

**Oregon Institute of Technology
Medical Imaging Technology Department
Vascular Technology Program Assessment
2017-2018**

I. Introduction

The Vascular Technology Program officially began in 1992 and is one of the five current on-campus Medical Imaging programs at Oregon Institute of Technology. Enrollment trends from 2002 – 2017 have varied from 50 to 89 students per year in the program. By fall term of 2017, there were 57 students enrolled in the program. For the class of 2017, retention was 85% and attrition was 15%

- The number of students who entered the VT program for the cohorts of graduating classes from 1994 to 2017 was 600. Of those 600 students, 461 have graduated.
- Overall retention has therefore been 76.8% and attrition has been 23.2%
- Core VT program course failure rates per the 600 students accepted were as follows:
 - 7.8% or 47 failures in MIT 231, Sonographic Physics & Instrumentation I
 - 3.3% or 20 failures in MIT 232, Sonographic Physics & Instrumentation II
 - 3.2% or 19 failures in VAS246, Peripheral Arterial Disease
 - 2.5% or 15 failures in VAS420, Externship.
 - 1.8% or 11 failures in BIO 220, Cardiovascular Physiology.
 - 1.6% or 10 failures in VAS365. Abdominal Disease
 - 0.8% or 5 failures in PHY217, General Physics.
 - 0.8% or 5 failures in VAS245, Peripheral Venous Disease
 - 0.8% or 5 failures in VAS214, Vascular Anatomy
 - 0.5% or 3 failures in VAS225, Patient Management Practices
 - 0.5% or 3 failures in VAS366, Special Circulatory Problems
 - 0.3% or 2 failures in VAS 335, Radiographic Vascular Anatomy
- Combining the 600 students with the students accepted into the graduating classes of 2018, 2019 and 2020, a total of 661 students have been accepted into the VT program by the Fall term of 2017.

The Job placement for the class of 2017 at six months was 88.4%. The average salary for the graduates of the classes of 2015, 2016 & 2017 was \$61,000 per year.

II. Program Purpose/Mission Statement, Goals, Objectives and Student Learning Outcomes

The Vascular Technology faculty met one time formally and multiple times since from the fall 2007 to fall 2017 and have consistently agreed to adopt the student learning outcomes as suggested by the programmatic accrediting body known as the, "Joint Review Committee on Education in Diagnostic Medical Sonography." The final version is listed below.

Closing the Loop items: from the faculty meeting conducted spring term 2016, planned improvements from previous assessment include:

Vascular Technology Program Purpose/Mission Statement

The Bachelor of Science program in Vascular Technology provides students with the knowledge, clinical skills and behaviors to become competent vascular technology professionals.

Program Goal(s)

"To prepare competent entry level vascular technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains."

Program Educational Objectives

1. The program prepares students to utilize diagnostic techniques, sound judgment and good decision making to provide patient services.
2. The program communicates the importance of becoming credentialed in the profession of vascular technology.
3. The program prepares students who think critically, communicate effectively and exemplify professional ethics.
4. The program conveys the importance of becoming life-long learners and responsible citizens.

Student Learning Outcomes

The students will demonstrate:

1. the ability to communicate effectively in oral, written and visual forms.
2. the ability to work effectively in teams.
3. an ability to provide basic patient care and comfort.
4. professional judgment and discretion including ethics.
5. knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal vascular anatomy.
6. knowledge and understanding of vascular physiology, pathology, and pathophysiology.
7. knowledge and understanding of vascular physical principles and instrumentation.
8. knowledge and understanding of clinical vascular diagnostic procedures and testing
9. an understanding of diverse cultural and humanistic traditions in the global society.

Additional Student Learning Opportunities

Students in the Vascular Technology Program are given the opportunity to every other year attend the UC Davis conference in Sacramento, CA. Students are also encouraged to attend the Annual Society of Vascular Ultrasound conferences when held on the West Coast or near their extern sites during the student's senior year.

III. Three-Year Cycle for Assessment of Student Learning Outcomes

The following are the nine main outcomes which will be assessed at a rate of three each per year on a three-year cycle, as listed in Table #1 below.

Vascular Technology Student Learning Outcomes Assessment Schedule	2016 - 2017	2017 - 2018	2018 – 2019
1. The student will demonstrate the ability to communicate effectively in oral, written and visual forms.			X
2. The student will demonstrate the ability to work effectively in teams.			X
3. The student will demonstrate an ability to provide basic patient care and comfort.			X
4. The student will employ professional judgment, and discretion including ethics		X	
5. The student will demonstrate knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal vascular anatomy		X	
6. The student will demonstrate knowledge and understanding of vascular physiology, pathology, and pathophysiology.	X		
7. The student will demonstrate knowledge and understanding of vascular physical principles and instrumentation.	X		
8. The student will demonstrate knowledge and understanding of clinical vascular diagnostic procedures and testing	X		
9. The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.		X	

Table #1, Assessment cycle.

IV. Summary of 2016-17 Assessment Activities

A. Student Learning Outcome #6: The student will demonstrate knowledge and understanding of vascular physiology, pathology, and pathophysiology.

The Vascular Technology faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome in the Vascular Technology courses can be found in Appendix A, Student Learning Outcome-Course Matrices Table A2.

Direct Assessment #1

The faculty assessed this outcome with 16 students in the VAS 365 Abdominal Disease course during fall term 2017, using the final practical patient history and physical and a case study. The faculty rated the proficiency of students using the performance criteria described in Table #2 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results - % with Target. or higher
Evaluates evidence from patient history and physical	Final Practical	100% scale per 5 choices used	80% with 80% or higher	100%
Performs appropriate physiological tests	Final Practical	100% scale per 5 choices used	80% with 80% or higher	100%
Correctly identifies patient pathology	Final Case Study	100% scale per overall case study	80% with 70% or higher	98%
Extends/ Identifies protocols as required by findings	Final Case Study	100% scale per overall case study	80% with 70% or higher	100%

Table #2.

Students performed at or above expectations in all categories in the table above. In 2007 and 2011 when the assessments for PSLO #6 were conducted, students scored 54% and 76% respectively under the category of “Correctly identifies patient pathology.” For 2014, the students then scored 100%. The corrective action as a result of the data for both previous years was stated as, “more pathology could be incorporated into the didactic portion of the course; however, this may not improve results as patients with pathologies are not available on campus to serve as models.” The vascular faculty agreed that just being aware and having emphasized the importance of pathology identification has been what was just as effective as having included a greater volume of possible pathologies students could be made aware of.

As a result of the data, and what has been learned as a result of conducting this assessment, the vascular faculty agreed to maintain the increased level of emphasizing the importance of pathology identification in all VAS prefix courses.

Direct Assessment #2

The faculty also assessed this outcome with 13 students in the VAS 420 Extern course from the 2017–2018 academic year using random student competencies as assessed by industry. The faculty rated the proficiency of students using the performance criteria described in Table #3 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Evaluates evidence from patient history	Student Competency Evaluation #6, a	100 point Scale	80% with a score of 85% or higher	100%
Evaluates physical exam and evaluates results	Student Competency Evaluation #6, b	100 point Scale	80% with a score of 85% or higher	92.3%
Performs appropriate physiological tests	Student Competency Evaluation #6, c.	100 point Scale	80% with a score of 85 or higher	92.3%
Correctly identifies patient pathology	Student Competency Evaluation #6,d.	100 point Scale	80% with a score of 85 or higher	84.6%
Extends/ Identifies protocols as required by findings	Student Competency Evaluation #6, e.	100 point Scale	80% with a score of 85 or higher	92.3%

Table #3..

Students performed above expectations in all categories. For vascular program students, knowledge and understanding of vascular physiology, pathology, and pathophysiology can be only taught on a theoretical basis as no actual patients can be evaluated on campus. This theoretical knowledge is heavily put into practice while students are on extern working on actual patients. This process over the years has obviously met with the approval of the vascular industry as this assessment activity is rated by the same industry.

As a result of the data, the vascular faculty had agreed to maintain the current high degree of difficulty required for PSLO #6 on campus (as mentioned above) and for the extern experience.

Indirect Assessment #1

The faculty assessed this outcome with 17 students in VAS 420 Extern course using student 2016-2017 exit surveys which asked them to rate how well the OIT Vascular Technology program and their extern site prepared them for this learning outcome #6. The student rated their proficiency using the performance criteria described in Table #4 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Student rating of how OIT prepared them for outcome #6	2016–2017 Extern Exit Survey	1 – 4 Scale	80% with a score of 3.0 or better	100%
Student rating of how their extern site prepared them for outcome #6.	2016–2017 Extern Exit Survey	1 – 4 Scale	80% with a score of 3.0 or better	100%

Table #4.

Students rated both Oregon Tech and their extern sites above expectations for both performance criteria. Sometimes while on extern, some students would like their learning style to be accommodated. When the extern site determines a different learning style will have a better long term result, the alternative style will be engaged. This sometimes is not well received by the student and they will consequently provide a lower rating for PSLO #6 for their site as a result.

As a result of the data however, the Oregon Tech vascular program will continue to compare student satisfaction for PSLO #6 in concurrent years.

B. Student Learning Outcome #7: The student will demonstrate knowledge of vascular physical principles and instrumentation.

The Vascular Technology faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome in the Vascular Technology courses can be found in Appendix A, Student Learning Outcome-Course Matrices Table A3.

Direct Assessment #1

The faculty assessed this outcome with 25 students in the MIT 231 Sonographic Principles and Instrumentation I course during winter term 2018, using final exam questions. The faculty rated the proficiency of students using the performance criteria described in Table #5 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Demonstrate understanding of the nature of sound waves	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	96%
Interpret interaction of ultrasound with various media	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	84%
Identify component function of the transducer	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	88%
Apply physical principles to optimize ultrasound images	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	76%

Table #5.

Students performed at or above expectations in all categories. The Ultrasound Physical Principles & Instrumentation taught in this course are heavily conceptually and mathematically based. The instructor for this course has worked tirelessly to make these concepts understandable and yet maintain the rigor required to pass the registry exam every vascular technologist must pass to obtain their credentials through the American Registry of Diagnostic Sonographers. The national pass rate for this exam hovers between 54% and 56%. The pass rate for the Vascular Technology program graduates of the class years 2013 to 2017 was 100% for this registry exam.

As a result of the data, the vascular faculty had agreed the MIT 231 course continues to meet and exceed the demands of the Vascular program. Although the MIT 231 course is the reason for a fair amount of attrition in the Vascular program, the faculty agreed the same degree of rigor should be maintained.

Direct Assessment #2

The faculty also assessed this outcome with 13 students in the VAS 420 Extern course from the 2017-2018 class using random student scanning competencies where this outcome was assessed by industry. The faculty rated the proficiency of students using the performance criteria described in Table #6 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Selects appropriate technique(s) for examination	Student Competency Evaluation #3, a.	100% Scale	80% with a score of 85% or better	84.6%
Adjusts instrument controls to optimize image quality.	Student Competency Evaluation #3, b.	100% Scale	80% with a score of 85% or better	92.3%
Takes appropriate measurements	Student Competency Evaluation #3, c.	100% Scale	80% with a score of 85% or better	92.3%
Recognizes and compensates for acoustic artifacts	Student Competency Evaluation #3, d.	100% Scale	80% with a score of 85% or better	92.3%
Minimizes patient exposure to acoustic energy.	Student Competency Evaluation #3, e.	100% Scale	80% with a score of 85% or better	92.3%

Table #6.

Students performed above expectations in all categories listed above. Although the Ultrasound Physical Principles & Instrumentation taught in this course was heavily conceptually and mathematically based, the goal was to teach students how to operate the ultrasound equipment with maximum proficiency. As evidenced by the scores above, industry rated vascular extern students quite highly in the proficient use of ultrasound equipment.

As a result of the data, the vascular technology faculty had agreed to maintain the high standards required for on campus (MIT 231 & 232) courses. The professor for both courses was commended for the unique graphics adopted to make difficult concepts easier to understand and was encouraged to develop or discover more through Internet sources.

Indirect Assessment #1

The faculty assessed this outcome with 17 students in VAS 420 Extern course using student 2016-2017 exit surveys which asked them to rate how well the OIT Vascular Technology program and their extern site prepared them for learning outcome #7. The students rated their proficiency using the performance criteria described in Table #7 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target Av. or higher
Student rating of how OIT prepared them for outcome #7.	Exit Survey	% scale per category used	80% with a score of 3.0 or better	100%
Student rating of how their extern site prepared them for outcome #7.	Exit survey	% scale per category used	80% with a score of 3.0 or better	94.1%

Table #7

Students rated both Oregon Tech and their extern sites above expectations for performance criteria. As evidenced by the results of Table #10, students do highly value the knowledge they receive at Oregon Tech and during their extern experience.

As a result of the data, the vascular program will continue to compare student satisfaction for PSLO #7 in concurrent years.

C. Student Learning Outcome #8. The student will demonstrate knowledge and understanding of clinical vascular diagnostic procedures and testing.

The Vascular Technology faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome in the Vascular Technology courses can be found in Appendix A, Student Learning Outcome-Course Matrices Table A3.

Direct Assessment #1

The faculty assessed this outcome using the ISLO Critical Thinking assignment presented to 15 students in the VAS 367 course, Spring term, 2018. A rubric designed to evaluate a diagnostic midterm lab case study rated student performance on a 1-0 point scale. The faculty rated the proficiency of students using the rubric the assignment in Table #8 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Accurately interprets ultrasound spectral waveforms	VAS 367 midterm case study quest. 1,3	1 – 10 Scale	80% with a score of 6 or higher	80%
Considers all possible causes of patient vascular condition from history and physical	VAS 367 midterm case study question 2	1 – 5 Scale	80% with a score of 3 or higher	80%
Ability to predict hemodynamic changes based on pressure differentials	VAS 367 midterm case study question 4	1 – 5 Scale	80% with a score of 3 or higher	87%

Table #8

Students performed at or slightly above expectations for PSLO #8 in all categories. The case study used for this assessment activity absolutely pushed student ability to relate ultrasound generated hemodynamic waveforms with pathology present in more than one location. This evaluation requires students to not only remember what has been taught in VAS 367, but also most of the previous VAS prefix courses. As one would see, expectations currently are for only a 60% threshold.

In an effort to raise the threshold to 80%, the vascular faculty had agreed to emphasize more routine case study consideration in all VAS prefix courses.

Direct Assessment #2

The faculty also assessed this outcome with 13 students in the VAS 420 Extern course from the 2017-2018 class using random student scanning competencies where this outcome was assessed by industry. The faculty will rate the proficiency of students used in the performance criteria described in Table #9 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Correlates Patient History to Findings	Student Competency Evaluation #8, a.	1 – 100 Scale	80% with a score of 85% or higher	84.6%
Considers all Possible Causes of Symptoms	Student Competency Evaluation #8, b.	1 – 100 Scale	80% with a score of 85% or higher	84.6%
Accurately Interprets Spectral Waveforms	Student Competency Evaluation #8, c.	1 – 100 Scale	80% with a score of 85% or higher	84.6%
Is Able to Answer the Clinical Question	Student Competency Evaluation #8, d.	1 – 100 Scale	80% with a score of 85% or higher	84.6%
Ability to Write an Actual Preliminary Report	Student Competency Evaluation #8, e.	1 – 100 Scale	80% with a score of 85% or higher	100%

Table #9,

Students performed near or slightly above expectations for PSLO #8 in all categories.

Because students in the vascular program were not able to assess real patients on the Oregon Tech campus, how well they were able to relate knowledge and understanding of clinical vascular diagnostic procedures and testing with actual patient pathology was really put to the test while on extern. The ultimate evaluation of student ability for this most crucial of skills was conducted by professionals in the field is fairly high. Although rating of these skills waxes and wanes from year to year, the faculty was actually most content with these scorings.

Indirect Assessment #1

The faculty assessed this outcome in VAS 420, from the student 2016-17 exit surveys of 17 students, asking them to rate how well the OIT Vascular Technology program and their extern site prepared them for this learning outcome #8. Student rating is described in Table #10 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target Av. or higher
Student rating of how OIT prepared them for outcome #8.	Exit Survey	% scale per category used	90% with a score of 3.0 or better	94.1%
Student rating of how their extern site prepared them for outcome #8.	Exit survey	% scale per category used	90% with a score of 3.0 or better	94.1%

Table #10, assessment results for SLO #8 in VAS 420, 2012-13 exit surveys

Students rated themselves at or above expectations in rating how well they were prepared for PSLO #8 from both Oregon Tech and their clinical extern sites.

Over the years, the vascular faculty was sometimes dismayed at how didactically, students would not fully understand the concepts of hemodynamics as they related to patient pathology while students were on campus. The faculty has since concluded there are some aspects of these concepts not fully understood until applied with real living patients. As mentioned above, the vascular faculty agreed to maintain the same levels of high expectations for students in the future.

D. Essential Student Learning Outcome: Inquiry & Analysis

The faculty assessed this outcome in VAS 420, from the student 2017-18 case study discussion and conclusion sections of 10 randomly selected students. Student were rated according to a rubric provided by the communication department and is described in Table #11 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Identify	Provided rubric	1 – 4 Scale	80% with a score of 3 or higher	100%
Investigate	Provided rubric	1 – 4 Scale	80% with a score of 3 or higher	100%
Support	Provided rubric	1 – 4 Scale	80% with a score of 3 or higher	93.3%
Evaluate	Provided rubric	1 – 4 Scale	80% with a score of 3 or higher	100%
Conclude	Provided rubric	1 – 4 Scale	80% with a score of 3 or higher	100%

Table #11 ESLO Inquiry & Analysis results

Students performed at or slightly above expectations for PSLO #8 in all categories.

Although the vascular faculty are many times frustrated by student reluctance to cite sources in the APA format we require, our students perform above average work in regard to inquiry and analysis. Perhaps this is driven by the fact that student has reporting on an actual living and breathing patient who the student did indeed perform an ultrasound vascular exam on. We the faculty actually look forward to reading the discussions sections as we too learn from the extern students' research. As a result of this assessment activity, the vascular faculty has determined the level of rigor required for extern case studies will be maintained.

V. Evidence of Student Learning

During the 2017-18 academic year, the program faculty formally assessed the student learning outcomes summarized below. Additional details on these assessment activities can be found in the attached assessment report and in department records.

Student Learning Outcome #6: The student will demonstrate knowledge and understanding of vascular physiology, pathology, and pathophysiology.

Strengths: Senior extern students performed above expectations for all performance criteria, including evaluates patient history & physical, performs appropriate physiological tests, correctly identifies patient pathology and extends/identifies protocols as required by findings.

Areas needing improvement: None at this time.

Student Learning Outcome #7: The student will demonstrate knowledge of vascular physical principles and instrumentation.

Strengths: Senior extern students performed above expectations for all performance criteria, including selection of appropriate techniques for the examination, adjusts controls to optimize image quality, takes appropriate measurements, recognizes and compensates for acoustic artifacts and minimizes patient exposure to acoustic energy. Although student performance while in the on-campus physics MIT 232 course was not optimal, the practical application of the difficult concepts during extern completes the picture to the overwhelming satisfaction of industry.

Areas needing improvement: None at this time.

Student Learning Outcome #8. The student will demonstrate knowledge and understanding of clinical vascular diagnostic procedures and testing.

Strengths: Both industry and students rated the training of this outcome fairly high. No other outcome tested what the vascular faculty regarded as a critical thinking skill than the activity of answering the clinical question as assessed in the second direct activity mentioned above. Although this ability was honed and polished while the vascular students encountered their extern experience, the robust didactic training while on-campus appeared to be most sufficient.

Areas needing improvement: None at this time.

VI. Changes Resulting from Assessment.

As a result of assessment activities conducted in 2010 to present for PSLO #1, it was determined students need to both write preliminary reports better and to communicate better orally to doctors when on extern. In addition, the vascular faculty had agreed there should be more of a requirement for visual communication as well. In the junior level courses the faculty had included more requirements of preliminary report writing in conjunction with presentations of case studies housed on-campus. And interestingly enough from the Class of 2018 exit evaluations, some of the students actually made comment to increase requirements for all components of preliminary report writing.

As a result of the assessment activities conducted in 2011 for PSLO #8, it was determined to have greater dialogue with students both in the sophomore orientation and in the VAS 388 Extern Orientation course regarding the fact that exposure to vascular pathology on campus would be non-existent other than in theory and observation at Sky Lakes Medical Center. The bulk of exposure to pathology would be engaged while on extern. Students in sophomore orientation had been informed of this better and greater dialogue had been engaged in the VAS 388 course. Some students responded with a greater level of fear and apprehension for the process and yet some seemed to feel the process would not be a problem. Although the value of this dialogue was hard to assess, while the faculty was making extern visitations, students did seem a bit more at ease with the process.

VII. Qualitative Assessment:

Although quantitative assessment has been the most paramount charge in the development of assessment criteria, the qualitative assessment recommendations the vascular faculty have received from our industry affiliate extern professionals was regarded highly. Some of those recommendations include:

- Scanning skills/technique – Each had bad habits that were hard for them to break. Considering they have had two years of access to machines, it is hard to understand why each struggled with things like:
 - Obtaining and maintaining a good, full long axis image on a typical straight segment of vessel.
 - Demonstrating they can keep the probe stable while walking the Doppler through a segment.
 - Holding the probe properly. All came in scanning with a grip at the butt end of the probe instead of near the base where they could better stabilize the probe to help with something like item 2 above.
 - Heel toeing the probe to improve image or better align Doppler.
 - Transitioning from sagittal to transverse without putting both hands on the probe.
- Physiologic testing
 - Unable to readily locate and/or optimize Doppler signals in vessels at the ankle/foot.

- Unable to locate and optimize CFA and Pop Doppler signals.
- Cuff wrapping. Inconsistency from limb to limb and one level to the next.
- Pressure measurement. Challenges staying on a vessel and slowly releasing cuff pressure (manual sphygmo) for accurate measurement.
- PVR basics. Understanding of the waveforms as well as understanding that, unlike with the Doppler waveform analysis, you have to have gain settings the same to compare PVR waveforms accurately.
- Digit assessment. Similar issues to above, individuals struggle with releasing cuff pressure in a slow and smooth manner to get an accurate pressure. We do toes on probably 90% of our ABI and SEGS exams.
- Protocol familiarity
 - I know you can't force this upon students, but I have stressed it to each of the last incoming students that they should familiarize themselves with some of the basic protocols that we will be focusing on during the first term (Lower venous, carotid, and ABI/physiologic testing).

This information had been reviewed and many changes made as a result in the vascular program that were never reported in quantitative assessment. In this report however, the vascular faculty is convinced it should at least be mentioned.

Appendix A1

SLO #6: The student will demonstrate knowledge and understanding of vascular physiology, pathology, and pathophysiology.

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Physio	I	BUS 317	Health Care		VAS 420	Extern	E
	BIO 346	Patho Physio	I	SPE 321	Sm Group				
	PHY 217	Phy of MI		VAS 337	Survey Echo				
	VAS 214	Vas Anatomy		VAS 365	Abd Vas	I E			
				Soc Sci	Soc Sci elective				
Win	BIO 347	Patho Phys II	I	BUS 316	TQ in Health		VAS 420	Extern	E
	MIT 231	Vas Prin Inst I		CHE 210	Clin Pharm				
	VAS 245	Peri Ven Disease	I E	VAS 366	Circ Probs	R			
	VAS 335	Radio Vas Anat		VAS 375	Abd Sono				
				HUM Elec	Hum elective				
Spr	MIT 232	Vas Prin Inst II		VAS 367	Cerebro Disease	R	VAS 420	Extern	E
	VAS 225	Patient Mgmt		VAS 385	Vas Lab Mgmt				
	VAS 246	Peri Art Disease	I E	VAS 388	Extern Orient				
	WRI 227	Tech Report		COM Elec	COM elective				
	Soc Sci	Soc Sci elective		HUM Elec	HUM elective				

Appendix A2

SLO #7: The student will demonstrate knowledge of vascular physical principles and instrumentation.

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Physio		BUS 317	Health Care		VAS 420	Extern	E
	BIO 346	Patho Physio		SPE 321	Sm Group				
	PHY 217	Phy of MI		VAS 337	Survey Echo	R			
	VAS 214	Vas Anatomy		VAS 365	Abd Vas	R			
				Soc Sci	Soc Sci elective				
Win	BIO 347	Patho Phys II		BUS 316	TQ in Health		VAS 420	Extern	E
	MIT 231	Vas Prin Inst I	I E	CHE 210	Clin Pharm				
	VAS 245	Peri Ven Disease	R	VAS 366	Circ Probs	R			
	VAS 335	Radio Vas Anat		VAS 375	Abd Sono				
				HUM Elec	Hum elective				
Spr	MIT 232	Vas Prin Inst II	I E	VAS 367	Cerebro Disease	R	VAS 420	Extern	E
	VAS 225	Patient Mgmt		VAS 385	Vas Lab Mgmt				
	VAS 246	Peri Art Disease	R	VAS 388	Extern Orient				
	WRI 227	Tech Report		COM Elec	COM elective				
	Soc Sci	Soc Sci elective		HUM Elec	HUM elective				

Appendix A3

SLO #8. The student will demonstrate knowledge and understanding of clinical vascular diagnostic procedures and testing.

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Physio	I E	BUS 317	Health Care		VAS 420	Extern	R E
	BIO 346	Patho Physio		SPE 321	Sm Group				
	PHY 217	Phy of MI		VAS 337	Survey Echo				
	VAS 214	Vas Anatomy	I E	VAS 365	Abd Vas	I E			
				Soc Sci	Soc Sci elective				
Win	BIO 347	Patho Phys II		BUS 316	TQ in Health		VAS 420	Extern	R E
	VAS 210	Vas Prin Inst I		CHE 210	Clin Pharm				
	VAS 245	Peri Ven Disease	I E	VAS 366	Circ Probs	I E			
	VAS 335	Radio Vas Anat		VAS 375	Abd Sono				
				HUM Elec	Hum elective				
Spr	VAS 211	Vas Prin Inst II		VAS 367	Cerebro Disease	I E	VAS 420	Extern	R E
	VAS 225	Patient Mgmt		VAS 385	Vas Lab Mgmt				
	VAS 246	Peri Art Disease	I E	VAS 388	Extern Orient				
	WRI 227	Tech Report		COM Elec	COM elective				
	Soc Sci	Soc Sci elective		HUM Elec	HUM elective				

A3, SLO#8, ISLO: Course Matrix