2020-2021 Assessment Report

Vascular Technology Program
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Vascular Technology Program

Bachelor of Science Degree

Section 1 - Program Mission, Objectives & Learning Outcomes

Oregon Tech Mission

Oregon Institute of Technology, an Oregon public university, 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 Oregonians and provides information and technical expertise to state, national and international constituents.

Core Theme 1: Applied Degree Programs

Oregon Tech offers innovative and rigorous applied degree programs.

The teaching and learning model at Oregon Tech prepare students to apply the knowledge gained in the classroom to the workplace.

Core Theme 2: Student and Graduate Success

Oregon Tech fosters student and graduate success by providing an intimate, hands-on learning environment, which focuses on application of theory to practice. The teaching and support services facilitate students' personal and academic development.

Core Theme 3: Statewide Educational Opportunities

Oregon Tech offers statewide educational opportunities for the emerging needs of Oregon's citizens. To accomplish this, Oregon Tech provides innovative and rigorous applied degree programs to students across the state of Oregon, including high-school programs, online degree programs, and partnership agreements with community colleges and universities.

Core Theme 4: Public Service

Oregon Tech will share information and technical expertise to state, national, and international constituents.

Program Mission

The Bachelor of Science program in Vascular Technology provides students with a broad base of knowledge, hands-on clinical skills and professional behaviors to become competent life-long Learners as Registered Vascular Technologists to the State of Oregon and to hospitals and vascular labs across the Country.

Program Alignment with Oregon Tech Mission & Core Themes

The Oregon Tech Vascular Technology program constantly seeks new ways to implement the program's maximum credit hour courses in a dedicated vascular studies accredited degree through hands-on lab practice and simulation to provide vascular industry with the highest quality graduates anywhere in the Nation.

Section 2 - Program Description and History

The Vascular Technology Program officially began in 1992 and is one of the five current on-campus Medical Imaging programs at Oregon Tech. Enrollment trends from 2002 – 2020 have varied from 50 to 89 students per year in the program. By fall term of 2020, there were 59 students enrolled in the program. For the class of 2020, retention was 80.1% and attrition was 19.9%

- The number of students who entered the VT program for the cohorts of graduating classes from 1994 to 2020 was 661. Of those 661 students, 509 had graduated.
- Overall retention has therefore been 78.0% and attrition has been 22.0%

- Core VT program course failure rates per the 635 students accepted were as follows:
    - 8.0% or 53 failures in MIT 231, Sonographic Physics & Instrumentation I
    - 3.2% or 21 failures in MIT 232, Sonographic Physics & Instrumentation II
    - 2.9% or 19 failures in VAS246, Peripheral Arterial Disease 1
    - 2.4% or 16 failures in VAS420, Externship.
    - 2.4% or 16 failures in BIO 220, Cardiovascular Physiology.
    - 1.8% or 12 failures in VAS365. Abdominal Disease
    - 1.1% or 7 failures in VAS214, Vascular Anatomy
    - 0.8% or 5 failures in PHY217, General Physics.
    - 0.8% or 5 failures in VAS245, Peripheral Venous Disease
    - 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 661 students with the students accepted into the graduating classes of 2021, 2022 and 2023, a total of 725 students have been accepted into the VT program by the Fall term of 2020.

The Job placement for the class of 2019 at six months was 100%. The median salary for the graduates of the classes of 2017, 2018 & 2019 was $74,880 per year.

American Registry of Diagnostic Medical Sonography (ARDMS) Pass Rates, Employment Rates and Retention/Attrition Rates

Graduating Class of:	2016	2017	2018	2019	2020
Registry Pass Rates					
ARDMS Pass rate for Sonography Physics and Instrumentation*	100% (14/14)	100% (17/17)	100% (13/13)	100% (13/13)	100% (20/20)
ARDMS pass rate for General Vascular*	100% (14/14)	100% (17/17)	100% (13/13)	100% (13/13)	95% (19/20)
Employment Placement					
Employment within first 6 months of graduation	92.8% (13/14)	88.2% (15/17)	100% (13/13)	100% (14/14)	100% (20/20)
Retention/Attrition					
Retention	70%	85%	76.50%	77.80%	80.5%
Attrition	30%	15%	23.50%	22.20%	19.5%

*Pass rates only apply to those student who sat for registry that calendar year

Table 1

Program Enrollment

Program Enrollment - Head Count					
	2016	2017	2018	2019	2020
Sophomores	19	24	20	20	21
Juniors	17	16	15	13	15
Seniors	14	17	13	14	20
Total	50	57	48	47	57

Table 2

Survey Student Quotes from the Exit Surveys & Evaluations

Name 3 strengths of the program:

1. Giving us a deep understanding of why everything works the way it does instead of just remembering it.
2. Ample time working in the field before graduation, so by the time graduation comes around it isn't an adjustment to continue working.
3. Giving us connections to collaborate with other technologists or professionals in our field.

Suggestions that would help to better prepare future graduates

The program is rough and tough but once you make it through, you'll be thankful

Evaluation Comments

- Mr. Caster is a great teacher and adapted well to having to make this an online course!
- Mr Caster has always been someone you can count on. His goal has always very clearly been to educate, support, and encourage the students. He will always hold a place in our lives, and I respect him in many ways.
- It is nice to have information in advance about what is expected of us while on extern. I wish we could have taken it in the classroom setting, but Mr. Caster has done a great job making do with what we have to do.
- I feel ready and that is all that matters

Industry Relationships:

Oregon Tech's Vascular Technology program is affiliated with the following 2018-19 industry partners:

Peoria Vein Clinic, Peoria, IL
Arizona Doppler Specialists, Phoenix, AZ
Cedar-Sinai, Los Angeles, CA
Clevleand Clinic, Cleveland, OH
Franciscan Vascular Associates Tacoma
Hoag Heart and Vascular Institute, Long Beach, CA
James A. Haley Veteran's Hospital, Tampa, FL
Lake Washington Vascular Lab, Bellevue, WA
Milton S. Hershey Medical Center, Hershey, PA
Oregon Health & Sciences University Vascular Lab, Portland, OR
Oregon Heart & Vascular Institute Vascular Lab, Eugene, OR
Pacific Vascular, Inc., Bothell, WA
PeaceHealth Thoracic & Vascular Surgery
Providence Medford Vascular Lab, Medford, OR
Providence Medical Group Spokane Vascular Lab, Spokane, WA
Providence St. Vincent's, Portland, OR
Quality Vascular Imaging, Inc., Venice, FL
Renown Regional Medical Ctr. Vascular Lab, Reno, NV
Salem Hospital Vascular Lab, Salem, OR
Shasta Region Medical Ctr. Vascular Lab, Redding, CA
Specialists in Vascular Ultrasound, Inc., San Antonio, TX
Swedish Vascular Lab, Seattle, WA
St. Luke's Regional Medical Ctr. Vascular Lab, Boise, ID
University of California Davis Vascular Lab, Sacramento, CA
University of North Carolina Vasculr Lab, Chapel Hill, NC
University of Utah Medical Ctr. Vascular Lab, Salt Lake City, UT
University of Vermont Fletcher-Allen Health Care, Burlington, VT
University of Washington Medical Ctr. Vascular Lab, Seattle, WA

Section 3 – Program Student Learning Outcomes

Program Educational Objectives Students at the end of this course are able to:

1. Demonstrate diagnostic techniques, use sound judgment and good decision making to provide patient services.
2. Demonstrate great leadership skills in the field of vascular technology who contribute to the field on a local, regional or national level.
3. Synthesize and Analyze problems critically, communicate effectively and exemplify professional ethics.
4. Perform at a professional level and as lifelong learners and responsible citizens.

Programmatic Student Learning Outcomes

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

Origin and External Validation

The current set of program student learning outcomes originated from outcomes set forth by the vascular technology program's programmatic accrediting body known as the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS). The outcomes have remained consistent in JRC-DMS who has been the primarily external validation for the vascular technology program since it was accredited in 2015.

Changes

Although the vascular technology program was not accredited through JRC-DMS until 2015, the student learning outcomes put forth by JRC-DMS have been the same since the vascular technology program adopted them for assessment purposes in 2007. Therefore, there have been no recent changes to the current vascular technology program student learning outcomes.

Section 4 – Program Student Learning Outcomes Per Curriculum Map

F - Foundation
P - Practice
C - Capstone

Course	PSLO 1	PSLO 2	PSLO 3	PSLO 4	PSLO 5	PSLO 6	PSLO 7	PSLO 8	PLSO 9	ELSO 1 - Communication	ELSO 2 - Inquiry & Analysis	ELSO 3 - Ethical Reasoning	ELSO 4 - Quantitative Literacy	ELSO 5 - Teamwork	ELSO 6 - Diverse Perspectives
BIO 231					F										
CHE 101															
CHE 104															
MATH 111															
MIT 103															
BIO 232					F										
MATH 112															
WRI 121															
HUM															
SOC															
BIO 233					F										
BIO 200					F										
PSY 201/202/203															
SPE 111															
WRI 122															
PHY 217															
VAS 214					P		F	F			F		F		
BIO 220						F		F			F				
MIT 225			F	F					P			F			P
WRI 227	F									F					
BIO 346				F		F	F	F			F	F	F		
MIT 231							F						F		
VAS 246			F	P	P	F		F			F	P			
VAS 335															
MIT 232							P						P		
BIO 347						F									
VAS 245			P		P	P	P						P		
SPE 321	F	F								F				F	
VAS 375				P								P			
VAS 365	P		P	P	P	P	P	P	P	P	P	P	P		P
BUS 316, 317 OR 313															

Course	PSLO 1	PSLO 2	PSLO 3	PSLO 4	PSLO 5	PSLO 6	PSLO 7	PSLO 8	PLSO 9	ELSO 1 - Communication	ELSO 2 - Inquiry & Analysis	ELSO 3 - Ethical Reasoning	ELSO 4 - Quantitative Literacy	ELSO 5 - Teamwork	ELSO 6 - Diverse Perspectives
VAS 366	P			P	P	P	P	P	P	P	P	P	P		P
CHE 360															
VAS 337			P				P						P		
VAS 367			P	P	P	P	P	P	P		P	P	P		P
MIT 385	P	P								P				P	
VAS 388															
VAS 420	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

Table 3

Section 5 – Assessment Cycle

Vascular Technology Student Learning Outcomes Assessment Schedule	2020 -2021	2021 – 2022	2022 - 2023
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
ESLO #1 Communication		X	
ESLO #2 Inquiry & Analysis	X		
ESLO #3 Ethical Reasoning		X	
ESLO #4 Quantitative Literacy	X		
ESLO #5 Teamwork		X	
ESLO #6 Diverse Perspectives			X

Table 4

Section 6 – Assessment Activity

Activity: Throughout this assessment cycle the vascular faculty used minimal assessment rubrics. All the objectives of the program provides alignment with programmatic outcomes and mission.

Rubric: The activities were scored and evaluated by the vascular faculty separate from course grade. The rubrics provides illustration of the performance criteria, assessment methods, measurement scale, minimum acceptable performance, and results.

Sample: 15-20 students were used to complete each activity, which is 100% of the student cohort class. No special or unusual characteristics of the student population that should are noted.

Reliability: All vascular and MIT faculty score the activities separately if multiple scoring faculty were needed on certain activities. The averages were used to as a final score using the compiled data.

Multiple Sites: Measures are not used at all multiple sites/modes where program is offered, because the Klamath Falls campus is the only campus offering such program.

Performance Target: The results of our national registry have been $\geq$95% in the past 6 years, thus no performance targets have been modified.

Performance Level: Results are presented, and they directly relate to objectives. The desired results for objectives, are clearly presented, and were derived statistical analyses, as appropriate.

History of Results: Annual JRCDMS accreditation and 6 year reaccreditation validates the historical success of the Vascular program at Oregon Tech.

Faculty Discussion: All qualitative and quantitative data/information was provided to all program faculty, mode and details of communication at conclusion of our programmatic convocation meeting. In addition, the vascular program information shared with our clinical affiliates and advisory board members as meeting minutes.

Interpretation: A complete and clear narration and analysis of the assessment results were found in the vascular faculty, advisory board, and annual clinical instructors meeting minutes. Interpretations of results seem reasonable and at time no changes are needed programmatically.

Summary of 2020-2021 Assessment Activities

Student Learrning Outcome	*Assessment Method*	*Course*	*F - Foundation* *P – Practice* *C - Capstone*
PSLO # 6 – The student will demonstrate knowledge and understanding of vascular physiology, pathology and pathophysiology	**Direct Assessment Final Lab Practical performance and case study questions**	**VAS 365**	**Practice**
	Direct Assessment Extern Competency	**VAS 420**	**Capstone**
	Indirect Assessment Extern Survey	**VAS 420**	**Capstone**
PSLO # 7 - The student will demonstrate knowledge and understanding of clinical vascular diagnostic procedures and testing	**Direct Assessment Exam Questions- Multiple Choice**	**MIT 231**	**Foundation**
	Direct Assessment Extern Competency	**VAS 420**	**Capstone**
	Indirect Assessment Extern Survey	**VAS 420**	**Capstone**
PSLO # 8 - The student will demonstrate knowledge and understanding of clinical vascular diagnostic procedures and testing	**Direct Assessment Case Study "Discussion & Conclusion" Sections**	**VAS 420**	**Capstone**
	Direct Assessment Extern Competency	**VAS 420**	**Capstone**
	Indirect Assessment Extern Survey	**VAS 420**	**Capstone**

Table 5

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 on pages 6&7, Table #3 of this report.

Direct Assessment #1

The faculty assessed this outcome with 15 students in the VAS 365 Abdominal Disease course during fall term 2020, 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 #6 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 80% or higher	100%
Extends/ Identifies protocols as required by findings	Final Case Study	100% scale per overall case study	80% with 80% or higher	100%

Table 6

Students performed 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, 2017 and 220, 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 in VAS 420, from the 2020-2021 academic year, using randomly selected student competencies from 20 students where outcome #6 was assessed by industry. The faculty rated the proficiency of students used in the performance criteria described in Table #7 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	95%
Evaluates physical exam and evaluates results	Student Competency Evaluation #6, b	100 point Scale	80% with a score of 85% or higher	90%
Performs appropriate physiological tests	Student Competency Evaluation #6, c.	100 point Scale	80% with a score of 85 or higher	90%
Correctly identifies patient pathology	Student Competency Evaluation #6,d.	100 point Scale	80% with a score of 85 or higher	90%
Extends/ Identifies protocols as required by findings	Student Competency Evaluation #6, e.	100 point Scale	80% with a score of 85 or higher	90%

Table #7

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 in VAS 420, from the student 2019-20 academic year extern exit surveys of 20 students, asking them to rate how well the OIT Vascular Technology program and their extern site prepared them for learning outcome #6. Student rating is described in Table #8 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Student rating of how OIT prepared them for outcome #1.	Exit Survey	1 – 4 Scale	90% with a rating of 3 or higher	100%
Student rating of how their extern site prepared them for outcome #1.	Exit survey	1 – 4 Scale	90% with a rating of 3 or higher	95%

Table 8

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 on pages 6&7, Table #3 of this report.

Direct Assessment #1

The faculty assessed this outcome with 16 students in the MIT 231 Songraphic Principles and Instrumentation I course during winter term 2021, using final exam questions. The faculty rated the proficiency of students using the performance criteria described in Table #9 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	81%
Interpret interaction of ultrasound with various media	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	69%
Identify component function of the transducer	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	31%
Apply physical principles to optimize ultrasound images	Final Examination Questionss	% scale of 4 questions used	75% with 3 or more questions correct	38%

Table 9

Students performed at an acceptable rate in one category and very unacceptable rates in the tree other categories. Before further comment, it is important to understand this course, MIT 231 is not only the "Gatekeeper" course for the vascular program, but for Oregon Tech's other two ultrasound programs as well. Also, the last time this course was assessed in 2018, all students had performed at acceptable rates. So, what had changed that caused the significant difference in student performance? The added component the vascular faculty had agreed was a significant variable was the fact that this course was taught in the height of campus restrictions due to the COVID pandemic. In essence, the students had demonstrated a sense of entitlement that an exception would be granted for them in this course for just having to engage all the COVID restrictions. At no point had the instructor or any other vascular faculty illuded to any hint of an exception being

made. 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 2020 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 and hopefully in the years beyond the COVID pandemic, student performance would once again return to acceptable rates.

Direct Assessment #2

The faculty also assessed this outcome with 20 students in the VAS 420 Extern course from the 2020-2021 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 #10 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	95%
Adjusts instrument controls to optimize image quality.	Student Competency Evaluation #3, b.	100% Scale	80% with a score of 85% or better	100%
Takes appropriate measurements	Student Competency Evaluation #3, c.	100% Scale	80% with a score of 85% or better	100%
Recognizes and compensates for acoustic artifacts	Student Competency Evaluation #3, d.	100% Scale	80% with a score of 85% or better	95%
Minimizes patient exposure to acoustic energy.	Student Competency Evaluation #3, e.	100% Scale	80% with a score of 85% or better	100%

Table 10

Students performed above expectations in all categories listed above. Although the Students were under the COVID distance delivery for the MIT 232 Songraphic Principles and Instrumentation II course, not only had these students been successful on campus, but on their extern experience as well

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 20 students in VAS 420 Extern course using student 2019-2020 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 #11 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	100%

Table 11

Students rated both Oregon Tech and their extern sites above expectations for performance criteria. As evidenced by the results of Table #11, students do highly value the knowledge they receive at Oregon Tech and during their extern experience from the MIT 231 & 232 courses.

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 on pages 6&7, Table #3 of this report.

Direct Assessment #1

The faculty assessed this outcome using the ISLO Inquiry & Analysis rubric used to evaluate the "Discussion" section of extern case studies generated by 20 students in the VAS 420 Extern course, 2020-2021. The faculty rated the proficiency of students using the rubric in Table #12 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
IDENTIFY	ESLO 2 Rubric	1 – 4 Scale	80% with a score of 3 or higher	95%
INVESTIGATE	ESLO 2 Rubric	1 – 4 Scale	80% with a score of 3 or higher	95%
SUPPORT	ESLO 2 Rubric	1 – 4 Scale	80% with a score of 3 or higher	100%
EVALUATE	ESLO 2 Rubric	1 – 4 Scale	80% with a score of 3 or higher	95%
CONCLUDE	ESLO 2 Rubric	1 – 4 Scale	80% with a score of 3 or higher	85%

Table #12

Students performed at or slightly above expectations for ISLO Inquiry & Analysis /PSLO #8 in all categories. The case study "Discussion" section used for this assessment activity absolutely pushed student ability to research available/current medical information as applicable to the actual patient pathology(ies) the students were able to scan or be a part of taking care of. Perhaps scoring a little lower, but within expectations, was the student's ability to sum everything eloquently in their conclusions.

As a result of the data, the vascular faculty had agreed to include further conversations in the VAS 388 Extern Orientation course to better sum conclusions in future case studies.

Direct Assessment #2

The faculty also assessed this outcome with 20 students in the VAS 420 Extern course from the 2020-2021 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 #13 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	95%
Considers all Possible Causes of Symptoms	Student Competency Evaluation #8, b.	1 – 100 Scale	80% with a score of 85% or higher	90%
Accurately Interprets Spectral Waveforms	Student Competency Evaluation #8, c.	1 – 100 Scale	80% with a score of 85% or higher	90%
Is Able to Answer the Clinical Question	Student Competency Evaluation #8, d.	1 – 100 Scale	80% with a score of 85% or higher	90%
Ability to Write an Actual Preliminary Report	Student Competency Evaluation #8, e.	1 – 100 Scale	80% with a score of 85% or higher	90%

Table #13

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 2019-20 exit surveys of 20 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 #14 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	100%
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	95%

Table 14

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.

Section 7 – Data-driven Action Plans: Changes Resulting from Assessment

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.

Section 8 – Closing the Loop: Evidence of Improvement in Student Learning.

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)."

To address these concerns from industry, 6 mini-practicals had been developed and implemented in the VAS 214 Vascular Anatomy Lab with extra emphasis in all vascular labs for the physiologic testing & protocol familiarity. The first student to have received the training will have been sent to the affiliate vascular that generated the above quoted concerns during the 2021-2022 extern academic year.