructional Methods
(3-0-3)
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 RCP or BDH degree completion program.

AHED 451 Instructional Experience
(2-3-3)
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
(0-9-3)
Student and faculty advisor design an individualized teaching experience. A learning contract is written and implemented. Prerequisite: AHED 451 or AHED 460.

AHED 460 Fundamentals of Distance Education
(3-0-3)
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.

(ANTH) Anthropology

ANTH 101 Introduction to Physical Anthropology
(3-0-3) SS
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 Introduction to Archeology
(3-0-3) SS
Survey of the science of archeology. 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 Introduction to Cultural Anthropology
(3-0-3) SS
Culture, language, subsistence patterns, group formation, kinship, economic systems, political organizations, religion and cultural change.

ANTH 107, ANTH 207, ANTH 307, ANTH 407 Seminar
(Hours to be arranged each term.) SS

ANTH 335 The Built Environment
(3-0-3) SS
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
ANTH 107, ANTH 207, ANTH 307, ANTH 407 Seminar
(Hours to be arranged each term.) SS

ANTH 452 Globalization
(3-0-3) SS
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.

(BIO) Biology

BIO 101 General Biology
(3-3-4)
Introduction to cell biology, genetics and evolution.

BIO 102 General Biology
(3-3-4)
Consideration of phylogenetic relationships of the major groups of plants and animals.

BIO 103 General Biology
(3-3-4)
Basic animal physiology with emphasis on humans. (Cannot be used for graduation credit by students who have taken BIO 231, BIO 232 or BIO 233.)

BIO 105 Microbiology
(3-3-4)
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, BIO 207, BIO 307, BIO 407 Seminar
(Hours to be arranged each term.)
BIO 109 Introduction to the Medical Sciences
(1-2-2)
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 111 Introduction to Environmental Sciences
(3-3-4)
A topical overview of environmental sciences stressing the integration of the social, natural and physical sciences. Emphasis on active learning.

BIO 112 Introduction to Data Analysis
(1-0-1)
Skills in sampling design, analysis and quality control measures essential in acquiring defensible environmental data. Use of time series analysis, spreadsheets for data analysis and graphical display including trend lines, histograms and cumulative frequency distributions. Basic computer proficiency is expected.

BIO 200 Medical Terminology
(2-0-2)
Basic structure of medical works including prefixes, suffixes, roots and combining forms. Correct spelling, pronunciation and meaning of terms are stressed.

BIO 205 Nutrition
(3-0-3)
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. Pre-or corequisite: CHE 103 or BIO 213 or instructor consent.

BIO 209 Current Research Topics in Medical Sciences I
(1-0-1)
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
(3-3-4)
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
(3-3-4)
Principles of modern biology emphasizing evolution, ecology, population genetics and behavior of organisms. Prerequisite: BIO 211 with grade “C” or better, or with instructor consent.

BIO 213 Principles of Biology
(3-3-4)
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. Prerequisite: BIO 212 with grade “C” or better, or with instructor consent.

BIO 216 Introduction to Veterinary Medicine
(3-3-4)
Covers many aspects of animal health and their impact on society. Discussions of 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
(3-3-4)
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 222 Introduction to Wildlife Rehabilitation
(3-0-3)
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 Introduction to Forensic Science
(3-3-4)
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 and Physiology I
(3-3-4)
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 and Physiology II
(3-3-4)
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 and Physiology III
(3-3-4)
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
(3-0-3)
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
BIO 247 Forensic Anthropology
(3-3-4)
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 a hands-on experience applying the methodologies as presented in the lecture section.

BIO 325 Applied Aquatic Botany
(2-3-3)
Ecology, taxonomy and economic significance of aquatic plants, including algae. Emphasis placed on determination of contaminants in the physical or biological environment.

BIO 327 General Ecology
(3-3-4)
An examination of ecological principles applied to microhabitats, habitats and ecosystems. Includes community ecology, population ecology and resource analysis, supplemented by regional and local field exercises with training in measurement and collection of ecological components.
Corequisites: GEOG 105, BIO 111 and BIO 213.

BIO 331 Human Anatomy and Physiology I
(3-6-5)
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.
Pre-or corequisite: BIO 200 or instructor consent.
Prerequisites: BIO 213 and CHE 223, both with grade "C" or better.

BIO 332 Human Anatomy and Physiology II
(3-6-5)
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 and Physiology III
(3-6-5)
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
(3-0-3)
Cross-sectional anatomy correlated with computer tomography, ultrasonography and magnetic resonance imaging.
Prerequisite: BIO 233.

BIO 336 Essentials of Pathophysiology
(3-0-3)
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
(2-6-4)
Aquatic ecosystems, patterns of development, population dynamics, diversity and energy cycles in marine and freshwater communities. Local and extended one- or two-day field trips to study different ecosystems off-campus. Procedures for sampling, data collection, numerical modeling and simulation studies of aquatic pollutants.
Prerequisites: BIO 212, BIO 327.

BIO 341 Medical Genetics
(3-0-3)
Prerequisite: BIO 213 or BIO 233 or instructor consent.

BIO 342 Cell Biology
(3-3-4)
Organelle organization, protein sorting, cell signaling, cytoskeletal functions, cell division mechanics and cell interactions in development and aging.
Prerequisite: BIO 213 or instructor consent.

BIO 345 Medical Microbiology
(4-3-5)
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
(3-0-3)
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, atherosclerosis, hypertension, cardiac and vascular diseases. Prerequisites: BIO 200, and BIO 233 or BIO 331 with grade “C” or better, or instructor consent.

BIO 347 Pathophysiology II
(3-0-3)
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 351 Vertebrate Biology
(3-3-4)
This course will explore both diversity and evolutionary history of the vertebrates. Emphasis placed on functional morphology and adaptive physiology as related to the evolutionary history of each vertebrate class. The laboratory will introduce basic vertebrate structure and morphological adaptation.
Prerequisite: BIO 213.

BIO 352 Developmental Biology
(3-3-4)
This course will explore the developmental processes of selected invertebrate and vertebrate groups. The events of gametogenesis, fertilization, gastrulation, neuralization and post-embryonic development will be discussed. The role of differential gene expression in developmental pathways will be covered.
Prerequisite: BIO 213.

BIO 357 Introduction to Neuroscience
(3-0-3)
This is an introductory course covering the organization and function of the human nervous system to build a foundation of general knowledge in neurobiology of such topics as sensory/motor systems, the brain and behavior, the biological basis of brain development and learning and memory.
Prerequisite: BIO 232 or BIO 332 or PSY 339 or instructor consent.

BIO 409 Current Research Topics in Medical Sciences II
(2-0-2)
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
(3-0-3)
Principles of evolutionary science, including speciation, biogeography, biodiversity, population genetics, natural selection and coevolution.
Prerequisite: BIO 213 or instructor consent.

BIO 428 Animal Behavior
(3-0-3)
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 PSY 428.)
Prerequisite: PSY 202 or BIO 213.

BIO 434 Data Analysis Methods
(3-3-4)
Fundamental principles of data analysis from field projects, data archives and other sources. Analysis of variance, hypothesis testing, random processes. Regression and time series analysis. Discussion and practice of data visualization and presentation techniques.
Prerequisite: MATH 243 or MATH 361.

BIO 436 Immunology
(3-3-4)
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 461, BIO 462 Human Cadaver Dissection
(0-3-1)
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 consent of instructor.

BIO 471 Senior Project Proposal Research
(1-0-1)
Review of the scientific method and scientific research procedures, identification of a research topic and preparation for writing a research proposal.
Prerequisite: BIO 262.

BIO 472 Senior Project Proposal
(1-0-1)
Review of research procedures including research ethics, project management, instrumentation, field methods for data acquisition and data analysis. Development and presentation of a research proposal.
Prerequisite: BIO 471.

BIO 473 Senior Project Data Collection
(1-6-3)
Independent completion of field, laboratory, or investigative project in collaboration with agency, faculty or industry professionals. Includes data collection, initial analyses and presentation of initial findings.
Prerequisite: BIO 472.

BIO 474 Senior Project Data Analysis and Presentation
(0-5-2)
Application of appropriate statistical methods to data collected by students as part of their senior projects. Advanced techniques introduced as appropriate. Presentation of senior project data. Emphasis on the design, preparation and delivery of effective written and oral presentations.
Prerequisite: BIO 473; BIO 434 or MATH 362.

BIO 484 Sustainable Human Ecology
(2-6-4)
Investigation of global interconnections between humans and natural systems through the study and application of ecological principles. Ethical and ecological considerations are used to solve complex environmental problems. Laboratories involve field work with local experts.
Prerequisite: BIO 327 or CIV 315 or instructor consent.
BIO 485 Klamath Bioregional Studies
(3-0-3)
The Klamath River Bioregion from an integrated ecological perspective. Team project in assessing current socioeconomic, cultural and ecological conditions in the bioregion and developing management strategies for sustainable resource use.
Prerequisites: ENV 225 and BIO 327, or instructor consent.

(BUS) Business
BUS 101 Introduction to Business
(3-0-3)
Introduction to the basic aspects of business, marketing, management, production, accounting, and finance; various forms of business ownership; role of business in the economy, and society. Discussion of cultural, ethical, current events, and trends affecting business. Exposure to career opportunities.

BUS 107, BUS 207, BUS 307, BUS 407 Seminar
(Hours to be arranged each term.)

BUS 215 Principles of Management
(3-0-3)
Introduction to the history of management. Emphasis on the management functions of planning, organizing, directing, and controlling; existing and emerging managing 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
(3-0-3)
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
(3-0-3)
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; administrative law; and criminal law as it applies to business and industry.

BUS 256 Business Communication
(2-3-3)
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 101, WRI 122.

BUS 304 Engineering Management
(3-0-3)
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 308 Principles of International Business
(3-0-3)
Introduction to international business fundamentals in the areas of cultural, ethical, legal and economic environments, international finance 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 309 Introduction to Tourism
(3-0-3)
Introduction to tourism industry. Topics include major components of tourism, service suppliers, travel, transportation, accommodations, food and beverage, attractions, entertainment, destinations and impacts of tourism on society.

BUS 314 Entrepreneurship I
(3-0-3)
Prerequisites: BUS 215, or BUS 304, or BUS 317; ACC 203 and BUS 223.

BUS 316 Total Quality in Health Care
(3-0-3)
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
(3-0-3)
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: Junior standing or instructor consent.

BUS 318 Marketing II
(3-0-3)
Advanced study of markets with a focus on the motivational 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, PSY 201.

BUS 319 Integrated Marketing Communication
(3-0-3)
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
(3-0-3)
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; ACC 203.

BUS 326 Sales and Sales Management
(3-0-3)
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 current customer relationship management systems.
Prerequisite: BUS 223.

BUS 328 Health Care Accounting and Finance
(3-0-3)
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 systems analysis of variance, cost effectiveness and managerial reporting are examined.
Prerequisite: ACC 201.

BUS 331 Personal Finance
(3-0-3)
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
(3-0-3)
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.
Prerequisite: BUS 314.

BUS 337 Principles of Health Care Marketing
(3-0-3)
Fundamentals of health care marketing covering strategy, planning process, assessment, marketing actions, branding and evaluation.

BUS 345 Fraud Examination
(3-0-3)
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 347 Geography of Travel and Tourism
(3-0-3)
Study of those destinations around the world that are most important to travelers including the World Heritage sites. Topics include fundamentals of geography, both physical and cultural, and major tourism destinations.

BUS 349 Human Resource Management I
(3-0-3)
Roles and responsibilities of strategic HR management, basic labor and safety laws, employee rights, job analysis and description. Workforce planning, recruitment and selection. Training, development and performance evaluation. Compensation and benefits administration.
Prerequisite: BUS 215 or BUS 304 or BUS 317 or instructor consent.

BUS 350 Hospitality Management
(3-0-3)
Study of management principles in the tourism and hospitality industry. Topics include managing growth and change in the hospitality industry, major functional areas in hotels and restaurants and the economic aspects of the industry.

BUS 356 Business Presentations
(3-3-4)
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, WRI 122.

BUS 358 Marketing for Hospitality and Tourism
(3-0-3)
Study of marketing principles as they apply to the tourism and hospitality industry. Topics include marketing in strategic planning, the marketing environment, marketing information systems and marketing research, consumer buying behavior, market segmentation, product pricing, distribution channels and internet marketing. (Cannot be taken for graduation credit by students who have taken BUS 399 Special Topics: Marketing Tourism.)

BUS 385 Ecotourism
(3-0-3)
Study of sustainability principles as they apply to the tourism and hospitality industry. Topics include the ecotourism environment, the economic, sociological and cultural impacts of ecotourism, ecotourism as a business and a world survey of ecotourism sites.
Prerequisite: WRI 121.

BUS 387 International Human Resource Management
(3-0-3)
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 397 Human Resource Management II
(3-0-3)
Theories of organized labor, labor laws on diversity, collective bargaining, management and workforce relationships, HRM practices for job descriptions, motivation, engagement assessment, career development.
Prerequisite: BUS 349.

BUS 399 Marketing Special Topics
(3-0-3)
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
(Hours to be arranged each term.)

BUS 415 Environmental Regulation
(3-0-3)
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
(3-0-3)
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**  
(0-9-3)  
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. Prerequisites: Senior standing and approval from senior project advisor.

**BUS 434 Global Marketing**  
(3-0-3)  
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, BUS 308.

**BUS 435 Marketing III**  
(3-0-3)  
Marketing management 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 projects, services and line extensions. Prerequisite: BUS 318.

**BUS 441 Leadership I**  
(3-0-3)  
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 349 or instructor consent.

**BUS 442 Leadership II**  
(3-0-3)  
Leadership in developing and communicating vision/mission, 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 Management**  
(3-0-3)  
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**  
(3-0-3)  

**BUS 457 Business Research Methods II**  
(3-0-3)  
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 and MATH 361.

**BUS 467 Service Management**  
(3-0-3)  
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 317.

**BUS 473 Marketing Plan Development**  
(3-0-3)  
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, BUS 319.

**BUS 478 Cases in Strategy and Policy**  
(3-0-3)  
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, senior standing.

**BUS 496 Senior Project**  
(1-6-3)  
Senior students develop, plan, and initiate a project for a client or an independent research project. Topics include task definition, dealing with client contact, client confidentiality, and time estimation and management. Instructor functions as a consultant. Prerequisites: ACC 325; WRI 227. Pre- or corequisite: BUS 496 with a grade of “C” or better.

**BUS 497 Senior Project**  
(1-6-3)  
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 420 or BUS 496 with a grade of “C” or better.

**BUS 525 Marketing Management**  
(3-0-3)  
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.

*(CHE) Chemistry*

**CHE 101 Elementary Chemistry**  
(3-0-3)  
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. Pre- or corequisite: MATH 100. Corequisite: CHE 104 (lab).

**CHE 102 Elementary Chemistry**  
(3-0-3)  
A continuation of CHE 101 with emphasis on organic chemistry. The role of organic
CHE 103 Elementary Chemistry (3-0-3)
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 or instructor consent. Corequisite: CHE 106 (lab).

CHE 104 Elementary Chemistry Laboratory (0-3-1)
Lab accompanying class content in CHE 101.
Corequisite: CHE 101.

CHE 105 Elementary Chemistry Laboratory (0-3-1)
Lab accompanying class content in CHE 102.
Corequisite: CHE 102.

CHE 106 Elementary Chemistry Laboratory (0-3-1)
Lab accompanying class content in CHE 103.
Corequisite: CHE 103.

CHE 107, CHE 207, CHE 307, CHE 407 Seminar (Hours to be arranged each term.)

CHE 201 General Chemistry (3-0-3)
Atomic and molecular structure, chemical bonding, chemical and physical properties, introduction to stoichiometry and thermochemistry are presented.
Prerequisite: High school chemistry or CHE 101 equivalent.
Pre- or corequisite: MATH 111.
Corequisite: CHE 204 (lab).

CHE 202 General Chemistry (3-0-3)
A continuation of CHE 201. This course discusses the behavior of gases, liquids and solids, the properties of solutions, chemical kinetics and an introduction to chemical equilibrium.
Prerequisites: CHE 201 and CHE 204 (lab). Corequisite: CHE 205 (lab).

CHE 203 General Chemistry (3-0-3)
A continuation of CHE 202. This course continues the discussion of chemical equilibrium and its applications in aqueous solutions including pH, buffers, solubility and complexation. Also included are oxidation-reduction processes and electrochemistry, thermodynamics and an introduction to nuclear chemistry.
Prerequisites: CHE 202 and CHE 205 (lab). Corequisite: CHE 206 (lab).

CHE 204 General Chemistry Laboratory (0-3-1)
Lab accompanying class content in CHE 201.
Corequisite: CHE 201.

CHE 205 General Chemistry Laboratory (0-3-1)
Lab accompanying class content in CHE 202.

CHE 206 General Chemistry Laboratory (0-3-1)
Lab accompanying class content in CHE 203.
Corequisite: CHE 203.

CHE 207 Clinical Pharmacology (3-0-3)
The drug action of selected pharmaceutical. Emphasis is placed on drug interactions, routes of administration and effects on body systems.
Prerequisites: BIO 231, BIO 232.

CHE 210 General Chemistry (4-3-5)
Prerequisite: CHE 222.

CHE 211 General Chemistry (3-3-4)
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 or CHE 222.

CHE 212 General Chemistry (3-3-4)
Prerequisite: CHE 201 or CHE 221 or instructor consent.

CHE 235 Streamwater Chemistry and Sampling (1-6-3)
Introduction to water quality and automated stream water sampling. Laboratories focus on multiparameter water quality data sonde technologies. Calibration, operational use, discrete measurements and automated data logging are discussed. Field exercises include project planning, data validation, safety and constraint assessments.
Prerequisite: CHE 201 or CHE 221 or instructor consent.

CHE 260 Electrochemistry for Renewable Energy Applications (3-3-4)
Prerequisite: CHE 201 or CHE 221 or instructor consent.

CHE 315 Environmental Chemistry and Toxicology (3-0-3)
Mechanisms and toxicological effects of chemical reactions in water, soil and air. Global and regional concerns about atmospheric and marine contaminants, thermal pollution, pesticide and heavy metal disposal, radionuclide properties and effects of pollutants on living organisms. Organic nomenclature and selected biochemistry principles.
Prerequisite: CHE 331 or instructor consent.

Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33
CHE 325 Soil Science
(3-3-4)
Prerequisite: CHE 201, PHY 202 or instructor consent.

CHE 331 Organic Chemistry I
(3-3-4)
The structures and reactions of carbon compounds with emphasis on thermodynamics, reaction pathways and spectroscopy.
Prerequisite: CHE 223.

CHE 332 Organic Chemistry II
(3-3-4)
Organic stereochemistry with emphasis on biologically important molecules.
Prerequisite: CHE 331.

CHE 333 Organic Chemistry III
(3-3-4)
Free radical chemistry, pharmaceutical chemistry and the mechanistic aspects of enzymatic catalysis.
Prerequisite: CHE 332.

CHE 341 Instrumental Methods/Data Acquisition I
(3-3-4)
An 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: MIS 115 or CST 116 or instructor consent.

CHE 342 Instrumental Methods/Data Acquisition II
(3-3-4)
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
(3-0-3)
A survey of the chemical kinetics and thermodynamics of corrosion, the various types of corrosion, inhibition of corrosion and industrial applications.
Prerequisites: CHE 101, CHE 201, PHY 202 or instructor consent.

CHE 346 Corrosion Chemistry Laboratory
(0-3-1)
Laboratory accompanying CHE 345. Providing practical experience with electrochemical equipment used to measure corrosion processes.
Corequisite: CHE 345.

CHE 350 Clinical Pharmacology for Nuclear Medicine
(3-0-3)
Principles of pharmacokinetics, pharmacodynamics and a 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.
Prerequisites: BIO 233 or BIO 333 or instructor consent.

CHE 360 Clinical Pharmacology for the Health Professions
(3-0-3)
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.
Prerequisites: BIO 233 or BIO 333 or instructor consent.

CHE 365 Fate and Transport of Pollutants
(3-0-3)
Mass balance. The use of equilibrium and chemical kinetics in the modeling of pollutant transport in water, soil and air. Mixing zone analysis, the use of Darcy's law, flow nets and the Gaussian Plume approximation. Discussion, development and use of selected modeling scenarios.
Prerequisites: CHE 223, MATH 252.

(CIV) Civil Engineering
CIV 107, CIV 207, CIV 307, CIV 407 Seminar
(Hours to be arranged each term.)

CIV 112 Engineering Graphics
(0-6-2)
Graphical communication in civil engineering using computer aided drafting software. Emphasis on 2D with introduction to 3D methodologies, using industry standard 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.

CIV 201 Sustainable Civil Engineering I
(0-3-1)
This first of two courses will provide an awareness of sustainability concepts and an appreciation of key social, economic and environmental issues and processes relevant to civil engineering. Sustainable design practices in each civil engineering sub-discipline will be studied.

Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33
CIV 202 Sustainable Civil Engineering II
(0-3-1)
This second of two courses will provide an awareness of sustainability concepts and an appreciation of key social, economic and environmental issues and processes relevant to civil engineering. Sustainable design practices in each civil engineering sub-discipline will be studied.
Prerequisite: CIV 201 on instructor consent.

CIV 223 Elementary Properties of Materials
(3-3-4)
Study of the engineering properties of soil and concrete. Development of proper field and laboratory testing methods for classifying and evaluating soil characteristics and principles of quality control. Testing and mixing concrete based on aggregate properties determined in the laboratory.
Prerequisite: ENGR 101 with grade “C” or better or instructor consent.

CIV 299 Independent Studies
(Hours to be arranged each term.)

CIV 315 Principles of Environmental Engineering
(3-0-3)
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.
Prerequisite: CHE 201 or CHE 221 with grade “C” or better.

CIV 317 Economics for Civil Engineers
(3-0-3)
Economic analysis and evaluation of civil engineering projects. Economic evaluation from the perspective of the consulting engineer and contractor will be explored. Basic economic concepts such as equivalent worth, depreciation, taxes and statistical risk will be covered.
Pre- or corequisite: MATH 361.
Prerequisite: MATH 221 with grade “C” or better.

CIV 321 Introduction to Geotechnical Engineering
(3-3-4)
Soil permeability, seepage, effective stress, consolidation, settlement, shear strength, slope stability and related geotechnical engineering topics. Includes laboratory testing. Prerequisites: CIV 223 and ENGR 213 both with grade “C” or better.

CIV 332 Foundation Engineering
(4-0-4)
Analysis and design of shallow footings, deep foundations including piles, caissons and earth retaining structures. Advanced topics and computer applications in slope stability analysis.
Prerequisite: CIV 321 with grade “C” or better.

CIV 338 Structural Analysis
(3-3-4)
Prerequisites: ENGR 213, MATH 254N, PHY 222 all with grade “C” or better.

CIV 339 Reinforced Concrete Design
(3-3-4)
Design and behavior of reinforced concrete members including beams, slabs, footings, retaining walls and shear walls with applications to simple structures. Lab includes construction and destructive testing of reinforced concrete beams.
Prerequisite: CIV 328 with grade “C” or better.

CIV 344 Structural Steel Design
(4-0-4)
Design and behavior of structural steel members, including beams, tension members, columns and connections with applications to simple frames and structures. Computer applications also introduced.
Prerequisite: CIV 328 with grade “C” or better.

CIV 358 Project Management
(3-0-3)
Basic project management principles and practices for engineering projects. Topics include basic management principles, contracts, delivery methods, bidding, procurement, costs, estimating, planning, scheduling, controlling and allocation of resources, Gantt charts, CPM and PERT discussed. Concepts applied using currently available computer software.
Prerequisites: CIV 317, MATH 254N and PHY 222 all with grade “C” or better.

CIV 361 Closed Conduit Design
(3-3-4)
Prerequisites: ENGR 231, MATH 221, MATH 254N and PHY 222 all with grade “C” or better.

CIV 362 Hydrology and Surface Water Management
(3-3-4)
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.
Prerequisites: CIV 361 and MATH 361 both with grade “C” or better.

CIV 364 Introduction to Water and Wastewater Treatment Systems
(3-3-4)
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. Lab covers the water and wastewater quality analysis and unit operations/processes in treatment systems.
Prerequisites: CHE 201 or CHE 221 and CIV 315 with grade “C” or better.

CIV 371 Introduction to Transportation Engineering
(3-0-3)
Introduction to the design, planning, operation, management and maintenance of transportation systems. Principles for planning multi-modal transportation systems, layout of roadways, traffic flow modeling and capacity analysis.
Prerequisites: CIV 112, ENGR 211, GME.

Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance SS - Social Science
For more information, see page 33.
161, MATH 254N and PHY 222 all with grade “C” or better.

**CIV 375 Highway Engineering**  
(3-3-4)  
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: CIV 223, ENGR 213, MATH 254N and PHY 222 all with grade “C” or better.

**CIV 401/COM 401 Civil Engineering Project I**  
(4-6-6)  
First term of a two-term sequence integrating civil engineering design, group dynamics and technical communications. Students receive three credit hours in civil engineering design (CIV 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.

**CIV 402/COM 402 Civil Engineering Project II**  
(4-6-6)  
Second term of a two-term sequence. Students receive three credit hours in civil engineering design (CIV 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 and specifications and a construction cost estimate will also be completed.  
Prerequisite: CIV 401/COM 401 both with grade “C” or better.

**CIV 408 Workshop**  
(Hours to be arranged each term.)

**CIV 410 Basic Dynamics of Structures**  
(3-0-3)  
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, model superposition, earthquake engineering, current IBC methods.  
Prerequisite: CIV 328 with grade “C” or better.

**CIV 415 Civil Design Software Applications**  
(1-3-2)  
Advanced applications of civil engineering design software will be presented and applied to current year senior design project. Design components will include, at a minimum, site topography, layout of project roadways and parking lots, and layout of water, waste water and storm water lines.  
Prerequisite: CIV 112 with grade “C” or better.  
Corequisite: CIV 401/COM 401.

**CIV 416 Structural Design for Lateral Loads**  
(3-0-3)  
Wind and seismic forces on buildings according to the Uniform Building Code. Lateral force resisting systems for buildings. Software applications.  
Prerequisite: CIV 328 with grade “C” or better.

**CIV 418 Structural Matrix Analysis**  
(3-0-3)  
Static analysis of structures using flexibility and stiffness methods with strong emphasis on computer models and solutions for practical analysis problems.  
Prerequisite: CIV 328 with grade “C” or better.

**CIV 435 Timber Design**  
(3-0-3)  
Analysis and design of simple (determinate) timber beams, columns, trusses and connections using dimensioned lumber, plywood and laminated members. Computer solutions introduced.  
Prerequisite: CIV 328 with grade “C” or better.

**CIV 445 Design of Reinforced Masonry Structures**  
(3-0-3)  
Analysis and design of masonry beams, walls and columns using computer solutions with emphasis on lateral design considerations.  
Prerequisite: CIV 328 with grade “C” or better.

**CIV 464 Water and Wastewater Treatment Plant Design**  
(3-0-3)  
Planning, design, construction and operation of water and wastewater treatment systems. Prepare preliminary engineering design report. Work in design teams and present process designs for a potable water treatment plant and a municipal wastewater treatment plant.  
Prerequisites: CHE 202, CIV 315, CIV 364, and ENGR 231, all with grade “C” or better.

**CIV 466 Solid and Hazardous Waste Management**  
(3-0-3)  
Sources and characteristics of solid and hazardous wastes. Laws, regulations, methods and issues associated with the collection, handling, tracking, transportation, treatment and disposal of solid/hazardous wastes. Material recovery and recycling, waste to energy, composting, design of landfills and environmental considerations.  
Prerequisite: CIV 315 with grade “C” or better.

**CIV 467 Groundwater**  
(3-0-3)  
Offers an introduction to the physical properties and principles of groundwater. Topics will include groundwater and the hydrologic cycle, fundamental fluid flow laws, groundwater resource evaluation, and groundwater contamination.  
Prerequisites: BIO 327, MATH 251 for non-majors or CIV 321 for Civil Engineering majors.

**CIV 468 Environmental River Mechanics**  
(2-3-3)  
River response to watershed modification and infrastructure, including introduction to fluvial geomorphology, sediment transport and stream restoration. Management of waterways and floodplains.  
Prerequisites: CIV 361, CIV 362 both with grade “C” or better.

**CIV 469 Treatment Wetlands**  
(3-0-3)  
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.
CIV 574 Advanced Pavement Design  
(2-3-3)  
Methods of soil improvement required to enhance pavement behavior. In-situ soil stabilization, Geosynthetics in pavement design and construction. Mechanistic-empirical pavement design procedures. Advances in asphaltic mix designs.

(CLS) Clinical Laboratory Science  
CLS 100 Introduction to Clinical Laboratory Science  
(1-3-2)  
Orientation to the theory and practice of all aspects of the clinical laboratory science profession. The history of clinical laboratory science, professional organizations and career opportunities are discussed.

CLS 107, CLS 207, CLS 307, CLS 407 Seminar  
(Hours to be arranged each term.)

CLS 406 Biometry  
(2)  
Problem solving related to clinical laboratory determinations to include: solution preparation, systems of measurement, dilutions, factors, graphs and standard curves, and generation of laboratory results from raw data. Descriptive and inferential statistics related to clinical laboratory science and quality control to include: measures of central tendency, probability, distributions, hypothesis testing, confidence intervals, Z-scores, t-tests, chi-square, correlation and regression analysis, and ANOVA.

CLS 410 Clinical Microbiology I  
(2)  
Lecture course studying the major bacterial organisms pathogenic for man. Includes discussion of bacteria causing zoonotic diseases. Includes discussion of skin and wound infections, bone and joint infections, eye, ear, and sinus infections, dental and respiratory infections, enteric infections and food poisoning, urinary tract infections, central nervous system infections, intravascular infections, bacteremia, endotoxemia, infections of the fetus and newborn, sexually transmitted diseases, infections in the immunocompromised patient, nosocomial infections, and hospital infection control.  
Prerequisite: CLS 410  

CLS 415 Clinical Chemistry I  
(6)  
The theory, practical application and technical performance of chemical procedures. Fundamentals of quantitative chemical analysis in the determination of endogenous and exogenous substances in body fluids such as blood, urine, spinal fluid, amniotic fluid and ascites. Emphasis areas will encompass amino acids, proteins, carbohydrates, lipo-proteins, lipids, enzymes, renal and liver functions analytes, GI function related analytes, electrolytes, trace elements, hemoglobin and porphyrins, and hormones, bone metabolism, nutrition, pregnancy and fetal development analytes, and geriatric considerations.

CLS 416 Clinical Chemistry II  
(2)  
The theory, practical application and technical performance of chemical procedures. Fundamentals of quantitative chemical analysis in the determination of endogenous and exogenous substances in body fluids such as blood, urine, spinal fluid, amniotic fluid and ascites. Emphasis areas will encompass therapeutic drug monitoring, toxicology, and method evaluation.  
Prerequisite: CLS 415.

CLS 419 Immunohematology  
(2)  
Emphasis on theory and laboratory techniques used in blood banking including blood typing, major blood group antigens and antibodies including their role in transfu-
sion medicine, cross matching, and antibody identification. Current practices in blood donation, component therapy, and medical-legal aspects are also covered.

**CLS 420 Clinical Immunology**

(3)

- Fundamentals of humoral and cellular immunity, to include innate and adoptive immunity, organs and tissues of the immune system, principles of immune activation, immunoglobulin and receptor biochemistry, immuno-genetics, cytokines, the complement system, white blood cell populations, and phagocytic mechanisms. Clinical applications to include protective immunity, immuno-deficiency conditions, inflammation, immune mediated diseases, neoplasms of the immune system, transplantation, and cancer immunology. An overview of immunoassay and serology testing formats.

**CLS 422 Theories of Molecular Methods**

(2-0-2)

- Provides overview of molecular diagnostics principles, covering tests used for diagnostic purposes, and molecular techniques to include: nucleic acid structure and function, introduction to nucleic acid extraction, purification, and quantitation and amplification methods to include PCR, gene mutation and DNA technology.

Prerequisites: CLS 415, CLS 447, CLS 448.

**CLS 423 Molecular Techniques**

(1-0-1)

- Applies the concept of molecular biology to identify the genetic markers and mutations applicable to genetic diseases.

Prerequisite: CLS 422.

**CLS 440 Practicum: Specimen Collection**

(1)

- Provides theory, demonstrations and practice of medical laboratory techniques pertaining to the science of specimen collection or phlebotomy.

**CLS 441 Practicum: Instrumentation**

(1)

- Principles and applications of the instruments in use in the modern clinical laboratory. Basic principles of instrument operation for methods of detection, with emphasis on maintenance and safety. Instrumentation formats to include: spectrophotometry, electrochemistry, osmometry, electrophoresis, particle analysis, and measurement of radioactive decay.

**CLS 442 Practicum: Hematology**

(6)

- Normal development and function of blood cells; mechanisms of hemostasis; basic pathophysiology of hematological and hemostasis disorders; laboratory procedures pertaining to hematology and hemostasis; microscopic examination of blood films; and correlation and interpretation of laboratory data for disease states.

**CLS 443 Practicum: Transfusion Medicine**

(4)

- Coordinated lecture and laboratory practice. The principles of immunohematology as applied to Transfusion Medicine with special emphasis upon blood groups and types, techniques demonstrating antigen-antibody reactions; donor collection, processing, storage and hazards of transfusions, blood components and quality control are covered.

**CLS 444 Practicum: Microbiology**

(6)

- Emphasis on clinical laboratory techniques. Methods include discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving, and interpretation of results. Includes study of the culture, morphological characteristics, serologic methods, isolation and identification of bacterial organisms. Includes safety, specimen collection, microscopic methods, and antimicrobial susceptibility. Organisms include normal and pathogenic gram positive cocci, gram negative cocci, gram positive bacilli, gram negative bacilli, spirochetes, anaerobes, and related organisms with emphasis on organisms seen in a clinical laboratory. Includes discussion of chlamydia, mycoplasma, and rickettsiae.

**CLS 445 Practicum: Mycology**

(2)

- Emphasis on clinical laboratory techniques. Methods include microscopy, discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving, and interpretation of results. Includes study of the culture and morphological characteristics of normal and pathogenic fungi and yeast with emphasis on organisms seen in a clinical laboratory.

**CLS 446 Practicum: Parasitology**

(2)

- Emphasis on clinical laboratory techniques. Methods include microscopy, discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving, and interpretation of results. Includes study of normal and pathogenic parasitic organisms with emphasis on organisms seen in a clinical laboratory.

**CLS 447 Practicum: Chemistry**

(6)

- Principles of chemical analysis, quality control, laboratory utilization, and safety. Hands-on exercises, demonstrations, and computer tutorials illustrating chemical analysis and data evaluation in a clinical chemistry laboratory. Discussion of case studies using problem-solving methods to analyze and interpret relevant chemical analysis data.

Prerequisite: CLS 441

Corequisite: CLS 415

**CLS 448 Practicum: Immunology/Infectious Serology**

(2)

- Techniques in immunologic and serologic procedures. Hands-on exercises, demonstrations, and computer tutorials illustrating immunoassay analysis and data evaluation in a clinical immunology and infectious serology laboratory. Discussion of immunoassay systems to include spectrophotometry, nephelometry, turbidimetry, fluorescence, electrochemiluminescence, radioassay, and flow cytometry; instruction and practice of testing methods and interpretation to include precipitation, agglutination, receptor-ligand, complement, microscopy, electrophoresis, and cell-mediated assays. Discussion of case studies using problem-solving methods to analyze and interpret relevant immunology and serology data.

Prerequisites: CLS 420, CLS 441.

**CLS 449 Practicum: Urinalysis**

(2)

- Study of urine with emphasis on urinalysis techniques, renal function, physical examination, chemical examination, microscopic examination, renal disease, and metabolic disorders. Methods include microscopy, discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving, and interpretation of results.
**CLS 452 Practicum: Advanced Hematology Techniques**  
(2)  
Microscopic examination of blood films and body fluids; instrumentation methodologies for analyzing cellular components of blood; analysis and interpretation of disease states. Prerequisite: CLS 442 with grade “C” or better.

**CLS 453 Practicum: Advanced Transfusion Medicine Techniques**  
(2)  
Provides directed study, review and advanced problem solving and critical thinking related to Transfusion Medicine. May include, but not be limited to, discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving and interpretation of results. Prerequisite: CLS 443 with grade “C” or better.

**CLS 454 Practicum: Advanced Microbiology Techniques**  
(2)  
Advanced techniques and review of microbiological organisms. Includes study of bacterial, fungal, and parasitic organisms and associated techniques. Methods include microscopy, discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving, and interpretation of results. Prerequisites: CLS 410, CLS 411, CLS 444, CLS 445, and CLS 446.

**CLS 457 Practicum: Advanced Chemistry/Immunology Techniques**  
(2)  
Directed study, review, and demonstration of advanced methods and instruments in use in clinical or research laboratories. These may include, but not be limited to tissue typing, molecular methods, automated systems, flow cytometry, and chromatographic methods. Prerequisites: CLS 447, CLS 448.

**CLS 459 Practicum: Advanced Urinalysis Technique**  
(1)  
Advanced techniques and review of urinalysis methods. Includes microscopy, discussion, case histories, computer tutorials, hands-on exercises, demonstrations, problem solving, and interpretation of results.

**CLS 462 Laboratory Management**  
(2)  
Theory and practice of clinical laboratory management to include: laboratory regulatory considerations, financial management, laboratory operating and communication systems, safety procedures, project planning, procurement, principles and fundamentals of personnel management, quality assessment, ethical practice and educational methodology.

**CLS 470 Clinical Laboratory Externship**  
(16)  
Sixteen weeks of clinical laboratory experience at an Oregon Tech approved clinical site correlating knowledge and skills presented in lectures and labs. Designed for the development of skills necessary for entry into professional practice. Students work under the direct supervision of certified clinical laboratory scientists. Prerequisite: Successful completion of all academic coursework in the Clinical Laboratory Science Program.

**COM 104 Introduction to Communication**  
(3-0-3)  
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 majors.

**COM 105 Introduction to Communication Theory**  
(3-0-3)  
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 Communication Research**  
(3-0-3)  
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, COM 207, COM 307, COM 407 Seminar**  
(Hours to be arranged each term.)

**COM 115 Introduction to Mass Communication**  
(3-0-3)  
Provides an introduction to mass media. Focuses on understanding how media operate with emphasis on contemporary social, economic, political, cultural and ethical issues.

**COM 205 Intercultural Communication**  
(3-0-3)  
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 215 Creativity in Communication**  
(3-0-3)  
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 Essentials of Grammar and Punctuation**  
(3-0-3)  
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 Interpersonal Communication**  
(3-0-3)  
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**  
(3-0-3)  
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, SPE 111.
COM 237 Introduction to Visual Communication  
(3-0-3)  
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  
(2-3-3)  
Study of the technical aspects of digital media design and production. Hands-on experience in creating and editing video and audio. Production of video and audio for specific contexts.

COM 255 Communication Ethics  
(3-0-3)  
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  
(3-0-3)  
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  
(3-0-3)  
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, WRI 122.

COM 301 Rhetorical Theory and Application  
(3-0-3)  
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, WRI 227.

COM 320 Advanced Intercultural Communication  
(3-0-3)  
C  
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 326 Communication Research  
(3-0-3)  
Introduction to research methods and design. Design of both quantitative and qualitative research. Emphasis on communication based methodologies: focus groups, directed interviews, and ethnographies. Includes a research project and written and oral research reports.  
Pre- or corequisite: WRI 227.

COM 345 Organizational Communication I  
(3-0-3)  
Studies communication in organizations, including message movement, exchange and interpretation, identification of variables, roles and patterns influencing communication in organizations.

COM 346 Health Communication  
(3-0-3)  
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 “C” or better; COM 205 or equivalent.

COM 347 Negotiation and Conflict Resolution  
(3-0-3)  
C  
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  
(3-0-3)  
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  
(3-0-3)  
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, WRI 227.

COM 365 Electronic Communication and Society  
(3-0-3)  
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/CIV 401 Civil Engineering Project I  
(4-6-6)  
C  
First term of a two-term sequence integrating civil engineering design, group dynamics and technical communications. Students receive three credit hours in civil engineering design (CIV 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.

COM 402/CIV 402 Civil Engineering Project II  
(4-6-6)  
C  
Second term of a two-term sequence. Students receive three credit hours in civil engineering design (CIV 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 and specifications and a construction cost estimate will also be completed.
Prerequisite: COM 401/CIV 401 both with grade "C" or better.

**COM 415 Developing Effective Multimedia-based Presentations**  
(3-0-3)  
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. Prerequisites: CST 101 or equivalent, SPE 111 and WRI 227.

**COM 420 Externship**  
(Variable to a total of 15 credits)  
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**  
(3-0-3)  
Allows students to initiate research on a significant capstone project in the communication field. Focuses on development of a proposal and presentation. Prerequisite: COM 421.

**COM 422 Senior Project II**  
(3-0-3)  
Continues work of COM 421, focusing on project research methodologies. Prerequisite: COM 421.

**COM 423 Senior Project III**  
(3-0-3)  
Focuses on completion of project, including final documentation and presentation. Prerequisite: COM 422.

**COM 425 Mediation**  
(3-0-3)  
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**  
(Variable Credit 1-3)  
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. Co- or prerequisite: COM 425.

**COM 437 Communication Training and Development**  
(3-0-3)  
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 Organizational Communication II**  
(3-0-3)  
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 and Leadership**  
(3-0-3)  
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 permission.

(CST) **Computer Systems Engineering Technology**

**CST 101, CST 104, CST 105 Introduction to Computer Systems I, II, III**  
(1-3-2) (0-3-1) (0-3-1)  
Concepts, terms and trends related to computer engineering technology (hardware) and software engineering technology (software) curricula. Includes discussions on fundamental aspects of the computer field. Laboratory component will introduce students to microcomputers, programming concepts and various computer engineering related software.

**CST 107, CST 207, CST 307, CST 407 Seminar**  
(Hours to be arranged each term.)

**CST 116 C++ Programming I**  
(3-3-4)  
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 123 Topics in Computer Science**  
(3-0-3)  
Overview of various software engineering subject areas. Topics include, computer history, operating systems, networking, software engineering, databases, software careers, and various application areas. Also examines ethical and social issues raised by widespread use of computers. Prerequisite: CST 126 with grade “C” or better.

**CST 126 C++ Programming II**  
(3-3-4)  
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**  
(3-0-3)  
Introduces computer elements, organization, and instruction sets, computer arithmetic, ALU, Registers, Datapath, memory and Control unit functions.  
Prerequisite: CST 162 with grade “C” or better.

**CST 131 Computer Architecture**  
(3-0-3)  
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 Electronics II – Sequential Logic with HDL**  
(3-3-4)  
Introduction to Sequential Logic, Latches, Flip/Flops, Timers, Counters/Registers, HDL Implementation, PLD HW Implementation, Finite State Machine Design/Analysis, Logic Testing, MPU System, Memory Devices, DC Parameters and Timing Analysis. Laboratory integral to the class. Students must register for a laboratory section.  
Prerequisite: EE 131 or CST 162, both with grade “C” or better.  
Corequisite: CST 134.

**CST 134 Instrumentation (0-3-1)**  
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.  
Corequisite: CST 133.

**CST 136 Object-Oriented Programming with C++**  
(3-3-4)  
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 141 Computer Programming (FORTRAN)**  
(3-3-4)  
Computer concepts and problem solving methods using the FORTRAN programming language. Topics include: algorithms, simple data types, conditional and iterative structures, subprograms, structured programming and documentation.  
Prerequisite: MATH 111.

**CST 162 Introduction to Digital Logic**  
(3-3-4)  
Introduction to combinational logic. Includes introduction to DC circuits, number systems, Boolean algebra, logic gates, Muxes, Decoders, Adders, Subtractors. Logic design using a hardware description language. Laboratory integral to the class.  
Pre- or corequisite: MATH 100.

**CST 204 Introduction to Microcontrollers**  
(3-3-4)  
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, CST 250, each with grade “C” or better, or instructor consent.

**CST 211 Data Structures**  
(3-3-4)  
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 Languages**  
(2-3-3)  
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**  
(3-0-3)  
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 211, and CST 223 or CST 231.

**CST 231 Computer Design with Programmable Logic**  
(3-0-3)  
This class introduces students to structured digital design techniques using programmable logic devices. The course investigates concepts, terminology and techniques used to design and implement programmable logic devices. Both software tools (synthesis tools) and programmable hardware applications will be provided to demonstrate the capabilities of programmable devices.  
Prerequisite: CST 133 with grade “C” or better.  
Corequisite: CST 232.

**CST 232 Computer Design with Programmable Logic Laboratory**  
(0-3-1)  
Laboratory experiments to support CST 231. Experiments with programmable logic devices including simulation.  
Prerequisite: CST 133 with grade “C” or better.  
Corequisite: CST 231.

**CST 236 Software Systems Testing**  
(3-3-4)  
Focus on software testing and reliably monitoring the health of software development. Topics include test driven development, story driven tests, unit tests, Web tests, load tests, static code analysis and dynamic code analysis.  
Prerequisite: CST 136 with grade “C” or better.

**CST 238 Graphical User Interface Programming**  
(3-3-4)  
Introduction to Windows based programming. Topics covered include a review of the standard user interface elements of Windows, the Windows Application Program Interface (API), message processing, writing Windows Procedures, working with text, using Windows resources, creating modal and modeless dialog boxes, and using the Graphics Device Interface.
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

Prerequisites: CST 211 with grade “C” or better and SPE 111.

CST 240 UNIX
(2-3-3)
Students will study the structure of the UNIX/Linux Operating System, including: file structure, input/output processing, commands and utilities, shell configuration, communications, and script programming languages. Emphasis will be placed on lab work done within the UNIX/Linux environment.
Prerequisite: CST 126 with grade “C” or better.

CST 250 Computer Assembly Language
(3-3-4)
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 260 Advanced Assembly Language Programming
(3-3-4)
Advanced applications of assembly language programming such as: interrupt handling, writing drivers involving bus interface devices, graphic applications, and interfacing with high level languages. Software projects will be developed on Intel 80XXX family of processors.
Prerequisite: CST 250, with grade “C” or better, or instructor consent.

CST 262 Digital Design Using HDL
(3-3-4)
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, EET 101, EET 102.

CST 276 Software Design Patterns
(3-3-4)
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 295 Individual Studies
(Hours to be arranged each term.)

CST 298 Reading and Conference
(Hours to be arranged each term.)

CST 299 Laboratory Practice
(Hours to be arranged each term.)

CST 311 Advanced Data Structures and Algorithm Analysis
(3-1-3)
Discussion and implementation of advanced data structures like K-way trees and sets. Analysis techniques of computer algorithms with respect to their time and space complexity. Emphasis will be placed on implementation of algorithms and analyzing their performance in various environments.
Prerequisite: CST 211.

CST 313 Computer Software Techniques
(3-0-3)
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 MIS 315.
Prerequisite: CST 126 with grade “C” or better.

CST 315 Embedded Sensor Interfacing and I/O
(3-3-4)
Prerequisites: CST 204; EE 223, or EET 237 and EET 238.

CST 316 Software Process Management
(3-3-4)
In this first term of a 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.
Prerequisites: CST 326; CST 276, CST 316 both with grade “C” or better; CST 238, CST 324.

CST 320 Compiler Methods
(3-3-4)
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 229.

CST 321 Introduction to Microprocessors
(3-6-5)
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
(3-3-4)
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, view of query language characteristics, and a comparison of commonly available DBMS.
Prerequisite: CST 211 with grade “C” or better.

CST 326, CST 336 Software Design and Implementation I, II
(3-3-4)
In this second and third terms of a 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.
Prerequisites: CST 326; CST 276, CST 316 both with grade “C” or better; CST 238, CST 324.

For more information, see page 33
Courses with the following notation fulfill the appropriate general education requirements:
C - Communication    H - Humanities    HP - Humanities Performance    SS - Social Science

For more information, see page 33
Courses with the following notation fulfill the appropriate general education requirements:

**C** - Communication  **H** - Humanities  **HP** - Humanities Performance  **SS** - Social Science

For more information, see page 33
Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33

C - Humanities
- Communication

Courses with the following notation fulfill the appropriate general education requirements:

Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 456 Embedded System Testing
Prerequisites: CST 345, CST 373.

CST 455 System On a Chip Design
(3-3-4)

CST 461 Advanced Topics in VLSI Design
(2-3-3)
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 and time prediction. Prerequisite: CST 352 with grade “C” or better.

CST 462 Real-Time Operating Systems
(2-3-3)
Topics in real-time operating systems analysis and design. Hard versus soft real-time systems. Scheduling paradigms and algorithms. Analysis of systems and processes. Real-time system modeling and time prediction. Prerequisite: CST 441.

CST 466 Embedded System Security
(3-0-3)
Fundamental theories and applications of cryptography relevant to computer and embedded system security. Prerequisites: CST 126, MATH 112.

CST 467 Advanced Computer Architecture
(3-0-3)
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 468 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 469 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 470 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 471 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 472 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 473 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 474 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 475 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 476 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 477 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 478 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 479 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 480 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 481 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 482 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 483 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 484 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 485 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 486 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 487 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 488 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 489 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 490 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 491 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 492 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 493 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 494 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)

CST 495 Advanced Topics in VLSI Design
(3-3-4)
Fault Injection, Executable Model Testing, Software Regression Testing, Performance, Hardware testing methods --Scan Design, and mixed signal hardware. Fault Models, (3-3-4)
C  - Humanities
H  - Humanities
HP - Humanities Performance
SS - Social Science

Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities   HP - Humanities Performance  SS - Social Science

DH 242 Prevention III
(3-0-3)
Preventive needs of infants through sixth grade. Sealants, early childhood caries, occlusion and nutrition, and management of this age group are considered. Healthcare for the provider is continued.
Prerequisite: DH 241.

DH 244 General and Oral Pathology
(3-0-3)
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 244 General and Oral Pathology
(3-0-3)
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 244 General and Oral Pathology
(3-0-3)
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
(2-0-2)
Theoretical background and practical application of dental radiography. Exposure techniques, processing, mounting, and evaluation of dental radiographs; physical principles of production; clinical use of X-radiation; and radiation safety procedures.

DH 252 Oral Radiology II
(2-0-2)
Specialized techniques for children, special needs patients, extra-oral procedures, occlusal projections, localization techniques, radiographic detection and interpretation of potential pathology.
Prerequisite: DH 244.

DH 254 Introduction to Periodontology
(1-0-1)
Introduction to periodontology with emphasis on etiology and pathogenesis of periodontal disease, disease classification, and assessment procedures.
Prerequisite: DH 244.

DH 267 Emergency Procedures
(2-1-3)
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
(2-0-2)
Professional ethics and legal requirements of the dental profession.

DH 299 Laboratory Practice
(Hours to be arranged each term.)

DH 311, DH 322, DH 323 Dental Hygiene Clinical Practice and Seminar IV, V, VI
(321-F)(2-6-4)(322-W)(1-6-3)(323-S)(1-12-5)
Continued development of dental hygiene skills, ultrasonic and advanced instrumentation, expanded functions and observation in specialty practices.
Prerequisite: For DH 321–DH 322.
Prerequisite: For DH 322–DH 321.
Prerequisite: For DH 323–DH 322.

DH 320 Pathology
(3-0-3)
Prerequisite: DH 340.

DH 341 Prevention V
(3-0-3)
Dental care for oral cancer patients. Examination of different antimicrobials and their use. The needs of geriatric patients and special needs patients. Healthcare for the provider.
Prerequisite: DH 340.

DH 344 Advanced General and Oral Pathology
(3-0-3)
Prerequisite: DH 244.

DH 351 Pain Management I
(1-3-2)
Coordinated lecture and laboratory practice in the techniques of local anesthesia. Factors in selection of local anesthetic.
Prerequisite: CHE 360 and DH 267.

DH 352 Pain Management II
(2-3-3)
Recognition of dental anxiety; behavioral management; nitrous oxide sedation techniques are practiced. Health history evaluation and case analysis.
Prerequisite: DH 351.

DH 354 Periodontology
(3-0-3)
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
(2-3-3)
General properties, composition and manipulation of common dental materials. Expanded functions including denture relines and amalgam polishing are practiced.

DH 365 Dental Anatomy
(2-0-2)
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 370, DH 371, DH 372 International Externship
(1-0-1)(1-0-1)(0-3-1)
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: For DH 370–DH 321 and DH 381.
Prerequisite: For DH 371–DH 370.
Prerequisite: For DH 372–DH 371.

DH 380 Community Dental Health I
(1-3-2)
Childhood education techniques provided and implemented within the community. Systemic fluoride and its controversial effects debated. Teamwork skills.
Prerequisite: DH 241.
Corequisite: DH 242.

DH 381 Community Dental Health II
(1-3-2)
Needs assessments and budget developed along with a project plan for a community oral health project. Educating and working with adolescents. Projects will be conducted in local schools. Teamwork techniques practiced.
Prerequisite: DH 380.

DH 382 Community Dental Health III
(1-3-2)
The ongoing community oral health project will be implemented. Formative and summative evaluations compared and utilized in project. The dental hygienist's role in managed care. The various structures, ethics, and alternatives of public health.
Prerequisite: DH 381.

DH 383 Community Dental Health IV
(0-3-1)
Conclusion, evaluation and future recommendations of community oral health project. Formal written presentation of project. In-depth look at geriatric clients and their needs. Students will experience different settings in the local geriatric community.
Prerequisite: DH 382.

DH 399 Laboratory Practice
(Hours to be arranged each term.)

DH 401 Overview of Advanced Dental Hygiene
(3-0-3)
Introduction to the online degree completion program. Career opportunities, roles of the dental hygienist, and the different emphases within the program are explored.

DH 421, DH 422, DH 423 Dental Hygiene Clinical Practice and Seminar VII, VIII, IX
(421-SU)(2-6-4)(422-F)(1-12-5)(423-W)(1-12-5)
Prerequisite: For DH 421–DH 323.
Prerequisite: For DH 422–DH 421.
Prerequisite: For DH 423–DH 422.

DH 430 Dental Hygiene Board Review
(2-0-2)
Designed to help students prepare for their national board exam. Multiple-choice test-taking skills are practiced. Mock tests simulating the real exam are used.

DH 453 Current Issues in Dental Hygiene
(3-0-3)
Current topics and issues related to dental hygiene practice are explored.
Prerequisite: Admission to BDHO program.

DH 454 Dental Practice Management
(3-0-3)
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 455 Dental Hygiene Research
(3-0-3)
Students choose a topic, conduct library and clinical research and document results.
Prerequisites: DH 453, MATH 243 and admission to BDHO program.

DH 461, DH 462, DH 463 Restorative Dentistry I, II, III
(1-3-2)(1-3-2)(0-6-2)
Properties of restorative dental materials. Practical experience using restorative dental materials. Placement and finishing of amalgam and composite restoration on typodonts in Restorative Dentistry I and on patients in Restorative Dentistry II and III.
Prerequisite: For DH 461–DH 363.
Prerequisite: For DH 462–DH 461.
Prerequisite: For DH 463–DH 462.

DH 467 Restorative Functions Endorsement
(2-2-4)
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
(2-3-3)
Dental hygienists plan and implement a community health program. Hygienists work with contacts and resources in their community to assess, analyze, budget, plan, implement and evaluate all phases of a community health project. Requires communication skills, networking, critical thinking and research.
Prerequisite: AHED 450 and admission to BDHO program.

DH 475 Dental Hygiene Research Methods I
(2-0-2)
Evidence-based practice is introduced. Current literature is reviewed and evaluated. Research ethics are discussed. Students write a literature review.

DH 476 Dental Hygiene Research Methods II
(2-0-2)
Students design and implement a pilot study.
Prerequisite: DH 475.

DH 477 Dental Hygiene Research Methods III
(2-0-2)
Students analyze study data and document results.
Prerequisite: DH 476.

DH 480 Community Health Practicum
(0-9-3)
Students design a community health project and gain practical experience providing dental hygiene care and education in a community group setting.
Prerequisite: AHED 450, DH 470.

DH 495 Individual Studies
(Hours to be arranged each term.)

DH 499 Laboratory Practice
(Hours to be arranged each term.)

(DHE) Dental Hygiene, (Extended)
DHE 100 Introduction to Dental Hygiene I
(2-0-2)
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.

**DHE 107, DHE 207, DHE 307 Seminar**
(Hours to be arranged each term.)

**DHE 211 Principles of Dental Hygiene I**
(2-0-2)
Sequential course providing theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to patient assessment and management. Communication skills emphasized. Prerequisite: DHE 212.

**DHE 212 Principles of Dental Hygiene II**
(2-3-3)
Sequential course providing theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to patient assessment and management. Communication skills emphasized. Prerequisite: DHE 211.

**DHE 213 Principles of Dental Hygiene III**
(3-0-3)
Sequential course providing theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to patient assessment and management. Communication skills emphasized. Prerequisite: DHE 212.

**DHE 221 Dental Hygiene Clinical Practice I**
(0-9-3)
Sequential course designed to provide clinical skills essential for the practice of dental hygiene. Skill development in the areas of patient appraisal, basic instrumentation, and individualized preventive care emphasized. Prerequisite: DHE 222.

**DHE 222 Dental Hygiene Clinical Practice II**
(0-12-4)
Sequential course providing theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to patient assessment and management. Communication skills emphasized. Prerequisite: DHE 221.

**DHE 223 Dental Hygiene Clinical Practice III**
(0-12-4)
Sequential course providing theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to patient assessment and management. Communication skills emphasized. Prerequisite: DHE 222.

**DHE 225 Head and Neck Anatomy, Histology and Embryology**
(2-3-3)
Anatomy of head and neck integrated with histology and embryology of head neck structures, and oral and dental tissues.

**DHE 233 Periodontontology**
(3-0-3)
First of a two-course sequence emphasizing periodontal diseases, their classifications, and the etiological factors involved. Preventive measures within the scope and responsibility of the dental hygienist are correlated with basic sciences and clinical aspects of periodontal diseases.

**DHE 234 General and Oral Pathology**
(3-0-3)
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.

**DHE 252 Oral Radiology I**
(2-3-3)
Theoretical background and practical application for dental radiography. Exposure techniques, processing, mounting and evaluation of dental radiographs; physical principles of production; clinical use of X-radiation and radiation safety procedures.

**DHE 253 Oral Radiology II**
(2-0-2)
Techniques for patients with special needs, extra-oral procedures, occlusal projections, radiographic detection and interpretation of potential pathology. Introduction to panoramic exposure techniques and images and refinement of techniques in exposure, processing and radiographic evaluation. Prerequisite: DHE 252.

**DHE 261 Dental Health Education**
(3-0-3)
An application of the concepts of preventive dentistry. Course includes oral health instruction for the individual patient based on an understanding of the causes and means to control dental disease. Selection and evaluation of oral physiotherapy aids, patient education, and other materials will be investigated. Concept of effective patient communication and motivation will be emphasized.

**DHE 275 Dental Ethics**
(2-0-2)
Professional ethics and legal requirements of the dental profession.

**DHE 282 Medical and Dental Emergency Procedures**
(2-3-3)
Equipment, drugs, signs, symptoms and treatment of medical emergencies that may occur in dental offices. Individual and team practice in carrying out emergency procedures (pulse, respiration, blood pressure, IV setup, oxygen, cardiopulmonary resuscitation, etc.) in timed simulations.

**DHE 299 Laboratory Practice**
(Hours to be arranged each term.)

**DHE 311 Principles of Dental Hygiene IV**
(3-0-3)
Sequential course providing advanced theoretical background for the clinical practice of dental hygiene. Students will learn how to promote patient adherence to disease prevention and health maintenance using evidence-based strategies. Prerequisite: DHE 213.

**DHE 312 Principles of Dental Hygiene V**
(3-0-3)
Sequential course providing advanced theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to clinical cases. Care of special needs populations emphasized. Prerequisite: DHE 311.

**DHE 313 Principles of Dental Hygiene VI**
(4-0-4)
Sequential course providing advanced theoretical background for the clinical practice of dental hygiene. Problem solving and critical thinking related to clinical cases. Interview-
ing skills, career opportunities and alternative practice settings discussed. Community health programs evaluated. Prerequisite: DHE 312.

DHE 320 Dental Materials and Chairside Assisting
(2-3-3)
A study of the general properties, composition and manipulation of common dental materials as well as practical application of these materials at the chairside utilizing the concepts of four-handed dentistry. Prerequisite: DHE 205.

DHE 321 Dental Hygiene Clinical Practice IV
(0-12-4)
Sequential course designed for the development of skills necessary for entry into professional clinical practice. Expanded dental hygiene functions practiced. Variety of off-campus clinical practice settings experienced. Prerequisite: DHE 322.

DHE 322 Dental Hygiene Clinical Practice V
(0-12-4)
Sequential course designed for the development of skills necessary for entry into professional clinical practice. Expanded dental hygiene functions practiced. Variety of off-campus clinical practice settings experienced. Prerequisite: DHE 323.

DHE 323 Dental Hygiene Clinical Practice VI
(0-15-5)
Sequential course designed for the development of skills necessary for entry into professional clinical practice. Expanded dental hygiene functions practiced. Variety of off-campus clinical practice settings experienced. Prerequisite: DHE 324.

DHE 333 Periodontal Therapy
(3-0-3) Philosophy and theoretical background of advanced periodontal issues of all supportive structures are explored. Various periodontal surgery techniques are studied. Prerequisite: DHE 233.

DHE 344 Advanced General and Oral Pathology
(3-0-3)
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: DHE 244.

DHE 351 Dental Analgesia
(2-3-3) This course explores pain control methods, including local anesthesia and nitrous oxide oxygen analgesia. Health history evaluation, local and systemic complications, anesthetic solutions, and vasoconstrictors and drug interactions are discussed. Techniques of local anesthesia, including block and infiltration injections are practiced. Administration of nitrous oxide is also practiced. Prerequisites: DHE 205, DHE 282.

DHE 366 Dental Anatomy
(2-0-2) 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.

DHE 380 Oral Health Planning and Care I
(2-3-3) Major concepts of public health including epidemiology, prevention and financing are covered. A systematic approach to planning group oral health projects begins.

DHE 381 Oral Health Planning and Care II
(2-6-4) Biostatistics and careers in public health are explored. Community oral health projects are implemented and evaluated. Table clinics and portfolios that document components of projects are presented. Prerequisite: DHE 380.

DHE 399 Laboratory Practice
(Hours to be arranged each term.)

(DMS) Diagnostic Medical Sonography
DMS 107, DMS 207, DMS 307, DMS 407 Seminar
(Hours to be arranged each term.)

DMS 223 Applications of Abdominal Sonography I
(3-0-3) History of sonography. Orientation to patient history, abdominal cross-sectional anatomy, scanning and normal sonographic presentation. Prerequisite: MIT 103 with grade “C” or better.

DMS 224 Applications of Abdominal Sonography II
(3-0-3) 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 Applications of Abdominal Sonography III
(3-0-3) 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
(3-0-3) 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 235 Diagnostic Medical Sonography Patient Care
(3-0-3) Sonographic management and applications of cognitive, psychomotor, and interpersonal skills as they relate to the health care consumer. Patient assessment and communication, body mechanics, medical and surgical asepsis, medical emergencies, pharmacology and analysis of ethical and legal issues. Prerequisite: DMS 223 with grade “C” or better.

DMS 252 Sophomore Laboratory I
(0-3-1) Applied scanning of right upper quadrant anatomy stressing imaging planes. Gray scale instrumentation, system-optimization, preventive maintenance, and quality hard
Courses with the following notation fulfill the appropriate general education requirements:

**C** - Communication  **H** - Humanities  **HP** - Humanities Performance  **SS** - Social Science

For more information, see page 33
Courses with the following notation fulfill the appropriate general education requirements:

- **C** - Communication
- **H** - Humanities
- **HP** - Humanities Performance
- **SS** - Social Science

For more information, see page 33
Courses with the following notation fulfill the appropriate general education requirements:

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**ECO 201 Principles of Economics, Microeconomics**
(3-0-3) SS
Topics include scarcity, consumer choice, supply and demand, elasticity, cost and pricing theory, theory of market structures (competition, monopoly, monopolistic competition, oligopoly).
Pre- or corequisite: MATH 111.

**ECO 202 Principles of Economics, Macroeconomics**
(3-0-3) SS
An introduction to the economic problem. Topics include gross domestic product, unemployment, monetary policy, fiscal policy, macro equilibrium, inflation, and supply and demand.
Pre- or corequisite: MATH 111.

**ECO 203 Principles of Economics, Special Topics**
(3-0-3) SS
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, ECO 202.

**ECO 357 Energy Economics and Policy**
(3-0-3) SS
Explores the role of energy and energy resources from the economic perspective. Analyzes U.S. 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.

**EE 131 Digital Electronics I**
(3-3-4)
Introduction to combinational logic, gates, Boolean Algebra, Karnaugh Mapping, Number Systems/Codes, arithmetic circuits, decoders/encoders, mux/demux, comparators, basic sequential gates (Latches/FF) introduction to HDL (Verilog/VHDL), PLD HW implementation.
Pre- or corequisite: MATH 111.

**EE 133 Digital Electronics II**
(3-3-4)
Introduction to sequential logic, with HDL, Clocking and flip/flops, timers, counters/registers, HDL implementation, PLD HW Implementation, finite state machine design/analysis, logic testing and timing analysis.
Prerequisites: CST 162 or EE 131 with grade “C” or better, MATH 111.

**EE 211 Circuits I**
(3-3-4)
Corequisite: MATH 251.

**EE 225 Circuits III**
(3-3-4)
Prerequisite: EE 223 with grade “C” or better.
Corequisite: MATH 321.

**EE 236 LabVIEW Programming**
(3-3-4)
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 301 Optoelectronics I – Optoelectronic Devices and Optical Detection**
(3-3-4)
Optoelectronic devices including polarizers,
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  
H - Humanities  
HP - Humanities Performance  
SS - Social Science

For more information, see page 33
EET 107, EET 207, EET 307, EET 407 Seminar
(Hours to be arranged each term.)

EET 115 Network Theorems and Transient Analysis
(3-0-3)
Current sources; source conversion; Thevenin, Norton and superposition theorems; capacitance; magnetism; inductance; transient analysis of RC and RL circuits.
Prerequisite: EET 101 with grade “C” or better.
Corequisites: EET 116, MATH 111.

EET 116 Network Theorems and Transient Analysis Laboratory
(0-3-1)
Theoretical concepts covered in EET 115 verified using available components and instrumentation.
Prerequisite: EET 102.
Corequisite: EET 115.

EET 125 AC Circuit Analysis
(4-0-4)
Sinusoidal AC voltage, phasors, average and effective values, impedance, AC series parallel circuits, AC power, AC network analysis, AC network theorems, dependent sources, transformers.
Prerequisite: EET 115 with grade “C” or better.
Corequisite: MATH 112.

EET 126 AC Circuit Analysis Laboratory
(0-6-2)
Theoretical concepts discussed in EET 125 verified using available components, instrumentation, and computer simulations using PSPICE.
Prerequisite: EET 116 with grade “C” or better.
Corequisite: EET 125.

EET 143 DC and AC Circuit Fundamentals
(5-0-5)
Network theorems applied to DC circuits: source conversions; Thevenin, Norton, superposition; capacitance; magnetic circuits; inductance; transient analysis of RC and RL circuits; sinusoidal waveforms; phasors; reactance and impedance; series, parallel, and series-parallel AC circuits.
Prerequisite: EET 101 with grade “C” or better.
Corequisites: EET 144 or EET 146; MATH 112.

EET 144 DC and AC Circuit Fundamentals Laboratory for LOET
(0-3-1)
Laboratory companion to EET 143 for LOET majors only. This course will not count for EET or CSET majors. Theoretical concepts covered in lecture will be verified using available components and instruments. This course must be taken the same term as EET 143. Written laboratory reports are required.
Prerequisite: EET 102 with grade “C” or better.
Corequisite: EET 143.

EET 145 Transistor Amplifiers
(3-0-3)
Design and analysis of transistor amplifiers, including biasing, load-line analysis.
Prerequisite: EET 125 with grade “C” or better.
Corequisite: MATH 112.

EET 146 Semiconductor Devices and Amplifiers
(3-0-3)
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 126.

EET 147 Digital Circuits I
(3-3-4)
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 152 Linear Circuits
(4-0-4)
Linear small-signal equivalent circuit models. Design and analysis of linear circuits, n-channel, p-channel, JFET, MOSFET.
Prerequisites: EET 145, MATH 112.

EET 160 Digital Circuits II
(3-3-4)
Introduction to sequential logic, latches, flip-flops, timers, counters, registers, finite state machines, logic testing. DC parameters and timing analysis.
Prerequisite: EET 152.

EET 209 Introduction to Amplifiers and Semiconductor Devices
(4-0-4)
Prerequisite: EET 125 with grade “C” or better.
Corequisite: EET 210.

EET 210 Introduction to Amplifiers and Semiconductor Devices Laboratory
(0-6-2)
Theoretical concepts discussed in EET 209 verified using available components and instrumentation. Computer simulation using PSPICE.
Prerequisite: EET 126 with grade “C” or better.
Corequisite: EET 210.

EET 211 Digital Circuits II
(3-3-4)
Introduction to sequential logic, latches, flip-flops, timers, counters, registers, flip-flop.ture, finite state machines, logic testing. DC parameters and timing analysis.
Prerequisite: EET 152.

EET 212 Electric Circuits II
(3-3-4)
DC Analysis and First-Order Transients. Ohm’s law, Kirchhoff’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 251.

EET 213 Electric Circuits III
(3-3-4)
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: EET 211, MATH 252.

EET 214 Semiconductor Devices and Amplifiers
(3-0-3)
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 212.

EET 215 Transistor Amplifiers
(4-0-4)
Linear small-signal equivalent circuit models. Design and analysis of linear amplifiers, n-channel, p-channel, JFET, MOSFET.
Prerequisites: EET 145, MATH 112.

EET 216 Digital Circuits II
(3-3-4)
Introduction to sequential logic, latches, flip-flops, timers, counters, registers, finite state machines, logic testing. DC parameters and timing analysis.
Prerequisite: EET 152.

EET 217 Electric Circuits I
(3-3-4)
DC Analysis and First-Order Transients. Ohm’s law, Kirchhoff’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 251.

EET 218 Electric Circuits II
(3-3-4)
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: EET 211, MATH 252.

EET 219 Seminar
(0-3-1)
AC circuits.
Prerequisite: EET 101 with grade “C” or better.
Corequisites: EET 144 or EET 146; MATH 112.

EET 220 Introduction to Amplifiers and Semiconductor Devices
(4-0-4)
Prerequisite: EET 125 with grade “C” or better.
Corequisite: EET 210.

EET 221 Digital Circuits III
(3-3-4)
Introduction to sequential logic, latches, flip-flops, timers, counters, registers, flip-flop.ture, finite state machines, logic testing. DC parameters and timing analysis.
Prerequisite: EET 152.

EET 222 Electric Circuits III
(3-3-4)
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: EET 211, MATH 252.

EET 223 Digital Circuits II
(3-3-4)
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 224 Semiconductor Devices and Amplifiers
(3-0-3)
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 212.
Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33
Prerequisite: Department approval. Corequisite: EET 285.

**EET 298 Reading and Conference**  
(Hours to be arranged each term.)

**EET 299 Laboratory Practice**  
(Hours to be arranged each term.)

**EET 308 Introduction to MOS Microelectronics**  
(3-0-3)  
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.  
Prerequisites: EET 245 or EET 237 and CST 262 or instructor consent. Corequisite: EET 309.

**EET 309 Introduction to MOS Microelectronics Laboratory**  
(0-3-1)  
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: EET 246 or EET 238 and CST 262 or instructor consent. Corequisite: EET 308.

**EET 319 Fundamentals of Microwave and RF Technology**  
(3-0-3)  
Introductory topics in the field of microwaves. Transmission lines (wave propagation, losses, reflected waves, and standing waves), Smith Charts, waveguides, microstrip circuits, and s-parameters are covered. Problem solving will use tools such as Smith Charts and software packages. Prerequisite: EET 373. Corequisite: EET 472.

**EET 340 Optics**  
(3-3-4)  
A course in geometrical and wave optics. Topics in reflection and refraction at plane and curved surfaces; imaging properties of lenses; paraxial ray tracing of optical systems; superposition; interference; interferometers; diffraction; polarization; scattering. Prerequisites: MATH 252, PHY 223.

**EET 358 Senior Project: Individual Project Proposal**  
(1-3-2)  
Selection, definition, and analysis of a problem suitable for senior project prior to actual project development. Includes consideration of project parameters and implications, proposal of alternate solutions, and justification of selected solution. Culminates in writing of project proposal. Prerequisites: EET 363, EET 373. Corequisites: WRI 321, EET Department approval.

**EET 361 Digital Systems I**  
(4-3-5)  
State machine design including state reduction and state assignment. Sequential circuit analysis. Digital system implementation using MSI devices such as ROMs and PLDs. Asynchronous state machines analyzed and designed. Computer circuits and memory elements used.

**EET 362 Digital Systems II**  
(4-3-5)  
Design digital systems using programmable devices as well as conventional building blocks. System controllers designed using state tables, ASM charts and VHDL. Laboratory explorations and projects of theoretical concepts.

**EET 363 Introduction to Microcontrollers**  
(4-3-5)  
A study of Motorola 68HC12 microcontroller. Internal structure, registers, busses, control unit. Clock, machine and instruction cycle timing, interrupts and DMA. Instruction set, mnemonics, functions and assembly language programming. Interfacing to external memory and I/O on chip peripherals. Laboratory explorations and projects of theoretical concepts.

**EET 364 Microcontroller Systems**  
(4-3-5)  
Advanced features of Motorola 68HC12 Micro-controller System environment with the external memory and peripheral devices. Advanced numerical routines. Digital control systems, displays, transducers. Laboratory explorations and projects of theoretical concepts.

**EET 371 LaPlace Transforms and Applications**  
(4-3-5)  
Applications of LaPlace in first and second order networks; poles, zeros and stability in S-plane; active filters and oscillators. Laboratory explorations and projects of theoretical concepts.

**EET 373 Operational Amplifiers and Applications**  
(4-3-5)  
Properties, modeling and analysis of feedback systems using the operational amplifier. Stability and frequency compensation of operational amplifiers. Oscillators, nonlinear circuit applications, Schmitt trigger, analog switches, peak detectors and sample and hold. A/D and D/A conversion techniques. Laboratory explorations and projects of theoretical concepts.

**EET 405 Reading and Conference**  
(Hours to be arranged each term.)

**EET 408 Workshop**  
(Hours to be arranged each term.)

**EET 413 Data Communications**  
(3-0-3)  
Principles and techniques of analog to digital conversion; encoding digital data; fundamentals of transmission media; error detection and correction; transmission protocols; multiplexing techniques; time, frequency and code division multiplexing; switching concepts; packet switching, frame relay and asynchronous transfer modes. Prerequisite: Senior standing in EET.

**EET 415 Telecommunications I**  
(2-3-3)  
Introduction to telecommunications. Electromagnetic wave propagation in free space, antennas, line of sight transmission (directive gain, beam width, polarization, impedance), RF components (amplifiers, mixers, upconverters), receivers, and transmitters. Laboratory assignments and demonstrations include antenna gain and field strength. Prerequisite: EET 319.

**EET 416 Microwave and RF Amplifier Design**  
(3-0-3)  
An introduction to the design of amplifiers in the frequency range of one half to ten gigahertz. Impedance matching, modeling, dynamic range, unilateral design, bilat-
eral design, stability, low noise design, and broadband design techniques. Students will use software to perform impedance matching, Smith chart plotting, and simulation. Pre-requisite: EET 415.

**EET 421 Active Filter Design**
(3-0-3)
An introduction to the design and analysis of active filters including Butterworth, Chebyshev, and Elliptic filters. Low-pass through band-pass filters are covered. The course includes one hardware and one software project.
Prerequisite: EET 371.
Corequisite: EET 373.

**EET 423 ASIC Design I Senior Project**
(2-3-3)
An introduction to various aspects of the design of an ASIC (Application Specific Integrated Circuit) and to new industry trends both in digital and analog design. Laboratory demonstrations and experiments with a complete EDA (Electronics Design Automation) software package. Senior project proposal required.
Prerequisites: EET 361 and EET 373.
Pre- or corequisites: EET 464 and EET 473.

**EET 425 Telecommunications II**
(2-3-3)
Baseband digital systems; messages, characters and symbols; review of sampling theorems and discrete vs continuous signals; noise sources in digital communications system; M-ary signals; baseband formatting including PCM waveforms; digital filters, including FIR and IIR, raised cosine filters, matched filters; bandpass modulation and demodulation techniques; spectrum transmission.
Prerequisite: EET 415.

**EET 433 ASIC Design II Senior Project**
(1-6-3)
Advanced topics in ASIC design: behavioral description languages, timing in digital design, design for testability, fault simulation. Field Programmable Logic Devices (FPGA). Simulation and prototyping of the senior project with FPGAs. Senior project report required.
Prerequisite: EET 423.

**EET 435 Telecommunications III**
(0-9-3)
A capstone course in telecommunications. Students will propose, design and construct/simulate a solution to some telecommunications problem or issue. The student will research vendor data books, application notes, articles and texts to support the design of a telecommunications related circuit, module, or system. A final paper will be written and presented to a faculty board.
Prerequisites: EET 415, EET 425, EET 455.

**EET 436 Optoelectronic Devices**
(3-3-4)
An introduction to devices commonly used in opto-electronics. Devices and instruments studied include photodiodes, photoresistors, photodetectors, filters, modulators, monochromators, integrating spheres and lock-in amplifiers.
Prerequisite: EET 373.

**EET 437 Optical Detection**
(3-3-4)
Propagation of optical radiation through optical systems. UV and visible optical detectors including photovoltaic and photoconductive detectors, pyroelectric detectors, linear and area arrays. Noise in photo detectors. Post detection electronic amplifiers and filters.
Prerequisites: EET 436, MATH 254N.

**EET 443 ASIC Design III Senior Project**
(0-9-3)
Completion of an integrated circuit design. Creation of an IC prototype in FPGA or and a file for fabrication in silicon. Final report containing project documentation required.
Prerequisite: EET 433.

**EET 445 Optical Fibers**
(3-3-4)
Theory and practice of light propagation in optical fibers, light sources, types of optical fiber, optical detectors. Terminals, coupling and splicing of optical fibers.
Prerequisites: EET 436, MATH 254N.

**EET 447 Topics in Optoelectronics**
(0-3-1)
A course designed to give the student additional capabilities with a variety of optics systems and instrumentation. Possible topics include large optics, optical arrays, Fresnel optics, interferometers, spectrometers, thin films and coatings, polarization. All topics to be investigated in a lab setting.
Pre- or corequisite: EET 436

**EET 454 Automated Test Engineering I**
(2-3-3)
An introduction to Automated Test Engineering (ATE). Topics include: measurement techniques for ATE instruments, measurement errors, and software used to control automated instruments. The IEEE-488 bus is also discussed. Students will complete a group term project.
Prerequisites: CST 116, EET 363, EET 373.

**EET 455 Digital System Design**
(3-0-3)
Use of register-transfer-language (RTL) notation to describe digital systems. Design of virtual machine, instruction set, random and micro-programmed control units for a typical digital computer. Design of a floating point coprocessor. Description of advanced architecture concepts, multiprocessors, cache memory, pipe-line virtual machines.
Prerequisite: EET 364.

**EET 458 Senior Project: Individual Project Design**
(1-3-2)
A continuation of EET 358 with emphasis on manufacturer and vendor contact resulting in verification and implementation of proposal trade offs in support of prototype design and construction. Prototype construction of project solution begins. Report produced on design calculations and functional analysis of hardware and/or software needed for project solution.
Prerequisite: EET 358.
Corequisite: WRI 322.

**EET 459 Digital Signal Processing II Senior Project**
(3-0-3)
Analysis and synthesis of digital signal processing systems including the following topics: non-recursive and recursive filters; hardware accelerators; digital speech processing. Most of the homework will be done using special applications software running on PC based work stations. DSP project proposal.
Prerequisite: EET 471.

**EET 461 Optoelectronic Principles**
(3-0-3)
A course to investigate the physics associated with a variety of commonly used optical devices. Solid-state physics required to understand function of optical devices such as detectors, solid-state lasers, and optical
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C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

modulators. Quantum aspects of optics leading to the understanding of photo-emitive devices, optical radiation and laser dynamics. Prerequisites: MATH 254N, PHY 223.

**EET 462 Lasers**  
(3-3-4)  
Laser radiation properties, laser cavities, coherence, atomic spectra, Boltzmann statistics, pumping rate, power gain, threshold conditions, resonator stability, beam shape, mode structure, beam modification with intracavity elements.  
Prerequisite: EET 461.

**EET 463 Quality Assurance and Reliability**  
(3-0-3)  
Prerequisites: Senior standing, MATH 254N.

**EET 464 Automated Test Engineering II**  
(2-3-3)  
A continuation of EET 454. Topics include: measurement techniques and error in digital circuits, IEEE-488 and VXI bus structures, design for test and test error analysis. Course includes a group term project.  
Prerequisite: EET 454.

**EET 465 Optoelectronic Applications**  
(3-3-4)  
A course designed to further the knowledge and capabilities of the optoelectronics student in fields of interest. Possible areas of study include: Optical Testing, Fourier Optics, Holography, Crystal Optics, Laser Systems and Fiber Optic Systems.  
Prerequisites: EET 462, EET 436, EET 437.

**EET 467 Modern Control Systems**  
(3-0-3)  
Analysis and application of modern control system theory in selected areas of electronics, industrial process control, and other systems. The phase-lock-loop is analyzed as the introductory example of a control system application, and Z transforms are developed in control system contexts.  
Prerequisites: EET 373, MATH 321.

**EET 468 Senior Project: Individual Project Evaluation**  
(1-12-5)  
A project laboratory (continuation of EET 458). Project proposed in EET 358 and designed in EET 458 will be constructed, tested, evaluated and packaged. Complete documentation with performance specifications, functional description, design calculations, test results, schematics, performance graphs, flowcharts, parts lists, wiring diagrams, and photographs become part of the complete senior project final report. The student will defend his/her project before a review panel that will consist of the senior project advisor, another technically qualified panelist and a third person of the student's choice.  
Prerequisite: EET 458. Corequisite: WRI 323.

**EET 469 Digital Signal Processing III Senior Project**  
(0-9-3)  
Digital Signal Processing senior projects defined in EET 459 will be designed and implemented. The projects will generally include both hardware and software. A final paper will be written and an oral presentation given.  
Prerequisite: EET 459.

**EET 471 Digital Signal Processing**  
(4-3-5)  
Analysis of discrete systems and signals including the following topics: discrete signals; linear time invariant systems, difference equations, frequency response, Z transforms. Analysis software applied to solutions. Discrete Fourier transforms. Spectral analysis. Laboratory explorations and projects of theoretical concepts.  
Prerequisite: EET 458. Corequisite: WRI 323.

**EET 472 Communication Systems**  
(4-3-5)  
Fourier series and transforms. System noise sources and definitions. Amplitude, frequency and phase modulation. Principles of superheterodyne receivers. Transmitter circuits and phase lock loop. Digital modulation techniques such as FSK, PSK and QPSK. Laboratory explorations and projects of theoretical concepts.  
Prerequisite: EET 468.

**EET 473 Analysis and Design of Analog Integrated Circuits**  
(4-3-5)  
The properties, modeling and analysis of bipolar and field effect transistor circuits commonly found in analog integrated circuits. Topics include high frequency effects, multi-stage circuits, active loads, output stages and the design of a complete integrated circuit operational amplifier. Laboratory explorations and projects of theoretical concepts.

**EET 476 Optoelectronics Senior Project**  
(1-6-3)  
Capstone course in optoelectronics. Students will propose, design and construct an optoelectronics circuit, module or system.  
Prerequisites: EET 447, EET 465.

**Emergency Medical Technology–Paramedic (EMS)**

**EMS 107, EMS 207 Seminar**  
(Hours to be arranged each term.)

**EMS 200 Medical Terminology**  
(3-0-3)  
Students build a strong medical vocabulary using prefixes, suffixes, and Greek and Latin roots and examine anatomical structures, disease, procedures, tumors, and descriptive terms using simple word analysis.

**EMS 211 Prehospital Emergency Pharmacology**  
(3-0-3)  
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 215 Essentials of Paramedicine**  
(3-0-3)  
A foundation course that provides the necessary context for a successful career in EMS. Topics include exploration of EMS system design, legal theory and application, medical ethics and analysis of industry trends. The course provides requisite background to function within the National Incident Management System.
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

EMS 218 Trauma Assessment and Management
(3-0-3)
Introduction to kinematics of trauma, and rescue techniques. Pathophysiology, assessment, and management of fluids and shock, CNS injuries, soft tissue injuries, burns, extremity injuries, spinal immobilization, control of hemorrhage and unique considerations in geriatric, pediatric and pregnant patients. Includes completion of Prehospital Trauma Life Support Course.

EMS 231 Medical Emergencies I
(4-0-4)
The first in a series of three, this course discusses the cardiac and pulmonary related emergencies including the pathophysiology, assessment and management; arterial blood gases, acid base balance; airway and ventilation, basic and advanced airway management techniques and the differential diagnosis of cardiac and pulmonary diseases.

EMS 232 Medical Emergencies II
(3-0-3)
Course content includes the pathophysiology, assessment and management of neurological, abdominal/genitourinary and endocrine emergencies. Students learn to assess and manage normal and abnormal obstetric patients, as well as neonate and pediatric patients. Prerequisite: EMS 231.

EMS 233 Medical Emergencies III
(3-0-3)
Integrates pathophysiology, assessment findings, and the psychosocial needs of special patient populations, including geriatrics, psychiatric, patients with drug or alcohol addictions and patients with special challenges. Students learn to form a field impression and a treatment plan for these patients. Prerequisite: EMS 232.

EMS 235 Basic Electrocardiography
(2-0-2)

EMS 236 Advanced Electrocardiography
(2-0-2)
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 271 EMT–Paramedic Skills Laboratory Part I
(0-6-2)
Offers the first part of a two-term course. Reviews EMT—Basic skills. Students learn and practice skills included in the EMT-Paramedic scope of practice. Advanced life support skills offered in part one include advanced patient assessment skills, airway and intubation, IV fluids and medication administration, cardiac monitoring and defibrillation, scenario based learning and evaluation.

EMS 272 EMT-Paramedic Skills Laboratory Part II
(0-9-3)
Continues the learning and practice of skills acquired in EMT-Paramedic Skills Lab, Part 1 with the addition of new skills learned in obstetrics, pediatrics, and medical emergencies. Includes invasive skills lab sessions, and scenario based learning and evaluation. Prerequisite: EMS 271.

EMS 273 EMT-Paramedic Skills Laboratory Part III
(4-0-4)
This course is designed to strengthen the student’s team lead abilities and to enhance critical thinking and decision-making skills through scenario-based skill practice sessions. Students prepare for national certification practical exam stations. Prerequisite: EMS 272.

EMS 281 Clinical Practicum I
(0-18-6)
Part I of a two-part clinical experience correlating knowledge and skills presented in lectures and labs. Supervised experience provided in emergency departments, respiratory therapy, psychosocial, poison control, EMS communications, anesthesia, surgical rounds, medical/cardiac critical care units, pediatrics and labor and delivery.

EMS 282 Clinical Practicum II
(0-36-12)
Continuation of a two-part clinical experience correlating knowledge and skills presented in lectures and labs. Supervised experience provided in emergency departments, respiratory therapy, psychosocial, poison control, EMS communications, anesthesia, surgical rounds, medical/cardiac critical care units, pediatrics and labor and delivery.

EMS 290 Field Externship Practicum
(0-54-18)
Field experience with an affiliated advanced life support transporting agency. Students work under the direct supervision of a paramedic field-training officer.

(ENGR) Engineering

ENGR 101 Introduction to Engineering I
(1-3-3)
Introduces the student to engineering with a focus on academic success, professional development, ethics, communication, 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 Introduction to Engineering II
(1-3-3)
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 207 Seminar
(Hours to be arranged each term.)

ENGR 211 Statics
(4-0-4)
Fundamental principles of mechanics of rigid bodies and the application of these principles to engineering problems. Pre- or corequisite: MATH 252. Prerequisite: PHY 201 or PHY 221.

ENGR 212 Dynamics
(3-0-3)
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, MATH 252.
ENGR 213 Strength of Materials  
(3-3-4)  
Internal stresses and deformations of structural members and machines when subjected to external forces.  
Prerequisite: ENGR 211.

ENGR 231 Fluid Mechanics  
(3-3-4)  
Fundamental properties of fluids, fluid statics, fluids in motion, dimensional analysis and similarity, flow in conduits, and flow measuring devices. Emphasis on practical applications of fluid mechanics principles.  
Prerequisites: ENGR 211 and MATH 252.

ENGR 236 Fundamentals of Electric Circuits  
(3-0-3)  
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 251, PHY 202/222.

ENGR 266 Computer Programming for Engineers  
(2-3-3)  
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 111.

ENGR 267 Engineering Programming  
(2-3-3)  
Prerequisite: MATH 251.

ENGR 355 Thermodynamics  
(3-0-3)  
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; PHY 202 or PHY 222.

ENGR 407 Seminar  
(Hours to be arranged each term.)

ENGR 445 Engineering Project Management  
(3-0-3)  
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.  
Prerequisites: Junior standing in Engineering or Engineering Technology.

ENGR 465 Capstone Project  
(0-6-2)  
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 permission.

ENGR 465 Fundamentals of Engineering Exam  
(1-0-1)  
Students are required to take the Fundamentals of Engineering Exam offered by the Oregon State Board of Examiners for Engineering and Land Surveying, or other state board with prior approval of program director.  
Prerequisite: Graduating Senior.

(ENGT) Engineering Technology  
ENGT 101 Engineering Technology Techniques  
(2-6-4)  
Engineering terminology and problem solving tools including computer aided drafting, technical sketching, word processing, spreadsheets, multifield projections, significant figures, and engineering problem solving techniques.  
Prerequisite: MATH 100.

ENGT 103 Engineering Terminology  
(3-2-4)  
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 Electrical and Electronic Nomenclature and Symbols  
(3-0-3)  
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, ENGT 207, ENGT 307, ENGT 407 Seminar  
(Hours to be arranged each term.)

ENGT 230 Statics  
(3-0-3)  
Fundamental principles of mechanics of rigid bodies and the application of these principles to engineering problems.  
Corequisite: MATH 112.

ENGT 231 Strength of Materials  
(3-0-3)  
Internal stresses, deflections, and deformations of structural members and machines when subjected to external forces.  
Prerequisite: ENGT 230 or ENGR 211.

ENGT 232 Advanced Strength of Materials  
(2-3-3)  
Internal stresses, deflections, and deformations of structural members and machines when subjected to external forces. Column buckling, 3-D stress states, and failure criteria.  
Prerequisite: ENGT 231.

ENGT 310 Introduction to Geothermal Energy  
(3-0-3)  
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 and Solar Cell Design  
(3-0-3)  
Residential passive solar heating and super-insulation construction techniques including heat load calculations using the Balcomb SHF method. Technical and economic analy-
sis of solar electric cells, storage batteries, and inverter technology.
Prerequisite: PHY 202 or instructor consent.

**ENGT 312 Critical Path Techniques**  
(1-3-2)  
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 Introduction to Automation and Robotics**  
(2-3-3)  
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 laboratories.  
Prerequisites: MATH 112, a programming course.

**ENGT 390, 490 Co-op Field Practice**  
(Variable Credit)  
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, 491 Co-op Field Practice**  
(Variable Credit)  
An approved work program related to the student's field of specialization for a continuous three-month period.

**ENGT 415 Occupational Safety**  
(2-3-3)  
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 Microprocessor Application in Automation and Robotics**  
(2-3-3)  
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 500 Research Methods**  
(3-0-3)  
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**  
(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**  
(3-3-4)  
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**  
(3-3-4)  
Prerequisite: VLSI or ASIC coursework or experience.

**ENGT 522 ASIC Design II**  
(3-3-4)  
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**  
(3-3-4)  
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 function design, simulation and physical layout.  
Prerequisite: ENGT 522.

**ENGT 545 Advanced Microcomputers**  
(3-3-4)  
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 Advanced Computer Architectures**  
(3-3-4)  
Advanced topics in computer architectures including design of computer hardware, organizational structures, and architectural properties of parallel, vector and multiprocess 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 Semiconductor Device Physics and Processes**  
(3-0-3)  
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**  
(1-9-4)  
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
Courses with the following notation fulfill the appropriate general education requirements:

- Humanities - Communication

Courses with the following notation fulfill the appropriate general education requirements:

**ENGT 582 Master's Project II**
(1-9-4)
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**
(1-9-4)
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.

**(ENG) English**

**ENG 104, ENG 105, ENG 106**
**Introduction to Literature**
(3-0-3) H

- Literature and the nature of literary experience through reading of 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.

**ENG 107, ENG 207, ENG 307, ENG 407 Seminar**
(Hours to be arranged each term.) H

**ENG 235 American Multicultural Literature**
(3-0-3) H

- An introductory study of short stories, poetry, essays, and a novel that illustrates the diversity of North American culture.

**ENG 246 Reading for Fiction Writers**
(3-0-3) H

- 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.

**ENG 253 American Literature I**
(3-0-3) H

- A study of the romantic movement in American literature, 1800-1860, including the works of Irving, Emerson, Melville, Tho-

**ENG 254 American Literature II**
(3-0-3) H

- A study of the realistic movement in American literature, 1860-1916, including the works of Dickinson, Howells, James, Cather, Crane, and Twain.

**ENG 255 American Literature III**
(3-0-3) H

- A study of the major writers and movements in American literature from World War I to the present, including the works of Hughes, Faulkner, Steinbeck, Plath, Silko, Bartheleme, and Carver.

**ENG 266 Native American Literature and Film**
(3-0-3) H

- 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.

**ENG 367 Art and Trash in Contemporary Fiction**
(3-0-3) H

- 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.

**ENG 373 British Culture and Literature: Romanticism to the Present**
(3-0-3) H

- Explores features of culture and selected works and writers from the Nineteenth and Twentieth Centuries in Britain. Some film presentation included.

**ENG 381 Contemporary World Literature**
(3-0-3) H

- 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.

**ENG 456 Topics in Film**
(3-0-3) H

- 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.

**(ENV) Environmental Sciences**

**ENV 107, ENV 207, ENV 307, ENV 407 Seminar**
(Hours to be arranged each term.)
Prerequisite: ENV major or instructor consent.

**ENV 112 Environmental Social Sciences**
(2-0-2)

- An introduction to the integration of science, social systems, environmental policy, and sustainability focusing on types of data, sampling techniques, and statistical methods used by social scientists. Emphasis on active learning and case study approaches.
Prerequisites: BIO 111, BIO 112, ECO 201, MATH 111 or instructor consent.

**ENV 225 Ecological Assessment of Riparian Ecosystems**
(1-3-2)

- Introduction to basic principles and practices of riparian ecology. Emphasis on the history and status of contemporary riparian assessment methods, with special focus on grazed rangelands of the Upper Klamath Basin. Lectures supported by field and laboratory exercises.

**ENV 265 Field Methods in Environmental Sciences**
(1-6-3)

- 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.

For more information, see page 33
ENV 314 Environmental Management and Restoration (3-0-3)
Overview of legislative, regulatory, and public and private voluntary activities involving the management and restoration of natural ecosystems and their services. Emphasis on the National Environmental Policy, Clean Water, and Endangered Species Acts, with illustrative case studies from local and regional environments. Prerequisite: WRI 122.

ENV 318 Systems Modeling (2-3-3)

ENV 325 Environmental Microbiology (2-6-4)
Microbial processes with emphasis on soil and water habitats. The impact of microorganisms in health, water and food sanitation, waste disposal, and bioremediation. Microscopy, laboratory, and field techniques for the isolation and identification of microorganisms. Prerequisites: BIO 213, CHE 223.

ENV 336 Environmental Hydrology (3-3-4)
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: ENV 225, MATH 252, MATH 361.

ENV 365 Advanced Field Methods in Environmental Sciences (1-6-3)
Advanced principles of experimental design, site and instrument selection for field research. Advanced instrumentation and data acquisition techniques are used as part of authentic research programs at different locations alongside environmental science professionals. Course may be repeated for credit. Prerequisites: MATH 112 and WRI 122.

ENV 427 Greenhouse Gas Accounting/Footprints (3-0-3)
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, MATH 361 and WRI 227.

ENV 435 Atmospheric Physics (3-3-4)
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. Prerequisites: MATH 252, PHY 202 or PHY 222.

ENV 466 Integrated Watershed Analysis (3-3-4)

ENV 469 Treatment Wetlands (3-0-3)
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, MATH 251.

GIS 103 The Digital Earth (1-3-2)
Introduction of how present day information systems attempt to represent the features and attributes of our natural world in digital form. Examination of how these systems can be used to portray and solve geospatial problems. Introduction to the concept, vocabulary, and use of GIS. Introduction to the use of various ‘free-ware’ software applications used for geospatial analysis.

GIS 105 Map and Compass/GPS (0-3-1)
Instruction in the practical use of a topographic map, compass, and hand-held GPS unit. Map scale, resolution, and accuracy. Projections and coordinate systems.
Integrating the use of a map and compass. Introduction to the theory and operation of recreational-grade GPS units.

GIS 107, GIS 207, GIS 307, GIS 407 Seminar
(Hours to be arranged each term.)

GIS 205 GIS Data Integration
(1-3-2)
Review of differential correction. Construction and use of a data dictionary. Importing feature and non-feature data into a GIS. Use of hand-held GPS/GIS units.
Prerequisites: GIS 105 and GME 134.

GIS 306 Geospatial Raster Analysis
(3-3-4)
Prerequisite: GME 134.

GIS 316 Geospatial Vector Analysis I
(3-3-4)
Prerequisite: GME 134.

GIS 326 Geospatial Vector Analysis II
(3-3-4)
Use of VBA/OOP to modify GIS GUI environment. Introduction to programming with ArcObjects and the use/creation of forms for managing data input/display. Navigation of ArcGIS UML diagrams for the creation of customized functionality.
Prerequisites: GIS 105 and GME 134.

GIS 426 Geospatial Vector Analysis II
(3-3-4)
Advanced techniques for geospatial analysis. Use and creation of dynamic segmentation and geometric networks for geospatial analysis. Advanced topological relationships. Use and creation of subtypes, domains, relationship classes and validation rules. Professional map creation skills. Prerequisite: GIS 316.

GIS 432 Customizing the GIS Environment II
(3-3-4)
Advanced use of ArcObjects to create custom GIS applications. Use of CASE tools. Students will apply skills towards the solution of various geospatial mapping scenarios.
Prerequisite: GIS 332.

GIS 446 GIS Database Development
(3-3-4)
Advanced geodatabase design. Study, use and creation of data models. Extensive use and creation of subtypes, domains, relationship classes and validation rules. Students will apply skills towards the solution of various geospatial mapping scenarios.
Prerequisites: GIS 426 and MIS 275.

GIS 456 GIS Management
(3-0-3)
Discussion of how to implement a GIS of any scope. Role of information products in implementation process. Creation of a data model. Selection of an appropriate data model. Hardware, software and personal requirements.
Prerequisites: GIS 426 and GIS 446.

GIS 468 GIS Practicum
(Hours to be arranged each term.)

(GEOL) Geology

GEOL 201 Physical Geology
(3-3-4)
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 107, GEOL 207, GEOL 307, GEOL 407 Seminar
(Hours to be arranged each term.)

(GME) Geomatics

GME 107, GME 207, GME 307, GME 407 Seminar
(Hours to be arranged each term.)

GME 134 Geographic Information Systems
(1-6-3)
Use of vector data, editing and querying of spatial and attribute data. Introduction to elements of map design. Shapefile-KML and CAD-GIS data conversion. Use of raster data, analyzing raster surfaces. Introduction to map algebra. Extensive use of ArcGIS software.
Prerequisite: CIV 112 or GIS 103.

GME 161 Plane Surveying I
(3-3-4)
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
(2-6-4)
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, MATH 112.

GME 163 Route Surveying
(2-9-5)
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, GME 175, both with grade “C” or better.

GME 175 Computation and Plating
(2-6-4)
Coordinate geometry concepts with emphasis on manual solutions to standard surveying computations. Introduction to HP calculator use and programming. Introduction to map composition and plating using industry standard software.
Prerequisite: GME 161. Corequisite: CIV 112.
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33
GME 452 Map Projections (2-3-3)
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 (2-6-4)
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, GME 451, both with grade “C” or better.

GME 455 GNSS Surveying for GIS (2-6-4)
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 (2-0-2)
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. Corequisite: WRI 327.

GME 468 Geomatics Practicum (1-9-4)
Students participate in projects which integrate spatial positioning (GPS, geodesy, adjustments), boundary law, and L/GIS applications. Student teams perform research, establish and adjust a control network, perform field mapping. Students prepare final reports and L/GIS products. Prerequisites: GME 444, GME 452, GME 454, and GME 466.

GME 482 Advanced Cadastral Surveying II (2-0-2)
Introduction to the complex process of evaluating field evidence and correlating with written records. Various scenarios discuss analysis aspects. Practical advice, legal concepts, and issues involved in evaluating corner evidence. Course utilizes BLM CFedS materials. Prerequisite: GME 381 with grade “C” or better.

GME 483 Advanced Cadastral Surveying III (2-0-2)
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. Course utilizes BLM CFedS materials. Prerequisite: GME 482 with grade “C” or better.

GME 497 CFedS (4-0-4)
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 (Hours to be arranged each term.)

GME 499 Independent Study (Hours to be arranged each term.)

(HED) Health Education
HED 107, HED 207, HED 307, HED 407 Seminar (Hours to be arranged each term.)

HED 240 Emergency Care and CPR (2-0-2)
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 Drugs and Alcohol Problems of Modern Society (2-0-2)
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 Contemporary Health Issues (2-0-2)
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 and Exercise for Lifetime Fitness (2-0-2)
Practical concepts of nutrition and exercise, their role in disease risk, obesity, and weight control. Consumer concerns, advertising, fads, gimmicks. Fitness and dietary evaluations.

(HIST) History
HIST 101, 102, 103 History of Western Civilization (3-0-3) SS
Development of Western civilization from early beginning to the 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, HED 207, HED 307, HED 407 Seminar (Hours to be arranged each term.) SS
HIST 201, 202, 203 U.S. History (3-0-3) SS
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 215 The American Western Experience (3-0-3) SS
History of 19th century western America. Native American relations and the influence of the fur trappers, trail blazers, the railroad, the cattle industry and certain religious and ethnic groups on western development.

HIST 216 American Military History (3-0-3) SS
Evolution of the conduct of war in the 20th century as a reflection of social, political, and technological developments. Course employs a case study approach focusing on a particular war of the 20th century. Wars studied may include World War I, World War II, and the Vietnam War.

HIST 224 Technology and the Ancient World (3-0-3) SS
The interaction of technology and world civilization from earliest times to 1500 A.D. Topics include the development of agriculture, the Greek and Roman engineering, and the technological roots of the Age of Discovery.

HIST 225 The Industrial Revolution (3-0-3) SS
The economic and social roots of the Industrial Revolution, the technologies and scientific advances associated with it, and its impact on world civilization during the period 1500-1875.

HIST 226 Technology and the Modern World (3-0-3) SS
The interaction of technological change and world civilization from 1875 to the present. Topics include the rise of industrial research, the origins and economic impact of mass production, and technological competition within the global economy.

HIST 256 Natural/Cultural History of Northwestern Nevada (3-0-3) SS
A field course focusing on the early human habitation, geology and pioneer history of the Black Rock Desert and its environs in northwestern Nevada, with an emphasis on the Applegate Emigrant trail to Oregon.

HIST 266 Natural/Cultural History of Eastern Oregon (3-0-3) SS
A field course focusing on the volcanic geology of Eastern Oregon, early ranch and sheep industries and an emphasis on early Native American Settlement.

HIST 335 The Engineering Profession (3-0-3) SS
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 (3-0-3) SS
Study of the 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 1970s, glut of the 1980s; the modern energy paradigm. Prerequisite: WRI 123 or WRI 227.

HIST 357 History of the Electric Grid (3-0-3) SS
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 (3-0-3) SS
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 468 History of the Pacific Northwest (3-0-3) SS
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 (3-0-3) SS
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.

(HSC) Health Sciences
HSC 207 Seminar (Hours to be arranged each term.) Prerequisite: Health Sciences major or instructor consent.

HSC 407 Seminar (Hours to be arranged each term.)

HSC 485 Research and Project Proposal (3-0-3)
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. Prerequisite: MATH 361, Health Sciences major or instructor consent.

(HUM) Humanities
HUM 107, HUM 207, HUM 307, HUM 407 Seminar (Hours to be arranged each term.)

HUM 125 Introduction to Technology, Society and Values (3-0-3) H
An introduction to the relationship of economic, political, and social contexts to technological development with a focus on human values.
HUM 147 Introduction to Humanities I
(3-0-3) H
Study of the ideas and values from the classical period which have profoundly influenced Western culture. Readings and discussion will focus on literature, philosophy, the arts, and religion.

HUM 148 Introduction to Humanities II
(3-0-3) H
Study of the ideas and values from the Medieval to the Renaissance period which have profoundly influenced Western culture. Readings and discussion will focus on literature, philosophy, the arts, and religion.

HUM 149 Introduction to Humanities III
(3-0-3) H
Study of the ideas and values from the Age of Enlightenment to the modern period which have profoundly influenced Western Culture. Readings and discussion will focus on literature, philosophy, the arts, and religion.

HUM 225 Contemporary Theater: Ashland Plays
(3-0-3) H
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. Course may be repeated for credit.

HUM 366 Engineering, Business and the Holocaust
(3-0-3) H
Examines three questions: what happened during the Holocaust, who was responsible, and what happened to those responsible. Topics include Nazi philosophy, anti-Semitic legislation, the camp system, German engineering and American business involvement, and aftermath. Prerequisite: WRI 122.

(JOUR) Journalism
JOUR 107, JOUR 207, JOUR 307, JOUR 407 Seminar
(Hours to be arranged each term.)

JOUR 211 Publications—Student Newspaper
(F,W,S)(2-3-3)
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 311 Advanced Publications—Student Newspaper
(F,W,S)(1-3-3)
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.

(MGT) Management
MGT 107, MGT 207, MGT 307, MGT 407 Seminar
(Hours to be arranged each term.)

MGT 212 Fundamentals of Renewable Energy Management
(3-0-3)
Explores primary energy sources available for power generation. Includes cost comparisons of traditional sources (gas, coal, nuclear, hydro) and renewable sources (solar, geo-thermal, 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 321 Operations Management I
(3-0-3)
Functions of the operations division within the organizational structure. Manufacturing and service organization trends. Capacity planning with forecasting and master scheduling. Introduction to Just-In-Time concepts. Prerequisite: BUS 215 or BUS 304.

MGT 322 Operations Management II
(3-0-3)
Supply chain management for service and manufacturing companies. Covers flows 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
(3-0-3)
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 345 Engineering Economy
(3-0-3)
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 equivalences, depreciation, taxes and inflation. Prerequisite: MATH 105 or MATH 111.

MGT 391, MGT 392 Co-op Field Practice
(0-9-3)
Credit will be given 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 445 Project Management
(2-3-3)
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: MGT 321.

MGT 461 Lean/Six Sigma Management I
(3-0-3)
Lean thinking as applied to production and service operations. Kaizen, kaikaku, 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 MGT 321.

MGT 462 Lean/Six Sigma Management II
(3-0-3)
Overview course of Six Sigma manage-
MIS 101 Word Processing Software Laboratory
(0-3-1)
Word processing lab using Microsoft Word software. Includes creating and editing documents, letters, Web pages, forms, labels, and newsletters, research papers, an index and table of contents.

MIS 102 Spreadsheet Software Laboratory
(0-3-1)
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 Software Laboratory
(0-3-1)
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, MIS 207, MIS 307, MIS 407 Seminar
(Hours to be arranged each term.)

MIS 115 Visual BASIC Programming
(3-3-4)
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
(3-3-4)
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. Prerequisite: MIS 126, with grade “C” or better.

MIS 118 Programming Fundamentals
(3-3-4)
Computer concepts and problem solving methods in the Windows environment using C# programming language. Topics include algorithms, simple data types, condition and iterative structures, functions and procedures, and the program documentation. Prerequisite: MATH 100 or instructor consent.

MIS 126 C++ Programming II
(3-3-4)
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
(3-3-4)
Introduces number systems, Boolean algebra, digital logic, computer arithmetic, instruction sets, memory, system software, and network organization and architecture. Laboratory exercises on digital logic, computer architecture, machine language and assembly language programming. Completion of a programming project. Corequisite: MATH 100.

MIS 136 Object-Oriented Programming with C++
(3-3-4)
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 CST 136. Prerequisite: MIS 126, with grade “C” or better.

MIS 206 Introduction to Management Information Systems
(3-3-4)
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 215 Business Application Programming
(3-3-4)
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 integrate software development with data management. Prerequisites: MIS 115 and MIS 275 with grade “C” or better or instructor consent.

MIS 217 Health Care Systems and Policy
(3-0-3)
This course will explore the U.S. Health System focusing on its historical development, current configuration and possible future direction. Included will be the study of health system development, key influencers, accessibility, financing, changing components and the effects the system has on patients, providers, 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.

MIS 218 Database Programming
(3-3-4)
Object-oriented and/or procedural languages employed with an emphasis on structured...
Courses with the following notation fulfill the appropriate general education requirements:

**C** - Communication  **H** - Humanities  **HP** - Humanities Performance  **SS** - Social Science

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**MIS 225 Business on the Internet (3-3-4)**
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 255 Health Informatics Concepts and Practices (3-0-3)**
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 on 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 256 Hardware/Software Integration (3-3-4)**
An overview of personal computer technology: comparing components such as display, CPU, memory units and peripherals. Setting standards for selecting, maintaining and supporting automated business information systems. Relationship of systems and applications software to available system software, hardware and selected peripherals. In-depth software comparison, user rating, security and error recovery techniques.

**MIS 272 Fundamentals of Networking I (3-3-4)**
Networking communications and essential LAN building blocks including network communications, Packet analysis, IP addressing, switches, routers, WAN technology, OSI model, client server applications, introduction to network security.

**MIS 273 Fundamentals of Networking II (3-3-4)**
Introduces the fundamental skills required to install, configure and manage a network operating system. Topics covered include installing and configuring Active Directory, domain controllers, DNS, users and group definition, print queues, network roles and services and application servers.

**MIS 275 Introduction to Relational Databases (2-3-3)**
The relational model, DBMS functions, administration, design methodology, normalization, QBE and SQL. Hands-on design, development and use of a database system using the Microsoft Access software including queries, updates, reports, forms, macros and application systems.

**MIS 311 Introduction to Systems Analysis (3-0-3)**

**MIS 312 Systems Analysis I (4-0-4)**
Planning and Analysis phases of Systems Development Life Cycle. Focus 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.

**MIS 315 Computer Software Techniques (3-0-3)**
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.

**MIS 316 Advanced Programming (3-3-4)**
Advanced survey of programming topics in areas such as Object Oriented, Data Mining, Business Intelligence and Web Scripting. Application will be emphasized through the development of software applications that provide business solutions. Prepares students with a strong programming background for upper division MIS courses.

**MIS 318 Advanced Programming (3-3-4)**
Advanced survey of programming topics in areas such as Object Oriented, Data Mining, Business Intelligence and Web Scripting. Application will be emphasized through the development of software applications that provide business solutions. Prepares students with a strong programming background for upper division MIS courses.

**MIS 322 Systems Analysis II (3-3-4)**

**MIS 341 Relational Database Design I (3-3-4)**
A comprehensive study of SQL and PL/SQL using the Oracle relational database management system. Hands-on training will include the use of PL/SQL and SQL*PLUS, database creation, data queries, view definitions and use, operators and functions, triggers, calculation, indexing, cursors and data manipulation.

**MIS 342 Relational Database Design II (3-3-4)**
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 System Development Life Cycle (SDL) for web/database integration for application development. Develop understanding and application of Software as a Service (SaaS).

Prerequisites: MIS 218 and MIS 312, both with grade “C” or better.

Prerequisite: MIS 126 with grade “C” or better.

Prerequisite: MIS 218 with a “C” or better.

Prerequisite: MIS 218 with a “C” or better.
C - Communication   H - Humanities   HP - Humanities Performance   SS - Social Science

Courses with the following notation fulfill the appropriate general education requirements:

**MIS 343 Relational Database Design III**
(2-3-3)
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**
(2-3-3)
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.
Corequisite: MIS 322.

**MIS 345 Health Care Information Systems Management**
(3-0-3)
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 317 and MIS 217.

**MIS 351 Enterprise Network Design I**
(3-3-4)
High-level design of primary network architectures employed in modern business networks. Design logical and physical models to create the network documentation required for modern information systems. Focus on the management, performance, scalability and reliability of the central data centers.
Prerequisites: MIS 273, MIS 312 and WRI 227.

**MIS 352 Enterprise Network Design II**
(3-3-4)
Focus on management responsibilities inherent in enterprise networks. Includes project lab work using network infrastructure to implement design goals and team projects.
Prerequisite: MIS 351.

**MIS 353 Enterprise Network Design III**
Focus on management, performance, reliability, scalability, and security. Key topics covered include: WAN communication protocols, Web-based applications, business to business VPN services, distributed management for satellite campuses and virtualization of the enterprise information system.
Prerequisite: MIS 352.

**MIS 357 Information and Communication Systems in Health Care**
(2-3-3)
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 and systems such as PACS, lab and pharmacy systems and computerized provider order entry (CPOE).
Prerequisite: MIS 255.

**MIS 375 Decision Support Systems**
(2-3-3)
Use of personal computer application programs for analysis and reporting, problem solving and decision assistance.
Prerequisites: MIS 102, MATH 361 and MATH 371.

**MIS 390, 490 Co-op Field Experience**
(Hours to be arranged each term.)
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**
(Hours to be arranged each term.)

**MIS 408 Workshop**
(Hours to be arranged each term.)

**MIS 414 Information Systems Development**
(2-3-3)
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 445 Legal, Ethical and Social Issues in Health Care Technology**
(3-0-3)
Legal, ethical, and social issues in health care, especially as they impact systems design, development, use, and management will be examined.
Prerequisites: MIS 345.

**MIS 479 Current Topics in Information Technology**
(3-0-3)
Advanced topics focusing on special interests and newly developed technology in IT. Concentration on a current subject such as client/server architecture, networking, telecommunications, database technology, programming, the Internet, ethics, security and privacy of information.
Prerequisites: MIS 272, MIS 275 and WRI 227.

**MIS 496 Senior Project Management**
(3-3-4)
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: BUS 356, MIS 312, WRI 327.
At least one programming class with grade “C” or better and all junior-level courses.

**MIS 497 Senior Project II**
(1-6-3)
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**
(1-6-3)
Senior 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.

(MFG) Manufacturing Engineering Technology

MFG 101 Introduction to Manufacturing
(2-3-3)
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 Introductory Welding Processes
(2-3-3)
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.

MFG 107, MFG 207, MFG 307, MFG 407 Seminar
(Hours to be arranged each term.)

MFG 112 Introduction to Manufacturing Processes
(3-0-3)

MFG 120 Manufacturing Processes I
(2-6-4)
An introductory course in metal removal processes emphasizing drilling, milling, and lathe processes. Includes tool bit grinding. Emphasis on production speeds and feeds. Prerequisites: MATH 100, MET 111.

MFG 204 Data Management
(2-0-2)
Current topics in data acquisition and management.

MFG 220 Manufacturing Processes II
(2-3-3)
Advanced concepts in material removal. Turning, milling, shaping, and drilling. Cutting tools and cutting requirements. Prerequisites: MET 160, MET 241, MFG 120.

MFG 223 Casting and Molding Processes
(3-3-4)
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: CHE 101, MET 112.

MFG 245 Electronics Manufacturing Processes
(3-0-3)
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, MET 112.

MFG 247 CAD for Manufacturing
(2-3-3)
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
(Hours to be arranged each term.)

MFG 298 Reading and Conference
(Hours to be arranged each term.)

MFG 299 Laboratory Practice
(Hours to be arranged each term.)

MFG 314 Geometric Dimensioning and Tolerancing
(2-3-3)
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, MET 241.

MFG 315 Geometric Dimensioning and Tolerancing Laboratory
(0-3-1)
Laboratory exercises using parts that have geometric drawing requirements. Corequisite: MFG 314.

MFG 317 Machine Element Design
(3-0-3)
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 ENGT 231 and MET 241, or instructor consent.

MFG 325 Principles of Metrology, Machining and Welding
(3-0-3)
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
(3-0-3)
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
(2-3-3)
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: MET 326.
MFG 333 Statistical Methods for Quality Improvement
(3-0-3)
Prerequisite: MATH 361.

MFG 334 Manufacturing Group Project
(1-6-3)
Development of a product by a group of manufacturing students working together. This includes creating or modifying the design of the 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 Programming
(2-3-3)
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, MFG 120, MET 241.

MFG 342 Computer Aided Machining
(2-3-3)
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: MFG 341, MET 375.

MFG 343 Manufacturing Tool Design
(3-0-3)
Prerequisites: MET 241, MET 315, MFG 314, or instructor consent.

MFG 344 Design of Manufacturing Tooling
(2-3-3)
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.
Prerequisites: MET 241, MFG 343.

MFG 351, MFG 352, MFG 353 Microelectronics Manufacturing Processes I, II, III
(3-0-3)
A three term 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, photolithography, process specific chemistry, etching and deposition processes, and surface mount technology.
Prerequisites: For MFG 351–CHE 101, PHY 202.
Prerequisite: For MFG 352–MFG 351. Prerequisite: For MFG 353–MFG 352.

MFG 404 Co-op Field Practice
(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.

MFG 405 Reading and Conference
(Hours to be arranged each term.)

MFG 408 Workshop
(Hours to be arranged each term.)

MFG 415 Finishing Methods
(2-0-2)
Review of material finishing technologies with focus on functional requirements of final product, life-cycle environmental considerations, and manufacturing technologies for material finishing.
Prerequisite: MET 160.

MFG 420 Manufacturing Processes III
(3-0-3)
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; and MFG 220 or MFG 325; and PHY 201/PHY 221.

MFG 425 Plastic Manufacturing Processes
(2-3-3)
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 thermoplastic processes such as injection molding.
Prerequisites: MET 160 and MET 375, or instructor consent.

MFG 428 Manufacturing Engineering Certification
(1-0-1)
Students are required to take the Certified Manufacturing Engineer Exam or Certified Manufacturing Technician Exam offered by the Society of Manufacturing Engineers.
Prerequisite: Graduating senior.

MFG 445 Plant Layout and Handling Systems
(3-0-3)
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, MFG 313.

MFG 447 Lean Manufacturing
(2-3-3)
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.
Prerequisites: MFG 313 or MFG 333.

MFG 453 Automation and Robotics in Manufacturing
(2-3-3)
Study of the appropriate level of manufactur-
Courses with the following notation fulfill the appropriate general education requirements:

- C - Communication
- H - Humanities
- HP - Humanities Performance
- SS - Social Science

For more information, see page 33
MFG 535 Product Life Software (3-0-3)
Use of high-end enterprise-wide software products for integrating design, automating the workflow, and comprehensively controlling security. Revision management over all types of data. Creating document links. Leveraging subject matter experts across the extended enterprise.

MFG 536 Automated Technology for Tool Path Generation (3-0-3)
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 Product Data Management and Configuration Control (3-0-3)
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 Manufacturing Software (3-0-3)
Independent study using advanced functionality in high-end manufacturing and enterprise software. Approval of faculty advisor required.

MFG 562 Advanced Materials Science and Technology (3-0-3)
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 Control and Production Planning (3-0-3)
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 and Philosophies (3-0-3)

MFG 595 Selected Graduate Topics in Manufacturing (3-0-3)
Manufacturing related topics in engineering science and design. Manufacturing related topics in software and computer integration. Manufacturing related topics in materials and processing technology. Manufacturing related topics in business and management. Course may be repeated for credit.

MFG 596 Selected Topics in Engineering Science and Design Technology (3-0-3)
Manufacturing related topics in engineering science and design. Course may be repeated for credit.

MATH 100 Intermediate Algebra (F,W,S)(4-0-4)
Fundamentals of algebra, linear and quadratic equations, systems of equations, inequalities, functions and graphs, radicals and exponents.
Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

and stated problems. (May not be used for graduation credit.)
Prerequisite: MATH 70 with grade “C” or better, or equivalent.

MATH 101. Accelerated Algebra
(70, 100, 111)(4-0-4)
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 102 Accelerated College Algebra/Trigonometry
(W)(4-0-4)
An accelerated algebra/trigonometry course for exceptionally qualified students. All students will start with College Algebra (MATH 111), and may, with extra effort be able to complete Trigonometry (MATH 112). Depending on individual accomplishment, students will receive credit for either MATH 111 or MATH 112 but not both.
Prerequisite: MATH 100 or MATH 111 both with grade “B” or better.

MATH 105 Collegiate Mathematics
(F, W, S)(4-0-4)
A variety of modern mathematical topics based on contemporary applications. Topics include combinatorics, probability, statistics, finance, matrices, and logarithmic and exponential functions.
Prerequisite: Intermediate Algebra with grade “C” or better.

MATH 107, MATH 207, MATH 307, MATH 407 Seminar
(Hours to be arranged each term.)

MATH 111 College Algebra
(F,W,S)(4-0-4)
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, MATH 111B College Algebra
(111A FW; 111B WS)(1-2-2)
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: For MATH 111A–Math 100 with grade “C” or better, or equivalent. Prerequisite: For MATH 111B–Math 111A with grade “C” or better.

MATH 112 Trigonometry
(F,W,S)(4-0-4)
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 211 Fundamentals of Elementary Mathematics I
(F)(4-0-4)
This is the first course in the mathematics sequence for prospective elementary 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 Elementary Mathematics II
(W)(4-0-4)
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 Elementary Mathematics III
(S)(4-0-4)
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 211 Introduction to Computational Software
(2-0-2)
Solve applied problems involving formulas, functions, summation and iteration using Excel and MATLAB. Use built-in functions and graphing capabilities of MATLAB and Excel. Do vector and matrix calculations and write function files using MATLAB. Write and execute macros in Excel.
Prerequisite: MATH 112.

MATH 243 Introductory Statistics
(4-0-4)
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’s consent.

MATH 251 Differential Calculus
(F,W,S)(4-0-4)
Theory, computational techniques and applications of the derivative.
Prerequisite: MATH 112 with grade “C” or better, or equivalent.

MATH 252 Integral Calculus
(F,W,S)(4-0-4)
Computational techniques for and applications of the definite and indefinite integrals.
Prerequisite: MATH 251 with grade “C” or better.

MATH 253N Sequences and Series
(4-0-4)
Indeterminate forms and improper integrals. Infinite sequences and series, convergence, power series. Taylor series and applications. This course replaces MATH 254.
Prerequisite: MATH 252 with grade “C” or better.

MATH 254N Vector Calculus I
(F,W,S)(4-0-4)
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.
Prerequisite: MATH 252 with grade “C” or better.

MATH 261 Introduction to Linear Algebra
(3-0-3)
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 311 Introduction to Real Analysis
(4-0-4)
A one term stand-alone course on topics in real analysis, covering properties of real numbers, completeness axiom, continuity, convergence of sequences and series of numbers, convergence of sequences and series of functions. Emphasis will be placed on proofs. Prerequisites: MATH 253N and MATH 327, both with grade “C” or better.

MATH 321 Applied Differential Equations I
(F,W,S)(4-0-4)
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 Applied Differential Equations II
(4-0-4)
The second in a two term 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
(F) (4-0-4)
Introduction to proof and mathematical abstraction. Topics include sets, set operations, functions, relations, sequences, series, recurrence relations, mathematical induction, equivalence relations. Prerequisites: MATH 252, or junior standing and MATH 111, both with grade “C” or better.

MATH 341 Linear Algebra I
(3-0-3)
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 251 with grade “C” or better.

MATH 342 Linear Algebra II
(3-0-3)
A continuation of the topics of MATH 341 to the setting of abstract vector spaces. Includes the study of orthogonality, inner product spaces, eigenvalues and eigenvectors, matrix decompositions and a more advanced study of linear transformations. Prerequisite: MATH 341.

MATH 346 Number Theory
(3-0-3)
A proof-based course in the theory of the 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 Fundamentals of Abstract Algebra
(4-0-4)
Introduction to group theory and algebraic structures with applications. Prerequisites: MATH 254N, MATH 327, both with grade “C” or better.

MATH 354 Vector Calculus II
(4-0-4)
Review of vector functions, space curves, gradients, and directional derivatives. Introduction to vector analysis: vector fields, divergence, curl, line integrals, surface integrals, conservative fields, and the theorems of Gauss, Green and Stokes with applications to force, work, mass, and charge. Prerequisite: MATH 254N with grade “C” or better.

MATH 361 Statistical Methods I
(F,W,S)(4-0-4)
Descriptive statistics, experimental design, introduction to probability, common probability distributions, random variables, sampling distributions, hypothesis testing and confidence intervals for means using one and two samples, simple linear regression. Prerequisite: MATH 111 or instructor’s consent.

MATH 362 Statistical Methods II
(W,S)(4-0-4)
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, logistic regression, 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, MATH 372 Finite Mathematics and Calculus I, II
(4-0-4)
Linear functions, matrices, linear programming, mathematics of finance, derivatives and their applications. The integral and its applications, and calculus of several variables. Prerequisite: For MATH 371—MATH 111 with grade “C” or better. Prerequisite: For MATH 372—MATH 371 with grade “C” or better.

MATH 421 Applied Partial Differential Equations I
(4-0-4)

MATH 422 Applied Partial Differential Equations II
(4-0-4)
The second course in a three term 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. Prerequisite: MATH 421.

MATH 423 Applied Partial Differential Equations III
(4-0-4)
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 425 Vector Analysis
(3-0-3)
Operations on vectors including dot product, cross product, curl and differentiation; tangent and normal vectors; divergence with applications. Prerequisite: MATH 254N.

MATH 451 Numerical Methods I
(4-0-4)
Computer applications of matrix methods, iterative solutions of equations, and systems of equations, polynomial interpolation and curve fitting, numerical differentiation and integration.
Prerequisites: MATH 252, MATH 341 or MATH 261, and a programming language.

MATH 452 Numerical Methods II
(4-0-4)
Prerequisites: MATH 451 and MATH 321.

MATH 453 Numerical Methods III
(4-0-4)
Prerequisites: MATH 421 and MATH 452.

MATH 465 Mathematical Statistics
(W, S) (4-0-4)
Counting techniques, probability, discrete and continuous random variables and distribution functions, joint probability distributions; expected value, variance and covariance; decision making.
Prerequisite: MATH 254N.

(MECH) Mechanical Engineering

MECH 107, MECH 207, MECH 307, MECH 407 Seminar
(Hours to be arranged each term.)

MECH 160 Materials I
(2-3-3)
Survey of materials used in industry and their physical and chemical principles as they relate to structure, properties, corrosion, and engineering applications. Major consideration given to metal alloys. Introduction to polymers, ceramics and composites included.
Prerequisite: CHE 221 or equivalent.

MECH 304, MECH 404 Co-op Field Practice
(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 305 Reading and Conference
(2-3-3)
This course extends the MET 160 Materials I class using a more theoretical approach. Subjects include metals, polymers, ceramics, and composites.
Prerequisites: MECH 315, MET 375.

MECH 307 Thermodynamics I
(3-0-3)
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 212, MATH 321.

MECH 312 Dynamics II
(3-0-3)
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, MATH 321.

MECH 313 Thermodynamics II
(3-0-3)
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
(3-0-3)
Study of stress and fatigue analysis as applied to machine elements.
Prerequisite: ENGR 213.

MECH 316 Machine Design II
(3-0-3)
Application of stress and fatigue analysis in the design and selection of machine elements.
Prerequisite: MECH 315.

MECH 318 Fluid Mechanics I
(3-3-4)
Covers fluid properties, fluid statics, conservation laws of pipe flow, drag, lift fluid dynamics, measurement of flow, viscous flow, laminar, and turbulent flow, and forces due to fluid motion.
Prerequisites: ENGR 211, PHY 221. Pre-or-corequisite: EE 223 or MECH 363.

MECH 323 Heat Transfer I
(3-0-3)
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: MATH 321, MECH 318.

MECH 326 Electric Power Systems
(2-3-3)
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
(2-3-3)
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.
Prerequisites: MECH 315, MET 375.

MECH 360 Materials II
(3-0-3)
This course extends the MET 160 Materials I class using a more theoretical approach. Subjects include metals, polymers, ceramics, and composites.
Prerequisites: MECH 160 and CHE 201 or CHE 221.

MECH 363 Instrumentation
(2-3-3)
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 213, PHY 222. Pre- or corequisite: ENGR 236.

MECH 375 Solid Modeling
(2-3-3)
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 405 Reading and Conference
(Hours to be arranged each term.)

Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

For more information, see page 33
MECH 414 Introduction to Aerodynamics
(3-0-3)
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, MECH 318.

MECH 415 Design Project
(2-3-3)
This course involves using material from prior course work in individual student projects. Prerequisites: MECH 315, MECH 318, MET 242.
Pre- or corequisite: MECH 316.

MECH 417 Fluid Mechanics II
(2-3-3)
Fluid Kinematics, differential analysis, similarity and modeling, and compressible flow. Computational fluid dynamics is introduced. Prerequisites: ENGR 355, MATH 321, MECH 318.

MECH 421 Introduction to Wind Tunnels
(2-3-3)
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, MECH 363.

MECH 427 Experiments in Thermodynamics
(2-3-3)
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, MECH 363.

MECH 433 HVAC
(2-3-3)
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.
Prerequisite: MECH 323.

MECH 436 Applied Control Systems
(2-3-3)
An introduction to control systems. Both classic control theory and programmable logic controllers are considered. Topics include block diagrams, mathematical models, transfer functions, LaPlace transforms, frequency responses along with control components and PLC programming.
Prerequisites: MECH 318, MECH 480.

MECH 437 Heat Transfer II
(1-3-2)
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.
Prerequisites: MECH 323, MECH 363.

MECH 438 Reciprocating and Turbine Engines
(3-0-3)
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, MECH 318.

MECH 475 Parametric Modeling
(2-3-3)
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 development backgrounds are also covered.
Prerequisite: MET 375.

MECH 480 Vibrations
(2-3-3)
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, MECH 315, MECH 363.

MECH 490 Senior Projects I
(2-3-3)
The first of a three-term comprehensive group design project, focusing on the design proposal. This sequence applies material from prior course work, along with concepts of project management, design optimization, and other material related to a group engineering project.
Prerequisites: ENGR 355, MECH 315, MECH 318, MET 375; or instructor consent.

MECH 491 Senior Projects II
(2-3-3)
The second of a three-term comprehensive group design project, focusing on project design.
Prerequisites: MECH 490, previous term from same instructor, or advisor and instructor consent.

MECH 492 Senior Projects III
(1-6-3)
The third of a three-term comprehensive group design project, focusing on project construction and testing.
Prerequisites: MECH 491, previous term from same instructor, or advisor and instructor consent.

(MET) Mechanical Engineering Technology

MET 107, MET 207, MET 307, MET 407 Seminar
(Hours to be arranged each term.)

MET 108 Geometric Dimensioning and Tolerancing
(2-0-2)
The study and application of ANSI geometric dimensioning and tolerancing principles relative to the preparation of engineering drawings.
Prerequisite: MET 241.

MET 111 Orientation I
(1-3-2)
Introduction to modern tools of engineering. Creativity in the design of systems and components; on both design and presentation teams. Identification, analysis and solutions to engineering problems. Effective communication techniques. Technical sketching and isometric drawing skills.

MET 112 Orientation II
(1-3-2)
Courses with the following notation fulfill the appropriate general education requirements:

C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

Continuation of MET 111. This sequence will introduce the students to economic, environmental, social, political, ethical, health and safety realities of the campus and the engineering work place; as well as club, networking and internship opportunities.

Prerequisite: MET 111.

**MET 160 Materials I**  
(2-3-3)  
Survey of materials used in industry and their physical and chemical principles as they relate to structure, properties, corrosion, and engineering applications. Major consideration given to metal alloys. Introduction to polymers, ceramics and composites included.  
Prerequisites: CHE 101/CHE 104 or CHE 201/ CHE 204 or CHE 221.

**MET 218 Fluid Mechanics**  
(3-3-4)  
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; PHY 201 or PHY 221.

**MET 232 Thermodynamics**  
(3-0-3)  
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; PHY 201 or PHY 222.

**MET 241 CAD for Mechanical Design I**  
(1-3-2)  
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: MET 111.

**MET 242 CAD for Mechanical Design II**  
(1-3-3)  
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**  
(Hours to be arranged each term.)

**MET 299 Laboratory Practice**  
(Hours to be arranged each term.)

**MET 304, 404 MET Co-op Field Practice**  
(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.

**MET 313 Applied Thermodynamics**  
(3-0-3)  
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 or MET 232.

**MET 315 Machine Design I**  
(3-0-3)  
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 ENGT 232; MET 160; PHY 201 or PHY 221.

**MET 316 Machine Design II**  
(3-0-3)  
A study of power transmission systems 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**  
(3-0-3)  
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 or MET 232; MET 218.

**MET 326 Electric Power Systems**  
(2-3-3)  
Study related to theory and application of industrial electric power systems. Topics covered include transformers, motors, generators, motor controls, and protective devices.  
Prerequisite: MET 375. Pre- or corequisite: MET 315.

**MET 360 Materials II**  
(3-0-3)  
This course extends the MET 160 Materials I class using a more theoretical approach. Subjects include metals, polymers, ceramics, and composites.  
Prerequisite: MET 160.

**MET 363 Instrumentation**  
(2-3-3)  
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: PHY 202 or PHY 222. Pre- or corequisite: ENGR 236.

**MET 375 Solid Modeling**  
(2-3-3)  
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 405 Reading and Conference**  
(Hours to be arranged each term.)

**MET 414 Applied Aerodynamics**  
(3-0-3)  
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.

For more information, see page 33
Prerequisites: ENGR 355 or MET 232; MET 218.

MET 415 Design Project
(2-3-3)
This course involves using material from prior coursework in individual student projects. Prerequisites: MET 218, MET 315, MET 363. Pre- or corequisite: MET 316.

MET 416 Energy Systems
(3-0-3)
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 326.

MET 417 Gas Laws
(2-3-3)
Application of thermodynamics and fluid mechanics to the analysis of flow of both ideal and real gases in pipes, nozzles, diffusers, compressors and turbines. The course also emphasizes the use of appropriate instrumentation. Prerequisites: MET 218, MET 313, MET 363.

MET 421 Wind Tunnel Technology
(2-3-3)
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, MET 363.

MET 426 Fluid Power Systems
(2-3-3)
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. Prerequisites: MET 218, MET 363.

MET 427 Experiments in Thermodynamics
(2-3-3)
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, MET 363.

MET 433 HVAC
(2-3-3)
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, MET 323.

MET 436 Control Systems
(3-0-3)
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, MET 363.

MET 437 Heat Transfer II
(1-3-2)
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. Prerequisites: MET 323, MET 363.

MET 438 Reciprocating and Turbine Engines
(3-0-3)
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, MET 315.

MET 462 Vacuum Technology
(2-3-3)
An introductory course defining the role of high and ultra-high vacuas 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 Computational Strength of Materials
(3-0-3)
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: ENGT 230 and ENGT 231; or ENGR 211 and ENGR 213; MET 351 and MATH 252.

MET 475 Parametric Modeling
(2-3-3)
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 development backgrounds are also covered. Prerequisite: MET 375.

MET 490 Senior Projects I
(2-3-3)
The first of a three-term comprehensive group design project, focusing on the design proposal. This sequence applies material from prior coursework, along with concepts of project management, design optimization, and other material related to a group engineering project. Prerequisites: ENGR 355 or MET 232; MET 218, MET 315 and MET 375; or instructor consent.

MET 491 Senior Projects II
(2-3-3)
The second of a three-term comprehensive group design project, focusing on project design. Prerequisite: MET 490 previous term from
same instructor, or advisor and instructor consent.

**MET 492 Senior Projects III**  
(1-6-3)  
The third of a three-term comprehensive group design project, focusing on project construction and testing.  
Prerequisite: MET 491 previous term from same instructor, or advisor and instructor consent.

**MIT 491**  
**Medical Imaging Technology**

**MIT 203 Introduction to Medical Imaging**  
(3-0-3)  
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, MIT 207, MIT 307, MIT 407 Seminar**  
(Hours to be arranged each term.)

**MIT 231 Sonographic Principles and Instrumentation I**  
(3-3-4)  
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. Satisfies Science elective.  
Prerequisite: PHY 217 with grade “C” or better.

**MIT 232 Sonographic Principles and Instrumentation II**  
(3-3-4)  
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. Satisfies Science elective.  
Prerequisite: MIT 231 with grade “C” or better.

**MIT 260 Introduction to PACS**  
(3-0-3)  
An introduction to PACS and how it has changed the medical work environment. Subjects covered include: EMR/RIS/PACS integration, evaluating the human computer interface, Dicom tools and viewers, archive media, PACS components, Moore’s Law, PACS licensing, user impact and DICOM configuration.

**MIT 333 HIPAA for PACS/Hi**  
(3-0-3)  
Basic concepts of HIPAA, including consideration of how HIPAA affects patient information systems. Covers the three parts of HIPAA law, and the role of IT professionals who interact with patient data.  
Prerequisite: MIT 103 or instructor permission.

**MIT 361 Advanced PACS**  
(3-0-3)  
An advanced survey of PACS-based systems and technologies making up enterprise PACS. Topics include: number systems and data representation, computer architecture, database management systems, computer networks, health informatics workflow, DICOM and HL7.  
Prerequisite: MIT 260 with grade “C” or better.

**MIT 362 PACS Networking**  
(3-0-3)  
Study of principles and fundamentals of network based communication between PACS, Imaging Modalities and network related devices. The 7 layer communication model is studied as mapped to standard TCP/IP implementations. Layer 7 is approached in relevance to the DICOM standard packet and DICOM information model.  
Prerequisite: MIT 260 with grade “C” or better.

**MIT 363 PACS DBMS**  
(3-0-3)  
Study of principles and fundamental concepts characterizing data representation relevant to PACS systems. Topics covered include database basics, SQL, Normalization Techniques, DICOM information definitions. Project definitions are based on DICOM Standard as an information model.  
Prerequisites: MIS 275, MIT 362 with grade “C” or better.

**MIT 374 Quality Assurance of Medical Images**  
(3-0-3)  
An overview of the medical imaging modalities, focusing on image identification and acquisition, relative to basic quality control procedures and guidelines for a quality assurance program.  
Prerequisites: BIO 200, BIO 233 with grade “C” or better.

**MUS**  
**Music**

**MUS 107, MUS 207, MUS 307, MUS 407 Seminar**  
(Hours to be arranged each term.)  

**MUS 195 Band**  
(0-3-1)  
HP (One hour each term.)

**MUS 197 Chorus**  
(0-3-1)  
HP (One hour each term.)

**NMT**  
**Nuclear Medicine Technology**

**NMT 107, NMT 207, NMT 307, NMT 407 Seminar**  
(Hours to be arranged each term.)

**NMT 205 Nuclear Medicine Administration**  
(2-0-2)  
Orientation to the principles of management, marketing nuclear medicine services, and administrative procedures.  
Prerequisite: MIT 103 with grade “C” or better.

**NMT 212 Nuclear Medicine Physics/Radiation Biophysics**  
(3-0-3)  

**NMT 215 Radiochemistry and Radiopharmacy**  
(3-3-4)  
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  
(3-3-4)  
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 Physics/Instrumentation  
(3-3-4)  
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  
(3-0-3)  
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, NMT 217.

NMT 311 Imaging Procedures I  
(3-3-4)  
Proper patient care before, during and after the procedure, identification and administration of prescribed radiopharmaceuticals. 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  
(3-3-4)  
Proper patient care before, during and after the procedure, identification and administration of prescribed radiopharmaceuticals. The use of imaging devices and external detectors for body and organ imaging.  
Prerequisite: NMT 225 with grade “C” or better.

NMT 313 Therapeutic Procedures and In-Vitro Studies  
(3-3-4)  
Common therapeutic applications of radioisotopes, dose ranges for each application, and proper techniques for calculating quantities of administered radiopharmaceuticals. Includes patient care, follow-up procedures and disposal of excreta. Body composition tests using In-Vitro techniques.  
Prerequisite: NMT 312 with grade “C” or better.

NMT 325 SPECT Imaging and Computer Applications  
(3-3-4)  
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. Theoretical basis of computer operations and medical applications in nuclear medicine. Lab experience with computerized systems, including hospital sites.  
Prerequisites: BIO 335 and NMT 312 with grade “C” or better.

NMT 346 Magnetic Resonance  
(3-3-4)  
Physics and principles used in the production of magnetic resonance images and spectroscopy. Static magnetic fields, gradient magnetic fields, secondary coil fields, nuclear magnetic resonance (NMR), spatial domain, frequency domain, computer data acquisition, relaxation times, pulse sequence diagrams. Laboratory simulation is included.  
Prerequisites: NMT 225 and PHY 217 (or equivalent) with grade “C” or better.

NMT 355 Computed Tomography  
(3-3-4)  
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: NMT 367, BIO 335.

NMT 367 PET Imaging  
(3-0-3)  
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  
(3-0-3)  
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.  
Prerequisites: Third quarter junior level status is required for this course.

NMT 410 Nuclear Medicine Technology Externship  
(0-40-15)  
All students must complete four consecutive terms (12 months) of clinical experience in nuclear medicine technology at an Oregon Tech 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 Experience  
(0-15-5)  
All students must complete three 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.  
Prerequisite: ARRT and/or NMTCB registry in Nuclear Medicine Technology. Successful completion and faculty approval of Computed Tomography and Cross Sectional anatomy course.

(Phil) Philosophy  
PHIL 107, PHIL 207, PHIL 307, PHIL 407 Seminar  
(Hours to be arranged each term.)  
H  
PHIL 331 Ethics in the Professions  
(3-0-3)  
H  
Applied ethics course that focuses on examining ethical issues common to the professions, such as privacy, confidentiality, social responsibility and whistle-blowing. Emphasizes critical thinking and ethical decision-making skills.  
Prerequisite: WRI 123 or WRI 227.
PHIL 342 Business Ethics  

(3-0-3)  

H  

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.

(PHED) Physical Education

PHED 100 Belly Dance: Beginning  

(0-3-1)  

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  

(0-3-1)  

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  

(0-3-1)  

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, PHED 307, PHED 407 Seminar  

(Hours to be arranged each term.)

PHED 110 Boot Camp/Kick Boxing  

(0-3-1)  

This is a high-low workout with an emphasis on kickboxing (both Taeto and Turbo kickboxing), also included is body pump workouts, core ball as well as Winsor Pilates stretching.

PHED 111 Core Strength and Balance  

(0-3-1)  

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  

(0-3-1)  

A survey participation of cardiovascular group exercise using cardio kickboxing (including both Taeto and Turbo kickboxing), dance aerobics, and step aerobics.

PHED 113 Super Circuit and Cardio Training  

(0-3-1)  

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  

(0-3-1)  

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  

(0-3-1)  

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  

(0-3-1)  

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  

(0-3-1)  

A combination of step aerobics and dance moves to provide a fat burning/cardiovascular workout.

PHED 124 Weight Loss  

(0-3-1)  

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  

(0-3-1)  

Continuation of the Weight Loss class. Meant to reinforce commitment to fitness for participants. Includes 40-45 minutes cardio and 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 and Core Ball Pilates  

(0-3-1)  

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  

(0-3-1)  

Learn the fundamentals of rowing in a multiperson 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  

(1-3-2)  

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  

(1-3-2)  

Learn diving in challenging environments. Six dives include night, navigation, and deep dives and three others (your choice). Dives on weekend’s off-campus. Dive gear furnished. Included is certification to dive Oxygen enriched mixtures (Nitrox).  
Prerequisite: PHED 131.

PHED 141 Tai Chi for Circulation  

(0-3-1)  

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.
Courses with the following notation fulfill the appropriate general education requirements:

- **C** - Communication
- **H** - Humanities
- **HP** - Humanities Performance
- **SS** - Social Science

**PHED 142 Tai Chi for Internal Organs**

(0-3-1)

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 and Qigong: Health, Bones, Muscle**

(0-3-1)

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 off arthritis, maximize joint flexibility, and strengthen muscles supporting joints.

**PHED 144 Tai Chi and Qigong: Neck/Back Strength**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

Class is generally Hatha Yoga, along with basic Ashtanga, and Kundalini Yoga techniques. In yoga a participant can hope to improve their flexibility, strength and balance.

**PHED 150 Aikido**

(0-3-1)

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**

(0-3-1)

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: Beginning**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

Lecture covers terminology, rules, etiquette, and course management. Practical class will cover putting, chipping, and driving.

**PHED 171 Archery: Beginning**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

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**

(0-3-1)

Competitive Soccer at the intercollegiate level, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization. Varsity athletes only or coaches approval.

**PHED 182 Varsity Track/Field**

(0-3-1)

Competitive Track and Field techniques are covered including training, conditioning and team organization. Competition at the intercollegiate level. Varsity athletes only or coaches approval.

**PHED 183 Varsity Men’s Baseball**

(0-3-1)

Competitive Baseball on the intercollegiate level, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization. Varsity athletes only or coaches approval.
PHED 184 Varsity Men’s Basketball
(0-3-1)
Competitive Basketball, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization, including intercollegiate competition. Varsity athletes only or coaches approval.

PHED 185 Varsity Women’s Basketball
(0-3-1)
Competitive Basketball, including coaching strategies, offensive and defensive strategies, training, conditioning and team organization, including intercollegiate competition. Varsity athletes only or coaches approval.

PHED 186 Varsity Women’s Softball
(0-3-1)
Competitive Softball including coaching strategies, offensive and defensive strategies, training, conditioning and team organization, including intercollegiate competition. Varsity athletes only or coaches approval.

PHED 187 Varsity Women’s Volleyball
(0-3-1)
Competitive Volleyball at the intercollegiate level including advanced technique analysis, offensive and defensive strategies, training, conditioning, and team organization. Varsity athletes only or coaches approval.

PHED 188 Varsity Sport Strength/Conditioning
(0-3-1)
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 approval.

PHED 190 Physical Education
(0-3-1)
Service course. General participation in physical activities to promote sound health.

PHED 201 Sports Seminar - Officiating
(1-3-2)
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
(1-2-2)
Development of professional competencies in fundamentals of training methods and objectives of major sports.

PHED 291 Lifeguard Training
(1-2-2)
Basic skills of lifesaving in aquatic programs; American Red Cross Advanced Lifesaving Authorization.

PHED 292 Water Safety Instructor
(1-2-2)
Analysis, methods of instruction, and teaching of aquatic skills; American Red Cross Authorization in Water Safety Instruction.

(Phy) Physics

PHY 107, PHY 207, PHY 307, PHY 407 Seminar
(Hours to be arranged each term.)

PHY 201 General Physics
(3-3-4)
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: PHY 201.

PHY 202 General Physics
(3-3-4)
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. Prerequisite: PHY 201.

PHY 203 General Physics
(3-3-4)
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 215 Topics in Astronomy
(2-3-3)
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 Medical Imaging
(3-0-3)
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 with Calculus
(3-3-4)
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 with Calculus
(3-3-4)
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, PHY 221.

PHY 223 General Physics with Calculus
(3-3-4)
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 222.

PHY 237 Meteorology
(2-3-3)
Principles of atmospheric structure and movement; horizontal and vertical motions; air masses; micrometeorology; atmospheric diffusion in relation to air pollution. Prerequisite: PHY 202 or PHY 222.

PHY 311, PHY 312, PHY 313
Introduction to Modern Physics
(3-0-3)
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 and Magnetism**  
(3-0-3)  
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 254N, PHY 222. Corequisite: MATH 253N.

**PHY 410 Mathematical Methods: Fourier Optics**  
(3-0-3)  
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 254N.

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**(PSCI) Political Science**

**PSCI 107, PSCI 207, PSCI 307, PSCI 407 Seminar**  
(Hours to be arranged each term.) SS

**PSCI 201 United States Government**  
(3-0-3) SS  
Basic concepts and principles of the American political system.

**PSCI 250 Introduction to World Politics**  
(3-0-3) SS  
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 326 World Politics in Transition**  
(3-0-3) SS  
International relations theory and world politics in the post-Cold War period. Topics include changing great power relations, conflict management, global inequalities and transnational problems. Prerequisite: PSCI 250.

**PSCI 355 International Conflict in the 20th Century**  
(3-0-3) SS  
The functions, origins, and forms of war in the 20th Century examined in the context of political theory and history. Case studies include World War I, World War II, Korea, Vietnam, and the Persian Gulf War. Prerequisite: PSCI 250.

**PSCI 497 United States Foreign Policy**  
(3-0-3) SS  
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.

**PSCI 498 Seminar**  
(Hours to be arranged each term.)

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**(PSG) Polysomnographic Technology**

**PSG 107, PSG 207 Seminar**  
(Hours to be arranged each term.)

**PSG 211 Fundamentals of PSG and Patient Care**  
(3-0-3)  
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**  
(3-0-3)  
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 223 Sleep Disorders Pathology**  
(4-0-4)  
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**  
(3-0-3)  
In-depth study of sleep disorders in women exploring: the menstrual cycle; circadian 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 Polysomnography**  
(4-0-4)  
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.

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**PSG 271A Clinical Polysomnographic Technology Part A**  
(2-12-6)  
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 nighttime clinical hours weekly. Pre-or-corequisite: PSG 211.

**PSG 271B Clinical Polysomnographic Technology Part B**  
(2-12-6)  
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 nighttime clinical hours weekly. Prerequisite: PSG 271A.

**PSG 271C Clinical Polysomnographic Technology Part C**  
(2-12-6)  
Advanced aspects of polysomnographic technology including recognition of sleep disorders, recording and monitoring, thera-
Psychotherapy interventions, scoring, MSLT, RTSW and neurophysiology interpretation of sleep. Part-time students only, requires 18 daytime clinical hours weekly.
Prerequisite: PSG 271B.

**PSG 272 Clinical Polysomnographic Technology I**
(2-27-9)
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 Polysomnographic Technology II**
(2-27-9)
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.

**(PSY) Psychology**

**PSY 107, PSY 207, PSY 307, PSY 407 Seminar**
(Hours to be arranged each term.) SS

**PSY 110 Human Services Careers**
(1-0-1) SS
Presentation and discussion of career options of psychology majors.

**PSY 201 Psychology**
(3-0-3) SS
Introduction to the principles and applications of psychology. Topics include scientific methodology, learning, memory and cognitive processes.

**PSY 202 Psychology**
(3-0-3) SS
Introduction to the principles and applications of psychology. Topics include the brain and behavior, consciousness, sensation and perception and health psychology.

**PSY 203 Psychology**
(3-0-3) SS
Introduction to the principles and applications of psychology. Topics include social psychology, personality, maladjustment and psychotherapy.

**PSY 215 Abnormal Psychology I**
(3-0-3) SS
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**
(3-0-3) SS
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 215 or instructor consent.

**PSY 220 Community Psychology**
(3-0-3) SS
Community mental health, epidemiology, program evaluation and social ecology. Research, theory and practice in community settings. The influence of community-environmental factors in individual functioning and their utilization to promote mental health.
Prerequisite: PSY 203.

**PSY 301 Basic Counseling Techniques**
(3-3-4) SS
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-play formats.
Prerequisite: PSY 216.

**PSY 308 Psychology of Eating**
(3-0-3) SS
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 and Development I**
(3-0-3) SS
A biosocial study of human development from conception to adolescence. Discusses the biological and social processes (e.g., cognition, personality, emotion, and social) affecting the developing child. Applications to health care, family, and education are discussed.
Prerequisite: PSY 201.

**PSY 312 Human Growth and Development II**
(3-0-3) SS
The psychological study of the continuing development of the human being from adolescence through old age and death. Discussion focuses on the social and health care issues of adulthood. Applications to health care, family and social policy.
Prerequisite: PSY 201.

**PSY 313 Psychological Research Methods I**
(3-3-4) SS
Overview of the techniques of research in psychology. Emphasis placed on evaluating psychological measurements, reliability and validity, and interpretation of psychological data. Reviews sources of invalidity and techniques for minimizing these sources.
Prerequisites: PSY 203, MATH 243 or MATH 361, each with grade “C” or better.

**PSY 314 Psychological Research Methods II**
(3-3-4) SS
Overview of the techniques of research in psychology. Emphasis placed on techniques of quantitative research. Review of experimental, quasi-experimental, field and survey research methods.
Prerequisite: PSY 313.

**PSY 317 Field Placement Seminar**
(2-0-2) SS
Presentations and discussions of externship and placement sites, including related skill sets.

**PSY 321, PSY 322 Theories of Personality**
(3-0-3) SS
In-depth coverage of personality theories in terms of each theorist’s personal experiences and the theories’ major concepts and definitions of mental illness and treatment. Applications of various theoretical concepts.
to case studies and to people in their personal lives.
Prerequisite: PSY 201, PSY 202 or PSY 203.

**PSY 325 Stress Management**
(3-3-4) SS
Discussion of the concept of stress and its physical and psychological impact. Description of the physical and psychological stress reactions, stress-related disease processes and techniques of stress management.
Prerequisite: PSY 201, PSY 202 or PSY 203.

**PSY 330 Social Psychology I**
(3-0-3) SS
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**
(3-0-3) SS
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 330.

**PSY 334 Behavior Modification I**
(3-3-4) SS
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. First in four course sequence approved by The Behavior Analyst Certification Board, Inc.* as meeting the coursework requirements for eligibility to take the Board Certified Behavior Assistant Analyst Examination*. Applicants will have to meet additional requirements to qualify.
Prerequisite: PSY 203.

**PSY 335 Behavior Modification II**
(3-3-4) SS
Principles learned in PSY 334 are applied to the study of human behavior. Complex techniques and new learning concepts found in the "real world" are also covered. Treatment plans for actual human problem behaviors are created in the laboratory. Second in four course sequence approved by The Behavior Analyst Certification Board, Inc.* as meeting the coursework requirements for eligibility to take the Board Certified Behavior Assistant Analyst Examination*. Applicants will have to meet additional requirements to qualify.
Prerequisite: PSY 334.

**PSY 336 Health Psychology I**
(3-0-3) SS
The scientific study of behavior, thoughts, attitudes, and beliefs related to health and illness. Specific areas covered include: stress, realities of health care delivery, research methods, and patient demographics.
Prerequisite: PSY 334.

**PSY 337 Health Psychology II**
(3-0-3) SS
The scientific study of behavior, thoughts, attitudes, and beliefs related to health and illness. Specific areas covered include: substance abuse, alcohol problems, eating disorders, AIDS, coronary health, pain, chronic illness, pediatric health, and health problems of aging.
Prerequisite: PSY 336.

**PSY 339 Biopsychology**
(3-0-3) SS
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: PSY 202 or BIO 232 or instructor consent.

**PSY 341 Psychoactive Drugs I: Psychiatric Drugs**
(3-0-3) SS
Physiological, behavioral, social, and societal effects of psychiatric drugs including anti-anxiety, anti-depressant, and anti-psychotic drugs.
Prerequisites: PSY 202 and PSY 216.

**PSY 342 Psychoactive Drugs II: Abused Drugs**
(3-0-3) SS
Physiological, behavioral, social, and societal effects of abused drugs including alcohol, hallucinogens, marijuana, opiates, and stimulants.
Prerequisite: PSY 341.

**PSY 347 Organizational Behavior**
(3-0-3) SS
Psychology applied to business organization and operations as they affect employees, customers, and the community with particular interest on group processes.
Prerequisite: Junior standing or instructor consent.

**PSY 351 Cognitive Restructuring I**
(3-3-4) SS
Analysis of thought patterns which cause behaviors leading clients to mandated counseling. Laboratory component includes participation in client groups and casework.
Prerequisite: PSY 301 or PSY 334.

**PSY 352 Cognitive Restructuring II**
(3-0-3) SS
Analysis of thought patterns which cause behaviors leading clients to mandated counseling. Laboratory component includes participation in client groups and casework.
Prerequisite: PSY 351.

**PSY 355 Evolutionary Psychology**
(3-0-3) SS
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 358 Psychology of Gender**
(3-0-3) SS
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, PSY 202, or PSY 203.

**PSY 360 Organizational Psychology**
(3-0-3) SS
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**
(3-0-3) SS
Application of psychological principles, theories and behavioral techniques applied to human relations, problems in industrial situations.
Prerequisite: PSY 201, PSY 202 or PSY 203.

**PSY 364 Environmental Psychology**
(3-0-3) SS
Analysis of the interaction between human
behavior and the environment. Discussions focus on how the environment affects humans and how our behavior influences the environment. Topics include environmental stress, architecture, perceptions and attitudes, and behavior to save the environment.

Prerequisite: PSY 201.

PSY 371 Human Sexuality I
(3-0-3) SS
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, PSY 202, or PSY 203.

PSY 372 Human Sexuality II
(3-0-3) SS
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.

Pre- or corequisite: PSY 371.

PSY 401 Advanced Counseling Techniques
(3-3-4) SS
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 CDROM, group therapy videotapes, and a Web site corresponding to readings.

Prerequisite: PSY 301.

PSY 402 Applied Psychology Methods I
(3-3-4) SS
Skills training in paraprofessional counseling and assessment techniques, program development and evaluation. Interviewing, evaluation procedures, consultation, referral, seminar development and delivery are included. Individualized instruction and supervision of individual projects. Role-playing of helping skills is a major focus.

Prerequisite: PSY 401.

PSY 403 Applied Psychology Methods III
(2-6-4) SS
Focus on application of skills and knowledge acquired in Methods I and II courses. Practicum-like experience of supervised implementation of projects created in PSY 402 (e.g., seminar delivery), or other participation in an established program, either on or off campus.

Prerequisite: PSY 402.

PSY 410 Organizational Change and Development
(3-0-3) SS
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 Abnormal Behavior of Children and Adolescents
(3-0-3) SS
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, PSY 312.

PSY 420 Applied Psychology Externship
(4, 8, 12 or 16 credit hours) SS
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 301 with grade “C” or better and 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
(1-6-3) SS
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 Senior Project II
(1-6-3) SS
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 Senior Project III
(1-6-3) SS
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 428 Animal Behavior
(3-0-3) SS
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: PSY 202 or BIO 213.

PSY 431 Family Therapy
(3-0-3) SS
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
(3-3-4) SS
Theory and application of group therapy techniques. Historical and current applications of group treatment, special populations and multicultural considerations.

Prerequisite: PSY 301.

PSY 434 Advanced Behavior Modification I
(4-0-4) SS
Ethical principles and issues in Applied Behavior Analysis, the methods for measuring and evaluating behavior change, specifically single-subject research designs and behavioral assessment methods and techniques. Third in four course sequence approved by The Behavior Analyst Certification Board, Inc.” as meeting the coursework requirements for eligibility to take the Board Certified Behavior Assistant Analyst Examination". Applicants will have to meet additional requirements to qualify.

Prerequisite: PSY 313. Pre- or corequisite: PSY 335.
PSY 435 Advanced Behavior Modification II
(4-0-4) SS
Application of principles and techniques of Applied Behavior Analysis to change behavior and develop systems to support behavior change. Fourth in four course sequence approved by The Behavior Analyst Certification Board, Inc.* as meeting the coursework requirements for eligibility to take the Board Certified Behavior Assistant Analyst Examination®. Applicants will have to meet additional requirements to qualify. Prerequisite: PSY 434.

PSY 446 Psychological Trauma
(3-0-3) SS
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 456 Performance Management
(3-0-3) SS
Applications of Applied Behavior Analysis in business, industry and government. Includes proposal to identify and intervene with real-life performance problem. Prerequisite: PSY 335.

PSY 464 Organizational Structure
(3-0-3) SS
Analysis of how organizations divide work to employees and then coordinate across employees. Describes how organizational structure changes with changing conditions. Prerequisite: PSY 361.

PSY 480 Theories of Learning
(4-0-4) SS
The basics of the major learning theories as they apply to operant and respondent conditioning, social learning, and memory. Prerequisite: PSY 335.

PSY 497 Special Projects/Training
(Variable Credit 1 - 6) SS
Students may enroll for credit in special programs offered by external agencies, approved by the department, leading to the development of specialized skills. Programs may include training to work with special populations. May be taken twice for credit. Prerequisite: Senior standing in Applied Psychology and permission of HSS department chair.

PSY 499 Independent Study
(Variable Credit 1-6) SS
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. Prerequisite: Senior standing in Applied Psychology and permission of HSS department chair.

(RDSC) Radiologic Science
RDSC 105 Radiation Protection and Radiographic Quality Control
(3-0-3)
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, RDSC 207, RDSC 307, RDSC 407 Seminar
(Hours to be arranged each term.)

RDSC 201 Imaging Techniques I
(3-3-4)
Demonstration and practice of the routine and radiographic, fluoroscopic, and mobile units. Includes the study of interactions of radiation and matter. Prerequisite: MIT 103 with grade “C” or better.

RDSC 202 Imaging Techniques II
(3-3-4)
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
(3-3-4)
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 care.
Courses with the following notation fulfill the appropriate general education requirements:
C - Communication  H - Humanities  HP - Humanities Performance  SS - Social Science

special radiographic positions of the skull, facial bones, and paranasal sinuses. Prerequisites: RDSC 211 and RDSC 233 with grade “C” or better.

RDSC 320 Surgical, Trauma and Mobile Radiography (3-3-4)
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 Cardiovascular/Interventional Technology (3-3-4)
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 with grade “C” or better.

RDSC 350 Bones: The Interactive Anatomy and Position Course (2-0-2)
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, RDSC 301, or Registered Radiologic Technologist.

RDSC 354 Mammography (3-3-4)
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 (3-3-4)
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 simulation is included.
Prerequisite: BIO 335.

RDSC 356 Magnetic Resonance (3-3-4)
Physics and principles used in the production of magnetic resonance images and spectroscopy. Static magnetic fields, gradient magnetic fields, secondary coil fields, nuclear magnetic resonance (NMR), spatial domain, frequency domain, computer data acquisition, relaxation times, pulse sequence diagrams. Laboratory simulation is included.
Prerequisites: BIO 335 and PHY 201 or PHY 217 all with grade “C” or better.

RDSC 365 Advanced Quality Assurance/Quality Control (3-3-4)
Principles of diagnostic radiographic quality assurance systems including: quality control testing, equipment calibration, preventive maintenance, and government regulations. Laboratory experiments involve QC tests and measurements.
Prerequisites: RDSC 202, RDSC 272.

RDSC 366 Radiographic Pathology (3-0-3)
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 (2-0-2)
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 410 Radiologic Science Externship (411 A, 0-18-7)(411B, 0-22-8)
This two-term (three-month) practicum is designed to develop the skills of the student in special imaging modalities of 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: The student must have completed all academic coursework in the Medical Imaging program with grade “C” or better and be a Registered Technologist.

RDSC 411A, RDSC 411B Special Radiologic Science Externship (411 A, 0-18-7)(411B, 0-22-8)
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: Be an ARRT registered technologist in good standing, and have completed all the academic coursework in the Medical Imaging curriculum with grade “C” or better.

RDSC 471 Clinical Imaging Education I (1-0-1)
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).
(REE) Renewable Energy Engineering

REE 107, REE 207, REE 307, REE 407 Seminar
(Hours to be arranged each term.)

REE 201 Introduction to Renewable Energy
(3-0-3)
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 243 Electrical Power
(3-3-4)
Fundamentals of electrical power; three-phase power systems, power factor, harmonics, resonance, PF correction. Electrical power systems: power transformers; transmission lines, distribution and transmission, HVAC and HVDC. Power systems representation: single-line diagrams, per-unit representation. Symmetric and asymmetric faults. Power flow analysis. Prerequisites: EE 223; MATH 252 with grade “C” or better.

REE 253 Electromechanical Energy Conversions
(2-3-3)
AC machines, including single phase, split-phase and three-phase (induction and synchronous machines) motors and generators; introduction to power switching devices, speed control and brushless DC motors. DC machines including shunt, series and compound. Control devices and circuits, including ladder diagrams. Prerequisite: EE 223; MATH 252 with grade “C” or better.

REE 331 Fuel Cells
(2-3-3)
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 and PHY 222 with grade “C” or better.

REE 333 Batteries
(2-3-3)
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.

REE 335 Hydrogen
(2-3-3)
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.

REE 337 Materials for RE Applications
(3-0-3)
Electrical, mechanical, thermal, chemical, optical, and processing properties of materials in renewable energy systems; solid-state device characteristics and their material properties. Engineering applications. Prerequisites: CHEM 202, CHEM 205, PHY 223.

REE 339 Senior Project I
(1-3-2)
Selection, definition, and analysis of a problem suitable for a renewable energy engineering senior project prior to actual project development. Includes consideration of project parameters, and implications, proposal of alternate solutions, and justification of selected solution. Culminates in the writing of project proposal. Prerequisite: WRI 327.

REE 344 Nuclear Energy
(3-0-3)

REE 345 Wind Power
(3-0-3)
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 sighting. Commercial development, economics and environmental impacts. Prerequisites: REE 253 or MECH 326. PHY 222.

REE 346 Biofuels and Biomass
(2-3-3)
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, or CHE 222, PHY 222.

REE 347 Hydroelectric Power
(3-0-3)

REE 348 Solar Thermal Energy Systems
(3-0-3)
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. Prerequisites: MECH 323, PHY 223.

REE 412 Photovoltaic Systems
(3-0-3)
The solar resource, sun charts, site assessments. Grid-connected and stand-alone systems. Module and array performance. PV system components including batteries, modules, charge controllers, maximum power point trackers, inverters. Economic consid-
orations including investment tax credits, present-value analysis, IRR. Advanced PV materials.

Prerequisite: EE 343.

REE 413 Electric Power Conversions Systems (2-3-3)

Prerequisites: EE 419

REE 427 Greenhouse Gas Accounting/Footprints (3-0-3)
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 ENV 427 (cannot be used for graduation credit by students who have taken ENV 427).

Prerequisites: Junior or senior standing, MATH 361 and WRI 227.

REE 439 Building Energy Auditing and Management (3-0-3)
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.

Prerequisite: MECH 433.

REE 449 Senior Project II (0-6-2)
A continuation of REE 339. Prototype construction of project solution begins. Written documentation is produced including design calculations and functional analysis of hardware and/or software needed for project solution.

Prerequisites: WRI 327, REE 339.

REE 451 Geothermal Energy and Ground-Source Heat Pumps (3-0-3)
An introduction to geothermal energy resources. Discussion of heat flow mechanisms. Investigation into heat exchange systems including: binary, flash, double flash, total flow. Application of thermal dynamics in analysis, design and control of heating/cooling systems.

Prerequisite: EE 449.

REE 453 Energy Systems Instrumentation (3-0-3)
Prerequisites: WRI 327, REE 339.

REE 453 Power System Analysis (3-0-3)

Prerequisites: ENGR 266, REE 243.

REE 454 Power System Protection and Control (3-0-3)
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 system protection and control using power system analysis software, emphasizing renewable resources.

Prerequisite: REE 453.

REE 455 Energy-Efficient Building Design (3-0-3)
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 433.

REE 459 Senior Project III (0-6-2)
Completion of the project proposed in REE 339 and designed in REE 449. Documentation with specifications, functional description, calculations, test results, schematics, graphs, flowcharts, parts lists, diagrams and photographs become part of the project final report. The student defends their project before a review panel.

Prerequisite: REE 449.

REE 463 Renewable Energy Transportation Systems (3-0-3)
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: REE 253 or MECH 326. MECH 323.

REE 465 Grid Integration of Renewables (3-0-3)
Issues unique to connecting renewable energy generation to the grid. Microgrids, Stability, transient and harmonic effects. Interconnect agreements and requirements, Standards development. SCADA and smart grid concepts, System optimization.

Prerequisite: REE 454.

(RCP) Respiratory Care Program

RCP 100 Introduction to Respiratory Care (2-0-2)
A survey of the development of respiratory care including an introduction to quality and evidence-based respiratory care, patient safety, communication, recordkeeping, principles of infection control, medical ethics, physical principles and computer applications in respiratory care.

RCP 107, RCP 207, RCP 307, RCP 407 Seminar
(Hours to be arranged each term.)

RCP 120 Interventions in Gas Exchange (4-0-4)
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 221 Introduction to Patient Assessment**  
(3-0-3) 
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.

**RCP 223 Emergent Chest Radiographic Interpretation**  
(2-0-2) 
The evaluation of the chest radiograph in the intensive care setting. Studies 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**  
(3-3-4) 
Pulmonary physiology including 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**  
(3-0-3) 
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: Acceptance into Respiratory Care Program or instructor consent.

**RCP 236 Cardiopulmonary Dynamics**  
(2-3-3) 
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: Acceptance into Respiratory Care Program or instructor consent.

**RCP 241 Respiratory Gas Therapeutics**  
(3-3-4) 
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 Respiratory Care Program.

**RCP 252 Cardiopulmonary Pharmacology**  
(4-0-4) 
A study of the administration, pharmacokinetics, administration and actions of medications. Emphasis is placed on bronchodilators, steroids, mukolytics and anti-aleukotrienes agents. Vasoactive, antiarrhythmics, diuretics, sedatives, antimicrobials and neuromuscular blocking agents are introduced. Prerequisite: CHE 360.

**RCP 326 Disaster Preparedness**  
(1-0-1) 
Preparation for unusual biological disasters. Case-based instruction on anthrax, SARS, influenza, bird flu, tuberculosis, emergency room hospital violence and unrest, evacuation and loss of services caused by hurricanes, floods and fire. Prerequisite: RCP 235.

**RCP 335 Exercise Physiology and Education**  
(2-0-2) 
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 337 Pulmonary Pathology**  
(4-0-4) 
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 Diagnosis and Monitoring**  
(2-3-3) 
Collaborative investigation, practice, 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**  
(1-24-9) 
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 Account- ing Act (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**  
(3-3-4) 

**RCP 352 Mechanical Ventilation II**  
(3-3-4) 
Description and analysis of the adult patient-mechanical ventilator system including the initiation, assessment, management and discontinuance. Prerequisite: RCP 351.

**RCP 353 Mechanical Ventilation III**  
(3-3-4) 
Advanced topics in mechanical ventilation including transport, dual modes, neonatal
and pediatric mechanical ventilation. Prerequisite: RCP 352.

**RCP 366 Clinical Simulation**  
(3-0-3)  
The practice and measurement of critical thinking in the context of computer branching logic simulations. Students use organized sequential topical examinations to review and measure retention of respiratory care content. Passage of secure national review examination required. Prerequisite: RCP 337.

**RCP 386 Critical Care I**  
(4-0-4)  
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**  
(2-0-2)  

**RCP 388 Advanced Neonatal Respiratory Care**  
(3-3-4)  
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**  
(3-3-4)  
Advanced topics in neonatal and pediatric respiratory care including transport, stabilization and care in resource limited international settings. Prerequisite: RCP 241.

**RCP 440 Case Management/Credentials I**  
(3-0-3)  
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. National examination required. Prerequisite: Completion of all academic coursework in the Respiratory Care Program prior to the senior year.

**RCP 441 Case Management/Credentials II**  
(3-0-3)  
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. National examination required. Prerequisite: RCP 440.

**RCP 442 Case Management/Credentials III**  
(3-0-3)  
Current clinical cases used as the basis for scholarly research and discussion. Students continue work on senior project in the fields of respiratory care, including formal presentation of the project. Passage of two national examinations required. Prerequisite: RCP 441.

**RCP 450, RCP 451, RCP 452 Clinical Care I, II, III**  
(1-24-9)(1-24-9)(0-36-12)  
Continued development of respiratory care skills, mechanical ventilation and neonatal intensive care, expanded functions and observations in specialty areas. Prerequisite: RCP 450 for RCP 451, RCP 451 for RCP 452.

**RCP 486 Extreme Physiology**  
(2-0-2)  
Physiologic adaptations to gas exchange and transport which occurs during the challenges of neonatal transition, exercise, high altitude and high-pressure environments. Prerequisite: RRT credential and admission to degree completion program.

**RCP 487 Expert Mechanical Ventilation**  
(2-0-2)  
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. Prerequisite: RRT credential and admission to degree completion program.

**RCP 488 Respiratory Care Innovations**  
(2-0-2)  
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 and education. Prerequisite: RRT credential and admission to degree completion program.

**(SOC) Sociology**  
**SOC 107, SOC 207, SOC 307, SOC 407 Seminar**  
(Hours to be arranged each term.) SS  

**SOC 204 Introduction to Sociology**  
(3-0-3) SS  
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 210 Marriage and Family Living**  
(3-0-3) SS  
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 304 Criminology**  
(3-0-3) SS  
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.

**(SPAN) Spanish**  
**SPAN 101, 102, 103 First Year Spanish**  
(4-0-4)  
An introduction to elementary Spanish. A three-term 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, SPAN 207, SPAN 307, SPAN 407 Seminar
(Hours to be arranged each term.)

SPAN 201, 202, 203 Second Year Spanish
(4-0-4) H
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.

(SPE) Speech
SPE 107, SPE 207, SPE 307, SPE 407 Seminar
(Hours to be arranged each term.)

SPE 111 Fundamentals of Speech
(2-2-3) C
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 314 Argumentation
(2-2-3) C
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 and Team Communication
(2-2-3) C
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.

(VAS) Vascular Technology
VAS 107, VAS 207, VAS 307, VAS 407 Seminar
(Hours to be arranged each term.)

VAS 214 Vascular Anatomy
(3-3-4)
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 225 Patient Management Practices
(2-3-3)
Current issues in the practice of vascular technology with emphasis on basic concepts of patient care, infection control procedures, and the technologist’s responsibility to the patient, the patient’s family, and the vascular technology profession.
Prerequisite: VAS 246 with grade “C” or better.

VAS 245 Peripheral Venous Disease
(3-3-4)
Investigation to the pathophysiology of venous disease with emphasis on theoretical and practical considerations of diagnostic methods of venous testing. These include clinical assessment, plethysmography, and duplex imaging of lower extremity veins.
Prerequisite: VAS 246.

VAS 246 Peripheral Arterial Disease
(3-3-4)
Investigation of the pathophysiology of arterial occlusive disease with emphasis on the theoretical and practical considerations of diagnostic methods of arterial testing. These include clinical assessment, physiological evaluation and duplex imaging of lower extremity arteries.
Prerequisite: VAS 214.

VAS 335 Radiographic Vascular Anatomy
(3-0-3)
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
(3-0-3)
A survey of basic echocardiography with emphasis on normal cardiac anatomy and abnormal disease states. Standard sonoographic imaging techniques of adult echocardiography, including instrumentation and protocols.
Prerequisites: BIO 220, VAS 246.

VAS 365 Abdominal Vascular Disease
(3-3-4)
Diagnostic methods of abdominal and visceral vascular disease testing. Includes aorto-iliac, renal artery and kidney, mesenteric system, liver system, and transplantsations. Laboratory emphasizes advanced instrumentation and scanning techniques, patient interviews, clinical signs and symptoms, physical assessment and findings.
Prerequisite: VAS 246.

VAS 366 Special Circulatory Problems
(3-3-4)
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
(3-3-4)
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, VAS 375.

VAS 375 Survey of Abdominal Sonography
(3-0-3)
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. Prerequisites: VAS 365.

**VAS 385 Vascular Laboratory Management**  
(3-0-3)  
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**  
(3-0-3)  
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, VAS 375 with grade “C” or better. Corequisites: VAS 367, VAS 385.

**VAS 420 Vascular Technology Externship**  
(0-40-15)  
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. Prerequisites: All academic coursework in the Vascular Technology curriculum.

**VAS 420A, 420B Special Vascular Technology Externship**  
(420A, 0-22-8/420B, 0-18-7)  
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 coursework in the Medical Imaging curriculum with grade “C” or better.

**WRI 107, WRI 207, WRI 307, WRI 407 Seminar**  
(Hours to be arranged each term.)

**WRI 115 Introduction to Writing**  
(3-0-3)  
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. Prerequisites: Writing ability as demonstrated by SAT/ACT score and/or writing sample.

**WRI 121 English Composition**  
(3-0-3)  
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. Prerequisite: Writing ability as demonstrated by SAT/ACT score and/or writing sample.

**WRI 122 English Composition**  
(3-0-3)  
Designed to develop skills in ethical argument, research, critical thinking. Multipage papers, including argumentative research paper, required. Focuses on writing process with attention to audience, effective style, overall rhetorical effect. Prerequisite: WRI 121 with grade “C” or better.

**WRI 123 English Composition**  
(3-0-3)  
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 214 Business Correspondence**  
(3-0-3)  
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. Prerequisites: WRI 122 or equivalent.

**WRI 227 Technical Report Writing**  
(F,W,S)(3-0-3)  
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 122. Pre- or corequisite: SPE 111.

**WRI 305 Writing for the Marketplace**  
(As required)(3-0-3)  
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 321, WRI 322, WRI 323 Advanced Technical Communication**  
(S,F,W)(1-0-1)  
Processes involved in technical communication; presents suggestions for solutions to the variety of problems emanating from junior project situations. This sequence is to be taken in consecutive terms (S,F,W) and is offered for the convenience of students whose junior or senior projects require a full year for completion. The three-term sequence substitutes for WRI 327. Prerequisite: WRI 227. Corequisite: Senior project.

**WRI 327 Advanced Technical Writing**  
(F,W,S)(3-0-3)  
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 227.

**WRI 328 Technical Journalism**  
(2-3-3)  
Production of a weekly newspaper (The Edge). Includes journalistic writing, design, layout, and production, as well as proposals, memos, business correspondence, and recommendation reports. May substitute for WRI 327 with approval of student’s major department. Prerequisites: WRI 227 and consent of instructor and advisor.

**WRI 350 Documentation Development**  
(3-0-3)  
Provides students with basic tools for preparing documentation. Focuses on usability.

Courses with the following notation fulfill the appropriate general education requirements:  
C - Communication  
H - Humanities  
HP - Humanities Performance  
SS - Social Science

For more information, see page 33
of documentation and includes planning and scheduling, audience evaluation, use of appropriate examples and illustrations, style, editing technique, organization and research. Prerequisite: WRI 227.

**WRI 410 Proposal and Grant Writing**

(3-0-3) C
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 227.

**WRI 415 Technical Editing**

(3-0-3)
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: WRI 227 or appropriate work experience.

**WRI 420 Document Design**

(3-0-3)
Applies publishing and graphic arts principles to the preparation of professional publications and presentation materials. Includes typography, design principles, the use of graphical elements, and integration of text and graphics. Prerequisites: SPE 111, WRI 227.
Administrative Offices

Assessment

DOW E213
(541) 885-1844
www.oit.edu/prospective-students/academic-agreements
academicagreements@oit.edu

Oregon Tech’s Office of Academic Agreements 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.

Affirmative Action and Equal Opportunity

Snell Hall, Room 108
(541) 885-1108

The Affirmative Action Officer is charged with oversight and enforcement of Oregon Tech’s compliance with relevant federal, state and university civil rights statutes and regulations. Complaints and grievances related to unlawful discrimination and harassment under Title IX, the Civil Rights Act, the Rehabilitation Act, the Americans With Disabilities Act and employment law 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, located in the Human Resources Office in Snell Hall.

College Union

Information Desk, CU 116
(541) 885-1030
www.oit.edu/collegeunion

The College Union is the center of student activity on campus. Located within the Union are the student government offices, Campus Arts and Entertainment, the Diversity Center, Student Services staff, Campus Dining operations, The Edge student newspaper, the Paper Owl bookstore, the campus mail center, the Outdoor Program, the Women’s Resource Center 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, concerts and dinner theaters, art 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.
Marketing and Communication

Snell Hall  
(541) 885-0938  
marketing@oit.edu

The Marketing and Communication Department at Oregon Tech is responsible for developing and implementing integrated marketing and communication strategies designed to advance the university’s image and standing among a variety of constituents and audiences.

The department builds and protects the university’s brand position and identity, provides consulting on marketing efforts undertaken by programs and departments, manages university-wide publications and the university’s website and social media, as well as provides public relations for the university.

Student Affairs

College Union 217  
(541) 885-1010  
www.oit.edu/student-services

An integrated program of support services and supervision of student life is offered by the Office of Student Affairs. These programs and services include: Admissions and Career Services, the Center for Learning and Teaching (CFLAT), Disability Services, Financial Aid, Housing and Residence Life, Integrated Student Health Center, Tech Opportunities Program (TOP) and Campus Life and Student Government (ASOIT).

The Vice President for Student Affairs and her staff maintain close relationships with students and student organizations and are available for consultation and collaboration on all matters pertaining to student well-being.

Strategic Partnerships and Government Relations

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:
1. Building long-term partnerships with businesses and industry associations that are crucial to Oregon Tech’s mission;
2. Providing support to secure external funding by leveraging private sector partnerships for grants and sponsored projects;
3. Proactively working with faculty to develop collaborations with industry that lead to sponsored projects, commercialization and entrepreneurial opportunities;
4. Building an alliance of local, state and national support for Oregon Tech’s policy and funding priorities; and
5. Representing the University on strategic partnerships, industry affairs, and legislative advisory councils with and for the Oregon University System and Oregon Tech.

The OSP collaborates with the Office of Innovation and Technology Transfer (OITT) 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 and the Provost to advance the University’s strategic priorities.

Business and Industry Partnerships

The Office of Strategic Partnerships assists OIT’s faculty at all locations to connect to industry partners and advisors to ensure that OIT’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, Oregon Cutting Systems, Jeld-Wen, and the Boeing Company, send their best and brightest to Oregon Tech for professional development so they can advance into engineering, technology 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, Northwest Collaboratory for Sustainable Manufacturing, Oregon BEST (Built Environment & Sustainable Technology), Manufacturing 21 Coalition, Northwest High Performance Enterprise Consortium, Pacific Northwest Defense Coalition, Oregon Manufacturing Extension Partnership, Oregon Workforce Investment Board and several local workforce boards, Oregon Transportation Research and Education Consortium, Oregon Healthcare Workforce Institute, and the Beaverton, Greater Portland, Klamath Falls, North Clackamas, Tualatin, and Wilsonville Chambers of Commerce.

Individual businesses or business associations that are interested in university-industry partnerships are encouraged to contact the Associate Vice President for Strategic Partnerships at 503-821-1247 or go to www.oit.edu/partnerships.
Government Relations
Oregon Tech’s government relations activities support the university community’s vision “to be recognized as an outstanding university in Oregon, the Northwest region, and nationally with graduates who excel in the technological workplace. We will be known for our commitment to applied research, the preparation of ‘world-ready’ graduates, and partnerships that ensure quality programs and opportunities for Oregon Tech to be a leader in economic development.”

Registrar’s Office
Snell Hall, lower level
(541) 885-1300
registrar@oit.edu
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, veterans’ services, 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.

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. 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.

• 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
• Reauthorization bills that impact Oregon Tech’s portfolio of programs
• Federal competitive grants to enhance Oregon Tech’s degree programs and net-zero campus

For updates and information, visit www.oit.edu/partnerships.
Athletics, Recreation and Fitness

(541) 885-1634

The mission of the Oregon Tech Athletic Department and the Tech Fit Center is to facilitate growth and development of 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 the Tech-Fit facilities and educational classes. Oregon Tech's Athletics, Recreation and Fitness Education Center has many facilities, fitness and education opportunities. An expansion off the front of the center provides students with a larger cardiovascular workout area. A free-weight room stocked with all the needed equipment is located downstairs on the east side. There are six tennis courts (four lighted), an eight-lane, 400- meter, all weather surface track and a lighted basketball court for your outdoor recreation. Also, watch for a lawn volleyball net as it tends to move around campus. Oregon Tech competitive athletics teams include men's and women's basketball, cross country, soccer and track; women's volleyball, women's softball and men's baseball. The Tech Fit Center and athletics are inanced by revenues generated from the programs' operation as well as from Incidental Fees, Oregon State Lottery funds, State General Appropriations and contributions from the community through the Oregon Tech Foundation or Oregon Tech Athletic Association.

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 three NAIA National Championships in team sports – men's basketball in 2004 and 2008 and softball in 2011. 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 Institute of Technology intramural program offers a variety of individual and team events in three divisions: men, women and co-ed. 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 885-1722 for information about intramural sports programs or see the Web site for rosters and information.

Tech Fit
The Tech Fit Center is free to all Oregon Tech students enrolled in eight or more credits per term. Students taking less than eight credits or community members may sign up in either credit or non-credit classes for a minimal charge. For more information call 885-1634.
Campus Life

College Union, Room 108
(541) 885-1825

The Office of Campus Life is committed to helping students develop skills in critical thinking, communication, teamwork, citizenship, community service, diversity awareness, and lifelong, independent learning. Since student involvement is often correlated with academic and career success, students are encouraged to participate in activities outside the classroom setting. A student can be involved in a variety of ways: join a campus club or organization (or start up a new one), serve on a committee, run for office, or apply for various student staff positions. Many opportunities for student involvement are highlighted below.

ASOIT (Student Government)

The Associated Students of Oregon Institute of Technology (ASOIT) invites the participation and involvement of all students in the governance process. The ASOIT officers currently comprise the Student Senate, which represents all students of OIT, and serves to communicate and advocate with all members of the university community. ASOIT officers are charged with adequately representing and interpreting student opinion related to campus policy and procedures, while promoting unity and community among the students of the university community. Students can participate by getting involved with a club or organization or by serving on a university committee or commission. For further information, visit the ASOIT web page at www.oit.edu/asoit or contact Campus Life or ASOIT at (541) 885-1826.

Campus Activities

The purpose of Campus Activities is to provide quality activities for all students, taking into consideration their expressed wishes, interests, and needs. Campus Activities (CA) funds quality social, cultural, arts and recreational programs for all OIT students. A broad array of events include: bands, comedians, student talent shows, lectures, discount bowling and movie nights, and homecoming week. For additional information, contact Campus Life at (541) 885-1392 or at www.oit.edu/campusactivities.

Campus Clubs and Organizations

Student clubs and organizations add another important dimension to life on campus. ASOIT usually funds 45-50 student organizations and clubs each year. Joining an organization is a great way to meet new people and pursue common interests in a relaxed setting. Almost half of the clubs are related to various academic disciplines, while others are linked to special interests, sports, recreation, spiritual, and social activities.

Diversity Center (DC)

OIT’s Diversity Center is a place to gather and build relationships within a creative and educational environment as well as provide academic, cultural and social support to all OIT students, faculty and staff. The DC student lounge provides a comfortable atmosphere where students can gather as well as study, and offers computers, internet access, a large screen TV, and a kitchen. The DC coordinates a variety of educational and social activities throughout the year. Coffee Hour presentations and the DC Social are popular events, bringing students, staff and faculty together in an informal atmosphere; providing a wonderful way to get to know one another. Special events are held throughout the year; such as kava ceremonies, Hawaiian dance lessons, Chinese calligraphy, Native American Dance and Drumming ceremony, Chinese New Year and movie nights.

Greek Life – Fraternity/Sororities

The Greeks have a long-standing presence on the OIT campus. Phi Delta Theta is a national fraternity and Alpha Sigma Alpha is a national sorority. Alpha Iota Mu is a new club that has just formed with interest in being a local sorority. Greek life at OIT is dedicated to community service, high academic standards, and enriching the sense of community on campus.

Hootie’s Halloo (New Student Orientation)

New Student Orientation (NSO) is coordinated through Campus Life by a student team. This program is designed to give students a chance to meet and also socialize with professors before classes begin. NSO also provides activities, workshops, barbecues, dances and a variety of other events and information to incoming students. An Orientation packet is provided to students when they first arrive, which includes a schedule of events and activities occurring the weekend prior to the start of fall classes.
Housing and Residence Life

Housing Office Residence Hall, A 151  
(541) 885-1094  
housing@oit.edu  
www.oit.edu/housing

Housing and Residence Life encourages self-responsibility, a necessary ingredient for the accomplishment of academic, social and personal objectives. Accordingly, every attempt is made to provide the environment to accomplish this aim. Studies have indicated that much of the knowledge required for success in life is gained outside the classroom. Oregon Tech’s Housing and Residence Life program provides a vital aspect of a student’s educational experience. Emphasis is on providing accommodations that are attractive, safe, reasonably priced and that offer stimulating programs that satisfy individual needs for privacy, community life, diversity in living arrangements and educational growth. In the Housing Office, students can make arrangements for a room, receive assistance with personal matters, consult with staff, make suggestions for improvements, work out financial details 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 and house up to 650 male and female students. Living in college housing relieves the student of many time-consuming and expensive tasks, including driving to and from campus. With this extra time and financial savings, students are able to devote more energy to their studies, to participate in non-academic learning experiences, to enjoy recreational and stress-relieving pursuits and to make new and often lifelong friends.

Information about on-campus housing is sent to all students admitted to Oregon Tech. Students living on campus for the first time must sign up for the points plan. If you need a housing or meal plan application, please contact the Housing and Residence Life Office.

Applications for on-campus housing should be completed and returned as soon as possible to the Housing and Residence Life Office. Space is guaranteed to new students who apply before May 1 for the following academic year.

Room-and-Board Rates
Room-and-board rates at Oregon Tech are approved by the Oregon State Board of Higher Education and are announced publicly after 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 at: www.oit.edu/housing.

Multicultural and International Student Services

This department promotes policies, programs, and activities that contribute to a broader understanding of people and their cultures, and serves as a resource for minority and international students, cultural clubs and organizations. In addition to our Diversity Center, we provide programs and opportunities for students to gather, study, socialize, and plan activities. Assistance is available for questions related to international study; this includes providing assistance to students with regard to SEVIS regulations, student visas, as well as personal, academic, and social adjustment.

In addition, a variety of diverse clubs, including the International Student Club, Native American Student Union, GSA, M.E.Ch.A., and others, are supported through staff advising to assist the groups in their goals. The International Club each year implements the popular international dinner and other events. M.E.Ch.A. has in the past helped sponsor Cinco de Mayo celebrations and NASU has provided Native American awareness events as well as POW WOW’s.

Outdoor Program (OP)

The Outdoor Program (OP) provides an opportunity to participate in various outdoor activities planned for student enjoyment, including, but not limited to, rafting, caving, mountain-climbing, hiking, biking, snowboarding, mountain biking, camping, and skiing. Most trips are offered at little or no cost. No previous experience is necessary to enjoy the events the OP offers, since the activities are planned for beginners and advanced adventurers alike. In addition to sponsoring trips, the OP also offers low-cost rentals of equipment for a variety of outdoor activities (equipment includes canoes, tents, backpacks, cross-country skis, snowboards, and more).

Student Media

KTEC Radio Station (89.5 FM)

KTEC is the campus radio station licensed to the Oregon State Board of Higher Education by the Federal Communications Commission and is the oldest FM station in Southern Oregon. Student staff and volunteers, with programs to serve the interests of the OIT student body and the Klamath Falls community, operate KTEC. Throughout the school year, KTEC provides a varied program schedule of music, educational material and special events. As KTEC staff members, students will practice and perfect their knowledge by producing both live and pre-programmed broadcasts.
Oregon Technical Broadcasting (OTB)
OTB is the student-run video production program at Oregon Tech. OTB films campus events, operates the closed-circuit TV station on campus and provides video service to campus organizations that request them. Anyone interested in TV/video/film productions, acting or comedy is encouraged to get involved with OTB (no previous experience is necessary).

The EDGE
Oregon Tech's student newspaper, The Edge, is a weekly publication written by students from all majors and produced by a student staff. Published fall, winter and spring terms it is distributed without charge to students. Academic credit is also available by enrolling in journalism courses.

Summer Activities
In an effort to increase the number and scope of activities offered to students who decide to take summer classes, a Summer Activities program was recently created. Historically, events have included everything from rental of outdoor equipment, all campus BBQ's, bowling nights and even an outdoor movie. The Oregon Tech Summer Music Series encourages community members, families and students to enjoy live music performed by different bands each week and a Klamath Idol Contest.

Student Leadership
Each of the student opportunities highlighted above have student staff teams who plan and coordinate events and activities (some are paid positions). This gives students a valuable opportunity to learn hands-on leadership skills in a variety of out-of-class paraprofessional settings. Often students are also given the opportunity to collaborate with academic professionals as well as other student leaders. Students also participate in various training seminars throughout the year to aid in the enhancement of their leadership skills.

University Services

Bookstore, The Paper Owl
College Union
(541) 885-1050
paperowl@oit.edu

The Paper Owl is a full-service campus store. Besides textbooks and course packs, the Paper Owl carries a wide variety of contemporary items that students prefer: school, office and residence hall supplies, scientific calculators, writing instruments, emblematic clothing and gifts, computer supplies and useful reference books, among others. Online ordering is available through the bookstore website at www.oregontech.bkstr.com. You may buy or rent actual textbooks as well as digital books. Apparel, gift and supplies are available to order online as well.

The Paper Owl has a high percentage of used books in stock. The book buy-back program allows students to sell back books they do not wish to keep after taking a course.

Mailing supplies such as stamps and packing material may be purchased at the Paper Owl, and packages can be shipped via Federal Express from the store.

Campus Dining

(541) 885-1076
www.oit.edu/dining

Your dining experience at Oregon Tech is more than great food. It is a community experience centered on culinary expertise, fresh ingredients, healthy options and a shared sense of environmental and social responsibility. Our team is committed to creating the best possible dining experience. Join us to experience the comfort, convenience, outstanding food and inviting atmosphere designed especially for you.

We are proud to offer a dining program complete with services in several locations across campus, and menu selections that include just about every item you can imagine. Just feast your eyes on what we have available! The Marketplace featuring a wide variety of fresh food designed to satisfy everyone's appetite with food choices to rival your favorite restaurants. The Bistro is a quick serve coffee/espresso and light meals venue located on the first floor of the College Union. Hooties, located in the DOW building, and Duffies, located in the Purvine building both offer 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, you can find a selection of beverages and snacks to satisfy that late night hunger. Campus Dining Services are provided by Sodexco Inc.
Career Services
Learning Resource Center, 228
(541) 885-1020
career@oit.edu

The Career Services Office supports student and alumni efforts to develop and achieve career goals. Services include: individual career advising; workshops and classroom presentations on résumé-writing, job interviewing, job search and applying to graduate school; on-campus employer recruitment, whereby companies and government agencies interview students for career and internship opportunities; Career Fairs, which bring employers and students together on campus to discuss career opportunities informally; career-resource materials and job listings; and a résumé referral service, which supports student applications for employment and graduate school.

Career Services also coordinates the Student Employment Service, which provides part-time employment for students both on and off campus with local employers. Positions are available through the College Work-Study Program or through regular employment.

Center for Learning and Teaching (CFLAT)
Learning Resources Center, 229-233
(541) 885-1791
www.oit.edu/cflat

CFLAT, the Center for Learning and Teaching, is a multi-purpose department designed to enrich learning, teaching and student success at Oregon Tech. CFLAT helps students succeed by providing effective academic assistance, support and resources through promotion of student learning, personal growth and programs designed to enhance instruction, advising, involvement, satisfaction, achievement, retention, persistence, graduation and post-graduate success. CFLAT provides peer tutoring for matriculated Oregon Tech students, academic success (ACAD) classes, accommodations for students with disabilities, test proctoring, a computer laboratory, the campus writing center, as well as many other services to support students, staff and faculty in an effort to facilitate student success at Oregon Tech. In addition, CFLAT assists with faculty orientation, support and development efforts, including September Institute and Advisor Training for new faculty. It provides ongoing support for faculty to help improve teaching effectiveness and instructional abilities as well as student support skills.

CFLAT functions as the University Testing Center. Oregon Tech testing, distance testing, placement testing, test proctoring and other standardized testing programs are also offered.

CFLAT 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. Visit www.oit.edu/cflat or contact CFLAT at (541) 885-1791 or cflat@oit.edu for more information.

Disability Services
Learning Resources Center, 228
(541) 851-5179
(541) 885-1072 - text telephone
www.oit.edu/ds access@oit.edu

The Office of Disability Services coordinates academic, housing and program services accommodations for students with documented physical, learning, sensory, psychiatric and other disabilities. Students with disabilities who anticipate needing services on campus should contact this office well in advance of attendance at Oregon Tech to arrange for timely services.

Document Resource Center
College Union
541-885-1058

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 shredding are available at low costs. Electronic job submission provides the campus with access to services and completed jobs can be delivered to campus mail boxes 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 a.m. to 5 p.m. Monday through Friday during the academic terms. During college breaks, operational hours are 8 a.m. to 5 p.m.

Information Technology Services
Boivin Hall, 123
(541) 885-1720
(541) 885-1470 Helpdesk/Service
(503) 821-1289 Portland Helpdesk

Information Technology Services provides computing and telecommunications resources for the Oregon Tech campus. 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
Integrated Student Health Center (ISHC)

Alden B. Glidden, M.D., Medical Director
James W. Pittman, Administrative Director

Integrated Student Health Center
(541) 885-1800
(541) 885-1866 fax health@oit.edu

The Integrated Student Health Center, 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 hours are entitled to and encouraged to use the Integrated Student Health Center. Other students can use the Integrated Student Health Center by paying the health fee.

Health Requirements to Register

The following health requirements must be fulfilled before registration. Documentation of requirements must be submitted to the Oregon Tech Integrated Student Health Center. 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 for courses.

1. A completed Health History form. This form is mailed to all students when they confirm registration.

2. Evidence of adequate immunizations (e.g., official immunization record, signed statement by a physician, immunizations on official high school transcript, etc.):
   • 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.*
   • Recent tetanus (Adacel), hepatitis A/B, polio, varicella (chickenpox), and meningococcal vaccines are strongly recommended. The Integrated Student Health Center carries most of these vaccines.

Services

Medical Clinic

Oregon Tech’s Integrated Student Health Center health care providers are committed to providing high quality, personalized care. The medical clinic is staffed by a physician, nurse practitioner, registered nurse and office assistants. Diagnosis and treatment of acute and chronic illnesses, birth control and emergency contraception, routine laboratory procedures, immunizations, pharmacy, 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 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. Students enrolled for five or fewer credits can receive one free assessment session, and then may access additional services by paying the Student Health 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.

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 Integrated Student Health Center 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. Students provide input on programs and services provided, generate new ideas and participate in wellness and promotion events. All students are welcome to apply to join this committee. SHAC meets on a monthly basis during the academic school year. Call or visit the Integrated Student Health Center to apply.

Peer Health Educator Program

The Oregon Tech Peer Health Education Leadership program gives students the opportunity to develop public speaking, leadership, and public health skills while providing a resource for health information to the Oregon Tech community. The mission of the program is “Helping people make informed, voluntary, health-promoting behavior changes.” Student volunteers are called Peer Health Educators (PHEs), who work with...
peers through education and outreach. They receive training to gain facilitation skills, public speaking experience and knowledge about college health issues. Students in good academic standing and with sophomore status or above may apply during Winter Term. Opportunities for others to volunteer and assist PHEs are available throughout the year. For more information, visit www.oit.edu/health/peerhealthed.

Fees/Charges
Students taking six or more on-campus credit hours pay a Student Health fee. 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. All medical expenses rendered outside the Integrated Student Health Center from private physicians or hospitals are the student's financial responsibility.

Student Health Insurance Plan (SHIP)
OTT health insurance is on a voluntary basis. If you do not have health insurance from an alternative source, you are strongly encouraged to look at purchasing the voluntary health insurance plan. International students and students in certain programs/externships will continue to have to meet requirements for health insurance through a hard waiver. The waiver must be completed within the first 14 days of a term before a refund can be given. Once completed, the waiver will cover the entire academic year.

Library Services
Karen Kunz, Interim Library Director
Anne Hiller Clark, Instructional Services and Shaw Librarian
Dawn Lowe-Wincentsen, Wilsonville Operations Librarian
Iris Godwin, Technical Services Librarian
Karen Kunz, Access Services and Systems Librarian
Kelly Peterson, Instructional Services Coordinator and Digital Projects Librarian
Alla Powers, Reference Services Coordinator
Jan Abeita, Access Services Manager

Library
Located on the first and second floors of the LRC, the Library offers public computers, individual and group study spaces and a computer lab. The Library contains approximately 150,000 volumes, including government documents; access to more than 18,000 print and electronic journals; and unique digital collections relating to the Klamath River Watershed and Crater Lake National Park. Online catalogs provide access to the collections of the Oregon Tech Library, regional academic libraries and to library resources worldwide. The Library's many Web-based databases offer students access to extensive information sources. All of the Library's electronic resources are available campus-wide and via remote access to promote student learning regardless of location. Research services include print and electronic reserves, interlibrary loans, individual research assistance and chat reference. The librarians offer class-related instruction in the use of the Library and information resources, workshops on various topics, classes in research methods and tours. For librarian assistance, call (541) 885-1773.

Wilsonville
The Wilsonville campus library offers access to all the Oregon Tech Libraries' electronic and print resources. The library houses a small print collection on-site focusing on engineering and will request any other print resources be shipped upon request. The Wilsonville campus library research services mirror those of the main library. For assistance please call 503-821-1260 or reach the Wilsonville campus librarian at 503-821-1258.

Shaw Historical Library
The Shaw Historical Library, established in 1983 by Laurence and Dorothy Shaw, houses collections of books, art, maps, manuscripts, photographic images and other materials pertaining to the history cultures and natural history of the Land of the Lakes—Southern Oregon, Northern California and Northwestern Nevada—from prehistory to the present. The Library's activities and publications, including the Journal of the Shaw Historical Library, focus on all aspects of the history and natural history of the region. The Library is located on the second floor of the LRC. To reach the Shaw Librarian, call (541) 885-1686.
Tech Opportunities Program

The Tech Opportunities Program (TOP) is a federally funded (Student Support Services TRIO) academic support program designed to assist highly motivated students who are also low income, first generation or students with disabilities. TOP staff work closely with participating 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 and related support; mentoring; networking with other students; college-success workshops and classes; additional academic advising; and limited financial assistance.

Veterans Services

The Veterans Certifying Official works with the Veterans Administration to deliver educational benefits to a variety of veterans, selected reservists, dependents and survivors. All students, including new, transfer or returning, who expect to receive VA benefits must notify the coordinator in order to start the process of certification. The also administers the satisfactory progress standards for students who are receiving VA educational benefits. See Veterans Satisfactory Progress Standards under the Academic Policies section of this catalog.

More information is available at www.oit.edu/veterans.

Women’s Resource Center

The Oregon Tech Women’s Resource Center (WRC) provides resource and referral information; facilitates programming and interpersonal support; and promotes academic and personal success. Our goal is to promote and maintain a positive and supportive climate at Oregon Tech. The WRC is here to help women on their journey and offer positive influences that will transform them into future leaders. Honoring the complexities of women’s identities, the WRC facilitates choices and change through programs, counseling, and workshops, and serves as the central resource for educational and support services for women. We offer referrals and supportive contacts on campus and in the community should students need help or support.
University Development

Robin Thompson, Vice President for Development and Alumni Relations
(541) 885-1130

University Development builds and enhances positive relationships with students, faculty, staff, alumni and friends of the university through 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, grant writing and other activities stimulate and convey the distinctive role and numerous educational, research and public service contributions of Oregon Tech throughout Oregon, the nation and internationally.

The Oregon Tech Foundation

Robin Thompson, Executive Director
(541) 885-1130

The Oregon Tech Foundation is a nonprofit organization that provides private financial support for Oregon Institute of Technology. The Foundation is governed by a Board of Directors that represents a broad range of community leaders, alumni and private benefactors. The Foundation raises funds to enhance academic programs, to support scholarships and to enrich student life. A related responsibility of the Oregon Tech Foundation is the management of private funds entrusted to it. These funds currently total above $16 million, a large part of which is committed to the support of numerous scholarships that are awarded primarily on the basis of academic achievement and financial need. The Foundation works closely with its affiliated and associated organizations, including the Oregon Tech Alumni Association, the Shaw Historical Library and the Oregon Tech Athletic Boosters.

The Oregon Tech Alumni Association

Justin Parnell, Alumni Relations and Scholarship Coordinator
Snell Hall, 215
(541) 885-0795
Justin.parnell@oit.edu
https://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.
Oregon Renewable Energy Center

The Oregon Renewable Energy Center 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 practical information. 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.
- 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 options to gasoline and diesel 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.

Renewable Energy Engineering Degree Program

The Renewable Energy Engineering undergraduate degree program offered by Oregon Tech is the only one of its kind in the United States. In addition to the REE courses, the general Oregon Tech curriculum includes classes and laboratories in renewable energy and sustainability that are available to students in other disciplines. The REE degree is delivered on Oregon Tech’s Portland and Klamath Falls campuses.
Directories

Governance Oregon University System

The Oregon University System includes seven institutions that provide general, professional and technical educational opportunities throughout the state.

Member institutions are Eastern Oregon University, La Grande; Western Oregon University, Monmouth; Oregon Institute of Technology, Klamath Falls; Oregon State University, Corvallis; Portland State University, Portland; Southern Oregon University, Ashland; and the University of Oregon, Eugene.

The system is governed by the Oregon State Board of Higher Education, whose members are appointed by the Governor and confirmed by the Oregon Senate. The Board maintains a permanent staff, headed by the Chancellor of the Oregon University System, who is appointed by the Board.

Oregon State Board of Higher Education

Members and term expiration dates:

Matthew (Matt) W. Donegan, Board President, 2013
Jill W. Eiland, Board Vice President, 2013
Lynda M. Ciuffi, 2012
Brianna R. Coulombe, 2013
Allyn Ford, 2013
James (Jim) L. Francesconi, 2012
Farbodd A. Ganjifard, 2013
Paul Kelly, Jr, 2015
Dr. Emily J. Plec, 2013
Dr. Preston Pulliams, 2013
David (Dave) V. Yaden, 2012

Administrative Offices

President, Christopher G. Maples
Provost and Vice President for Academic Affairs, Bradley Burda
Vice President for Finance and Administration, MaryAnn Zemke
Vice President for Student Affairs and Dean of Students, Erin Foley
Vice President for Development and Alumni Relations, Robin Thompson
Associate Provost and Vice President for Research, Mateo Aboy
Associate Vice President for Strategic Partnerships, Dolores “Lita” Colligan
Chief Information Officer and Information Technology Services, Andy Abbott
Dean, College of Engineering, Technology and Management, Charlie Jones
Dean, College of Health, Arts and Sciences Lawrence Powers

Academic Agreements, Marla Edge, Director
Admissions, Carl Thomas, Director
Athletics, Mike Schell, Director
Business Affairs, Sara Reuter, Director
Campus Life, Vacant
Campus Security, Ed Daniels, Director
Career Services, Vacant
College Union, Christopher Dalla, Director
Disability Services, Vacant
Distance Education, Barb DeKalb, Director
Facilities Services, David Ebsen, Director
Financial Aid, Tracey Lehman, Director
Housing and Residence Life, Mandi Clark, Director
Human Resources and Affirmative Action, Ron McCutcheon, Director
Institutional Research, David Waite, Director
Integrated Student Health Center, James Pittman, Administrative Director
Learning and Teaching, Center for, Danny Ziriax, Director
Library, Karen Kunz, Interim Director
Marketing and Communication, Gwen Raubolt, Director
Seattle at Boeing, John Bridge, Director
Oregon Renewable Energy Center, Charlie Jones, Interim Director
Registrar’s Office, Wendy Pedersen, University Registrar
Tech Opportunities Program, Vacant
Oregon Tech Foundation Board of Directors

Lance J. Bishop, Vice President
Greg Bulkley, Treasurer
Kristi L. Redd, Secretary
Mark Bansemer
Don A. Boyd
Russ Carter
Gerald Freschi
Gerda V. Hyde
Gary Johnston
Douglass Kintzinger
Ronald Loveness
Anne Ludlow
Kathleen Mitchell
Richard Siemens
Lois Stilwell
Theodore E. Thom
Diedra Thompson
Don Van Luvane
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Emeritus Directors
Timothy Bailey
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Dave Cowan
Alan Craigmiles
William Early
Trudy Farr
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John Gerbert
Winifred Hood
Susan Laubengayer
James McCobb
John Novak
Jean Pinniger
Joan Staunton
Nancy Wendt

Ex-Officio
Christopher G. Maples, Oregon Tech President
Mary Ann Zemke, Oregon Tech Vice President for Finance and Administration
James DeHoog, Oregon Tech Alumni Advisory Board President
Robin Thompson, Oregon Tech Vice President for Development and Alumni Relations; and Executive Director, The Oregon Tech Foundation
Mike Moore, Oregon Tech Athletic Boosters
Steve Kandra, President, Shaw Historical Library
Krista Darrah, Accounting Manager

President’s Advisory Council

William Buckley, Attorney at Law, Buckley LeChevallier P.C., 2014
Bill Castle, President and CEO, South Valley Bank & Trust, 2012
Michael Conboy, Senior Applications Specialist, Toshiba America Medical Systems, Inc., 2014
Mary Coucher, Vice President, Alliances and Business Development, IBM Corp., 2010
James DeHoog, General Manager, Environmental Technical Services, Inc., 2014
Lisa Graham, Vice President and COO, Bend Research, Inc., 2014
Mike Hallgrimson, Program Management, Boeing, Portland, 2012
Denise Honzel, Healthcare Consultant, 2012
Gary Johnston, President, 7L Investments LLC, 2012
Steven Mays, President, Electronic Wood Systems, Int., 2014
Martha Schrader, Former State Senator, District 20, State of Oregon, 2014

Patricia Smullin, President, California-Oregon Broadcasting, Inc., 2014
Paul Stewart, President and CEO, Sky Lakes Medical Center, 2015
Steve Vincent, Regional Business Manager, Avista, 2015
Administration


Diana Angeli (2006), Executive Secretary to Vice President for Finance and Administration.

Angela Archer (2010), Coordinator, Center for Learning and Teaching. B.S. (2009), Oregon Institute of Technology.


Bradley Burda (1983), Provost and Vice President of Academic Affairs. B.S. (1972), Iowa Wesleyan College; M.A. (1982), California State University, Long Beach.

Bettina Burns (2009), Assistant Director, Admissions. B.S. (2006), Southern Oregon University; M.A. (2009), Concordia University.


Mandi Clark (2004), Director, Housing and Residence Life. B.A. (1997), Kansas State University; M.S. (1999), University of Nebraska.


Dolores “Lita” Colligan (2007), Associate Vice President for Strategic Partnerships. B.A. (1975), University of California, Santa Cruz.


Barbara DeKalb (2007), Director, Distance Education. B.S. (1970), Linfield College; M.S. (1972), Washington State University.

David Ebsen (1999), Director, Facilities Services.

Marla Edge (1983), Assistant Professor; Director, Academic Agreements. B.S. (1976), M.Ed. (1989), Oregon State University.


Erin Floyd (2010), Success Specialist. B.S. (2008), Corban College.


Honor Christine Frazier (2008), Student Programs Coordinator, Campus Life. A.A (2006), B.S. (2008), Oregon Institute of Technology.

Betzy Fry (2011), Director of Development and Major Gifts. A.A. (81), Cottey College; B.A. (83), University of Oregon.

Michael Garrard (2007), Coordinator, Sports Marketing/Promotion.

Alden Glidden (1978), Associate Professor, Medical Director, Student Health Center. B.S. (1965), University of Michigan, Ann Arbor; M.D. (1969), Wayne State University.


Stephanie Hanson (2010), Executive Assistant to Vice President for Development and Alumni Relations. A.A. (2000), Oregon Institute of Technology.


Sandra King (1990), Payroll Supervisor, Business Office.


Anne Malinowski (1990), Office Manager, Portland Operations.


Russell McMahon (2003), Director, Athletic Development. B.A. (1973), Kansas Wesleyan University.


Cheryl Meyers (1989), Executive Assistant to Provost and Vice President of Academic Affairs.


Joel Moore (2010), Coordinator of Campus Visits and Programs. B.A. (2009), George Fox University.

Valjean Newsome (1997), Executive Secretary


Deanne Pandozzi (2002), Coordinator, Campus Life and SEVIS. B.S. (2010), Oregon Institute of Technology

Justin Parnell (2012), Alumni Relations and Scholarship Coordinator. B.S. (2011), Oregon Institute of Technology

Adria Paschal (2007), Executive Assistant to the President.


Laura Reid (2007), Academic Specialist, Tech Opportunities Program. B.S. (2005), Oregon Institute of Technology.


Tracy Ricketts (2010), Director of Donor Relations. B.S. (1999), University of Oregon.


Greg Stewart (2004), Head Women’s Softball Coach. B.S. (1992), Sterling College.
Nellie Stewart (2007), Executive Secretary to Vice President for Student Affairs, B.S. (2011), Oregon Institute of Technology


Robin Thompson (2008), Vice President for Development and Alumni Relations. B.S. (1980), West Virginia University; M.S. (1993), University of Utah.


Mary Ann Zemke (2008), Vice President for Finance and Administration. A.S. (1975), Lake Michigan College; B.A. (1977), Western Michigan University; M.B.A. (1990), Western Michigan University.


**Instructional Faculty**

*This listing reflects faculty for the 2012-2013 academic year. In some cases, changes taking effect for 2012-2013 are included in the faculty lists under the department descriptions.*


Valerie M. Ball (2008), Assistant Professor, Communication. B.A. (1973), University of Oregon; M.A. (1981), University of Colorado; M.S. (2003), Portland State University.


Bruce Barnes (2009), Assistant Professor, Electrical Engineering and Renewable Energy. B.S.E.E. (1978), and M.S.E.E., University of Illinois at Urbana; Ph.D. (2005), University of Idaho.


Cara Calvo (2012), Assistant Professor, Clinical Laboratory Science. B.S. (1983), Oregon Health Sciences University; B.S. (1983), Portland State University; M.S. (1990), University of Vermont; M.S. (2004), Oral Roberts University.

This listing reflects faculty for the 2012-2013 academic year. In some cases, changes taking effect for 2012-2013 are included in the faculty lists under the department descriptions.
Barry Canaday (2009), Assistant Professor, Medical Imaging Technology. B.S. (1968), Oregon State University; M.S. (1973), Western Washington University; A.A.S. (1978), Peninsula College; A.A.S. (1992), Spokane Community College.

Ralph A. Carestia (1990), Professor, Computer Systems Engineering Technology. B.S. (1974), University of Southern Colorado, Pueblo; M.S. (1980), San Jose State University.


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.

Burton D. Clark (1998), Professor, Natural Sciences. B.S. (1979), University of Massachusetts, Amherst; Ph.D. (1986), The Ohio State University.

Jennifer Clark (2011), Assistant Professor, Natural Sciences. B.S. and Science Coordinator, Crater Lake National Park Science and Learning Center (2009), Kent State University, Ph.D. (2003), Kent State University.

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Ronald H. Swisher (1976), Professor, Natural Sciences. B.A. (1972), Pomona College; Ph.D. (1976), University of Oregon.


Richard Torres (2007), Associate Professor, Natural Science. B.S. (1982), Brigham Young University; M.S. (1989), California State University, Long Beach; Ph.D. (1996), Idaho State University, Pocatello.

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Gary L. Zimmerman (1995), Professor, Medical Imaging Technology. B.S. (1984), Oregon Institute of Technology; M.S. (1993), University of Wisconsin, Oshkosh; Registered Technologist (R), (MR), (CT), ARRT.

Faculty Senate Presidents

1965-1966  Eugene A. Wellman
1966-1967  Max A. Saunders
1967-1968  Arthur A. LeCours
1968        George E. Miller
1968-1969  Dallhart R. Eklund
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. Kurz
1982-1983  Charles V. Highbee
1983-1984  Charles V. Highbee
1984-1985  Edward Silling
1985-1986  Herbert H. Jolliff
1986-1987  Albert D. Jolliff
1987-1988  Charles E. Harris
1988-1989  Ross S. Carroll
1989-1990  Pearl O. Juris
1990-1991  John V. Stoe
1992-1993  James R. Etchison
1993-1994  Bradley D. Burda
1994-1995  Bradley D. Burda
1995-1996  Valerie J. Vance
1996-1997  Valerie J. Vance
1997-1998  David C. Warner
1998-1999  David C. Warner
1999-2000  Alberto Bello, Jr.
2000-2001  Mark Clark
2001-2002  Mark Clark
2002-2003  Timothy Thompson
2003-2004  Bradley D. Burda
2004-2005  Bradley D. Burda
2005-2006  Bradley D. Burda
2006-2007  Mark Neupert
2007-2008  Mark Neupert
2008-2009  Marla Miller
2009-2010  Debbie Caldwell
2010-2011  Matt Schnackenberg
2011-2012  Matt Schnackenberg

Emeritus Faculty

Marshall Ager, B.S., Assistant Professor, Civil Engineering and Geomatics, 1977-2004.


Judy Bronkey, M.A., Associate Professor, Director, Ethnic and International Student Services, 1969-1995.


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.

Jesse Crabtree, Assistant Professor, Civil Engineering Technology, 1947-1976.

G. Gene Culver, B.S., Associate Professor, Associate Director, Geo-Heat Center, 1960-1995.

W.M. Douglass, M.Ed., Professor and Dean of Administration, 1954-1983.


David Dyrud, Ph.D., Professor of Communication, 1975-2003.


Jeanne Ford, R.N., Assistant Professor, Administrative Director, Student Health Service, 1964-1983.


Polly Francis, M.S., Professor, Mathematics, 1990-2009.


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.


Charles E. Harris, M.S., Professor, Department of Extended Studies and Summer Session, 1976-1996.


Margaret Huntley, Professor, Management, 1975-2006.

Herbert H. Jolliff, M.S., Professor and Department Chair, Mathematics, 1968-1999.


Cecil R. Lake, M.Ed., Professor, Director of Planning and Research, 1949-1986.

John W. Lund, Ph.D., Professor, Civil Engineering, and Director, Geo-Heat Center, 1967-1999.


Richard M. Moore, Ph.D., Professor and Director, Portland Operations, 1972-1997.


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Edward Silling, Ph.D., Professor, Communication Department, 1975-2003.


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Pauline Stuedli, Assistant Professor, Dental Hygiene, 1977-1999.


Larsen S. Svanevik, Ph.D., Professor, Natural Sciences, 1966-1997.


David J. Vargas, M.S.C.E., Associate Professor, Civil Engineering Technology, 1985-1997.


David C. Warner, Ph.D., Professor, Natural Sciences, 1984-2002.

Gary E. Wehr, M.A., Professor, Department Chair, General Studies, 1969-1996.


Raenelle J. Zumbo, M.S., Assistant Professor, Communication, 1976-2008.
Emeritus Administration

Mary J. Bradford, M.S., Aquatics Director/Softball Coach, 1975-2004

Paula Cloud, Executive Secretary to the President, 1997-2008.

Joemae Cox, M.S., Distance Education, 1994-2010.

Nancy K. Cox, Executive Secretary to the President, 1961-1999.


Martha Anne Dow, Ph.D., President, 1998-2007.

Christian H. Eismann, Ph.D., Professor and Dean of Academic Affairs, 1986-1996.

Sharon Hanson, Media Services Coordinator, Information Technology, 1986-2009.


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.


Beth Murphy, M.S., Assessment, 1990-2010.

J. Samuel Murphy, CFLAT Specialist, Student Services, Assistant Professor, B.A. (1973), East Carolina University; M.S. (1979), Gallaudet University; Ph.D. (1986), University of Arizona.


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