Oregon Tech
Medical Imaging Technology Department
Echocardiography Program
2019-2020 Assessment

I. Introduction

Oregon Tech's Bachelor of Science in Echocardiography degree is one of only a few B.S. Degree programs in echocardiography in the United States. Oregon Tech provides didactic instruction, clinical observations, and individual, hands-on training - including basic and advanced training in imaging skills needed *"To prepare competent entry-level adult cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains"*.

Students are required to complete a final 11-month clinical externship at specifically chosen echocardiography laboratories. Externship provides the hands-on training and patient load requirements necessary to meet the prerequisite requirements of the certifying board agency, the American Registry of Diagnostic Medical Sonographers (ARDMS), to be able to sit for the registry exam in adult echocardiography. Occasionally, a student may have the opportunity to complete additional directed clinical externship in pediatric echocardiography, and that, along with further clinical experience acquired in the month's post-graduation, be qualified to sit for the ARDMS pediatric echocardiography registry exam.

The first Oregon Tech cohort for Echocardiography began fall 2008, with 14 students, and additional cohorts of 17 students in the fall of 2009, 20 students in the fall of 2010, 20 students in the fall of 2011, 24 admitted fall 2012, 20 admitted fall 2013, 20 admitted fall 2014, 20 admitted fall 2015, 22 admitted fall 2016, 20 admitted fall 2017, 22 admitted fall 2018, and 22 in the fall 2019, which includes 2 that reinterred. An additional student from the 2018 cohort will join this cohort during Externship summer 2021. MIT fall 2020 enrollment in Echocardiography will add the latest cohort of 22 students, with one additional student pending reentering fall 2021.

Upon 2020 graduation, total current enrollment was 64 students, including those anticipated as being accepted for 2020-2021 reentry into the Echocardiography Program. All graduates known to have applied for registry exams through either ARDMS or CCI, have passed the Adult Echocardiography Registry, with a 100% first exam pass rate for the class of 2020. Several prior graduates have additionally passed and become registered in Pediatric Echocardiography, and Vascular Ultrasound. 98% of graduates (through the 2020 graduates) have worked or are working as cardiac sonographers, either per diem or in scheduled positions. Annual salaries reported varied from $62,000 to $87,000 for FT positions, excluding on-call wages.

One of the major goals of the Echocardiography program (along with Diagnostic Medical Sonography, and Vascular Technology) had been to obtain JRC-DMS/CAAHEP Programmatic Accreditation. The JRC-DMS self-study was submitted fall 2014, the JRC-DMS site visit occurred May 2015, and finalized submission of documentation for the accreditation process was completed by the end of June 2015. All three ultrasound programs received CAAHEP Initial Accreditation in September 2015. Reaccreditation site visits (virtual) were conducted fall 2020, with 5-year reaccreditation pending.

Retention/Attrition, credentialing success, and placement outcomes for the three year period through 2019 are reported on the OIT Echocardiography website in Program OUTCOMES:

https://oregontechsfstatic.azureedge.net/sitefinity-production/docs/default-source/academic-excellence/program-outcomes/echo-outcomes-2016-19.pdf?sfvrsn=7988e3e1_0

II. Program Purpose, Educational Objectives, and Student Learning Outcomes

The Echocardiography faculty agreed to adopt the student learning outcomes as suggested by the Joint Review Committee on Education in Diagnostic Medical Sonography (JRCDMS).

Echocardiography Program Purpose

The Oregon Tech Bachelor of Science program in Echocardiography provides students with the knowledge, clinical skills, values and behaviors to become competent cardiac sonographers.

Minimum Expectations: The program will meet the following goal, defining minimum expectations:

"To prepare competent entry-level adult cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains"

Echocardiography Program Educational Objectives

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

Expected Program Student Learning Outcomes

Graduates from this program will be able to:

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

Additional Student Learning Opportunities and Programmatic Input

Students have been encouraged to attend meetings sponsored by northwest regional chapter of the American Society of Echocardiography (the Willamette Valley Society of Echocardiography - WVSE) held quarterly in Portland and to try to attend other regional society conferences held near their externship sites throughout the year. Many students also attended the 2019 ASE Scientific Sessions, held in Portland June 21-25, 2019. The 2020 ASE Scientific Sessions were held virtually due to the COVID-19 pandemic.

Spring term 2020 campus classes were all conducted remotely due to COVID-19 restrictions. Externship during spring term presented additional challenges, as many sites barred students from all programs from being on-site and from active participation in patient care in their healthcare facilities. In spite of the restrictions, all externship students completed required competencies and evaluations, graduated on time, and were eligible to take the ARDMS Registry Exam in Adult Echocardiography.

Clinical Instructor input was accessed during physical Externship visits, luckily completed just as COVID restrictions were implemented. Conference calls and ZOOM "visits" were held throughout the year as needed. Topics covered discussions of the logistics of student documentation, updated verbal evaluations of the Trajecsys externship reporting system, review of areas of didactic concern, modifications to the current externship Competencies, and overall success of the program. ZOOM discussions and clinical training predominated in the case of spring term student that were away from their physical Externship sites.

As a result of gathered input from all communications with Externship sites, staff, and students, continuing modifications will be directed towards an update of the Competency Evaluations used on externship, better reflecting current practice models, and working towards elimination of many of the scoring areas that more properly fit within the Echocardiography Professional Evaluation. CME's were made available through SDMS for clinical site staff directly involved in the hands-on training for students on their Clinical Externship. Many Echocardiography Clinical Instructors attended the spring 2019 Clinical Instructor Workshop. All programs benefited from the combined CI inputs and suggestions at these workshops. COVID-19 restrictions precluded a 2020 CI Workshop.

The program's Medical Director was frequently updated on the progress of the program's development, and provided input as needed. An Advisory Board/Committee meeting was convened March 2020. The Medical Director's overview and assessment of the program, and Advisory Board minutes were a part of the JRC-DMS reaccreditation site visit documentation, November 2020.

Much of the externship assessment material has been incorporated within the Trajecsys reporting system, and full details of all externship scoring is available on-line as needed.

III. Assessments – the 2019-2020 assessments included both Programmatic Student Learning Outcomes (PSLO's), and the ESLOs – Ability to work in teams, and the ability to communicate effectively in oral, written and visual forms. The proposed new ESLO pattern is shown in Table #2.

Note: These ESLOs are incorporated within the PSLO #1 in the three-year assessment cycle. The faculty confirmed the assessment cycle planned, noted in Table 1 on the following page.

Three-Year Cycle for Assessment - Echocardiography Student Learning Outcomes

Echocardiography Degree Student Learning Outcomes Assessment Schedule	2016-17	2017-18	2018-19	2019-20	2020-21 (revised ESLO pattern)	2021-2022 (undergoing revision)
1. The student will demonstrate the ability to communicate effectively in oral, written and visual forms.	X(1)			X(1)		
2. The student will demonstrate the ability to work effectively in teams.	X(4)			X(4)		
3. The student will demonstrate an ability to provide basic patient care and comfort.		X			X	
4. The student will employ professional judgment and discretion, including ethics.			X(3)			X
5. The student will demonstrate knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal cardiovascular anatomy.	X			X		
6. The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.		X(2)			X	
7. The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.		X(5)			X	
8. The student will demonstrate knowledge and understanding of clinical echocardiography diagnostic procedures and testing			X			X
9. The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			X(6)			X

Table #1. Echocardiography Degree Assessment Cycle – (a number) indicates a PSLO that incorporates proposed ESLO's. The ISLO/ESLO pattern is undergoing revision.

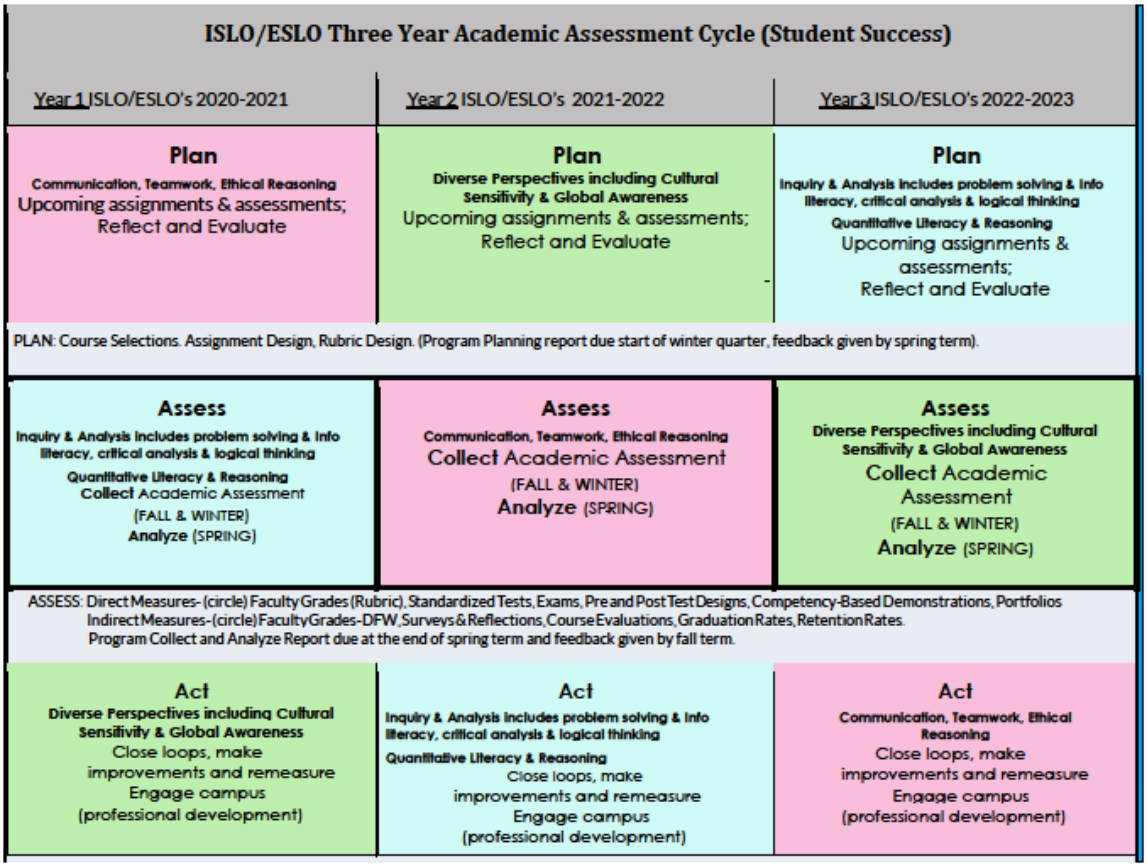


Table #2. OIT 3-year Assessment Cycle.

IV. Summary of 2019-20 Assessment Activities

A. Essential Student Learning Outcome #1 (PLSO #1): The student will demonstrate theability to communicate effectively in oral, written and visual forms.

Written Communication

The performance criteria for written communicate are:

1. Writing is clear, focused and understandable.
2. Order & structure are clear with satisfying introduction and conclusion.
3. Document is well supported.
4. Voice and wording are appropriate and compelling.
5. Standard writing conventions are used effectively.

Oral Communication

1. The performance criteria for oral communication are:
2. Content is supported, informative and persuasive.
3. Presentation is well organized with smooth transitions.
4. Topic is well understood and conveyed with enthusiasm.
5. Delivery is effective and poised.

Direct Assessment #1

The faculty assessed the *written communication* outcome in ECHO 420 fall term 2019 using the Echocardiography Externship fall term case study grading rubric. The faculty rated the proficiency of 16 senior students using the performance criteria described in Table 3 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Case Study Content	Grading Rubric	1-15 scale per rubric proficiency criteria	90% with 12.0 or higher	100%
Organization (overall presentation)	Grading Rubric	1-15 scale per rubric proficiency criteria	90% with 12.0 or higher	100%
Style (Discussion)	Grading Rubric	1-10 scale per rubric proficiency criteria	90% with 7.0 or higher	100%
Delivery (grammar, spelling, terminology)	Grading Rubric	1-10 scale per rubric proficiency criteria	90% with 7.0 or higher	94%
Visual aids	Grading Rubric	1-10 scale per rubric proficiency criteria	90% with 7.0 or higher	87%

Table #3 Assessment Results for the PSLO/ESLO - written communication, fall 2019

Strengths: Minimum acceptable performance was achieved in 4 of 5 performance criteria.

- Content is supported, informative & persuasive
- Well-designed visuals are utilized & integrated in to speech.
- Presentation is well organized with smooth transitions.
- Topic is well understood & conveyed with enthusiasm.
- Delivery is effective, and at a level expected of students in the clinical setting.

Weaknesses: While minimum levels were reached, review of case study presentations, and the need for utilization of proper grammar, spelling, and terminology will be emphasized during the Externship Preparation classes in spring term each year. Examples of adequate case studies will be made available for review. In the case of the lower performance in Visual aids, increased emphasis on alternate methods of providing visual aids will be made during Externship Preparation classes and reinforced during Externship after the first Case Study submission. Where sharing of visual data is prohibited by an externship site, other images representing the same basic concepts may be acquired from Internet sources and texts.

Direct Assessment #2

The faculty assessed the *written communication* outcome in ECHO 420 winter term 2020 using the Echocardiography Externship winter term case study grading rubric. The faculty rated the proficiency of 16 senior students using the performance criteria described in Table 4 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Case Study Content	Grading Rubric	1-15 scale per rubric proficiency criteria	90% with 12.0 or higher	100%
Organization (overall presentation)	Grading Rubric	1-15 scale per rubric proficiency criteria	90% with 12.0 or higher	100%
Style (Discussion)	Grading Rubric	1-10 scale per rubric proficiency criteria	90% with 7.0 or higher	100%
Delivery (grammar, spelling, terminology)	Grading Rubric	1-10 scale per rubric proficiency criteria	90% with 7.0 or higher	100%
Visual aids	Grading Rubric	1-10 scale per rubric proficiency criteria	90% with 7.0 or higher	100%

Table #4 Assessment Results for PSLO/ESLO - written communication, winter 2020

Strengths: Minimum acceptable performance was achieved in all performance criteria. A higher level of performance was expected in this, the 2nd of the two Case Study submissions.

- Content is supported, informative & persuasive
- Well-designed visuals are utilized & integrated in to speech.

- Presentation is well organized with smooth transitions.
- Topic is well understood & conveyed with enthusiasm.
- Delivery is effective, and at a level expected of students in the clinical setting.

Weaknesses: While minimum levels were reached, minor areas of presentation will still require review of case study presentations, and emphasis on the need for utilization of proper grammar, spelling, and terminology during the Externship Preparation classes in spring term each year. Examples of adequate case studies will be made available for review.

In comparison with prior assessments, the overall quality and thoroughness of case study presentation has improved. Students in the subsequent year will be encouraged to present their case studies live to the Externship Preparation class, COVID restrictions permitting. The expectation is that going forward into 2021-2022, live or ZOOM presentations of one Case Study may be required of each externship student.

Direct Assessment #3

The faculty also reviewed Clinical Instructors assessment of this outcome at Externship sites fall term 2019 using the Student Competency Evaluations available to sites via the Trajecsys reporting system. The Clinical Instructors rated the proficiency of 16 senior students using the performance criteria described in Table 5 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Maintains clinical records	Student Monthly Logs	0-100%	90% with a score of 80 or better	100% scored 80 or better
Exhibits accuracy and consistency in all labeling and calculations	Student Competency Evaluation	0-100%	90% with a score of 80 or better	100% scored 80 or better
Educates patients regarding echo procedure	Student Competency Evaluation	0-100%	90% with a score of 80 or better	100% scored 80 or better

Table #5 Student Competency Evaluation Results for ESLO **#1,** fall 2019

Strengths: Minimum acceptable performance was achieved for all the performance criteria specified.

Weaknesses: All students performed at or above expected level. Current ProfessionalEvaluation template in Trajecsys does not adequately state competency requirements.

To better reflect data needed for assessment, the Professional Evaluation template will be reviewed and modified. To match these modifications, additional mock study evaluation and reporting will be introduced in the ECHO 321, 333, and 334 classes. More thorough utilizationof the electronic report package in the CoreSound PACS will be instituted.

Indirect Assessment #1

This outcome was assessed in exit surveys evaluating the Echocardiography Program, completed by both senior students and clinical sites, at points nearing or upon completion of clinical externship in ECHO 420, spring term 2020. Twenty Clinical Instructor's Program Evaluations were submitted, and 15/16 students completed Student Echocardiography Program Evaluations. The criteria and results are provided in Table 6 below.

Evaluation scale: (1) Poor (2) Satisfactory (3) Good (4) Excellent (n/a) Not applicable

Performance Criteria	**Assessment Methods**	**Measurement Scale**	**Minimum Acceptable Performance**	**Results** - % **Rating Minimal Acceptable Performance**
The student will demonstrate the ability to communicate effectively **in** oral, written, and visual forms	Student Program Evaluation	1-4 evaluation scale	90% with 3 or higher	80% rated the program at 3 or better
The student will demonstrate the ability to communicate effectively **in** oral, written, and visual forms	Clinical Site Program Evaluation	1-4 evaluation scale	90% with 3 or higher	100% rated the program 3 or higher

Table #6 Exit survey results for ESLO #1, spring 2020

Strengths: Both students and clinical sites rated the Echocardiography Program as meeting acceptable levels of performance in providing students with an educational setting that allowedthe students to demonstrate the ability to communicate effectively.

Weaknesses: While no significant weakness was identified, continuing emphasis on, and expansion on opportunities to practice and improve on communication skills will be provided incore echocardiography classes.

B. Essential Student Learning Outcome (PLSO #2): The student will demonstrate theability to work effectively in teams.

Direct Assessment #1

The faculty assessed this outcome in ECHO 385 spring term 2020. Student group projects (5 groups), and project presentations were assigned, with groups aware that the assignment would be graded utilizing the Oregon Tech ESLO Team and Group Work Rubric. Nineteen Echocardiography juniors participated in the assessment. The faculty rated the proficiency of students using the performance criteria described in Table #7 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Identify and achieve goal/purpose	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	All students scored 3 or higher
Assume roles and responsibilities	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	89.47% scored 3 or higher
Communicate effectively	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	95% scored 3 or higher
Reconcile differences	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	All students scored 3 or higher
Shares work appropriately	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	89.47% scored 3 or higher
Develops strategies/actions	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	All students scored 3 or higher
Cultural adaptation	ESLO Rubric	Score of 1 - 4 (no/limited proficiency - high proficiency	80% with 3 or higher	All students scored 3 or higher

Table #7. ESLO (PSLO #2), ECHO 385 results, spring 2020

Students performed at and above the expected level of performance. Students exhibited minimal variation in ratings assigned to themselves, and to others in their respective teams.

As a result of the data, the student presentations will continue to be incorporated, with additional emphasis on accurate self/peer evaluation. Peer review needs further study, as students are observed as perhaps reluctant to critically rate their peers. Individual student contributions needto be assessed utilizing a redesigned scoring rubric, with closer overview.

Direct Assessment #2

The faculty assessed this outcome in ECHO 420 from the 2019-2020 academic year using 2020 Echo winter term Professional Evaluations for echocardiography as assessed by industry (Clinical Instructors). Sixteen students were included in the assessment. The faculty reviewed the proficiency of students using the performance criteria described in Table #8 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Student offers assistance to others in the department.	Echo 420 winter term Professional Evaluation	1 – 10 Scale	80% with 8 or higher	100%
Student is involved as a team member for completion of clinical tasks.	Echo 420 winter term Professional Evaluation	1 – 10 Scale	80% with 8 or higher	100%
Student communicates effectively with other departments	Echo 420 winter term Professional Evaluation	1 – 10 Scale	80% with 8 or higher	100%

Table #8. ESLO #2, ECHO 420 Externship results

Students performed at or above the desired level of proficiency in terms of team effort not only in the Echocardiography lab as a whole, but also as bedside imaging teams with observing clinical staff.

As a result of the data, an understanding of what constitutes team participation, and the expected performance in the clinical setting will continue to be emphasized in the Externship Preparation class, spring quarter. Individual student performance will be addressed as needed based on input provided from Clinical Instructors, and data obtained in the quarterly Professional Evaluations.

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420 from the student 2019-2020 exit surveys asking them to rate how well the OIT Echocardiography program prepared them for learning outcome #2. The students rated their proficiency using the performance criteria described in Table #8 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Ability to work effectively in teams (OIT preparation)	Exit Survey	1 – 4 Scale	80% with a score of 3.0 or better	100%

Table #8, ESLO #2 ECHO 420 student self-assessment/exit survey results.

Students rated the program as providing adequate preparation and training to effectively work in teams.

As a result of this assessment activity, oral presentations will be continued, and additional reporting of case studies will be emphasized in the junior level courses. In the Externship Preparation class, the position of the staff sonographer (and the student) as a team member will be emphasized, with examples of behaviors that contribute to team efforts and goals provided during discussion. Beginning 2021-2022, student presentation of case studies to their respective echocardiography lab will be tested as a requirement.

C. Programmatic Student Learning Outcome #5: The student will demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.

The performance criteria for this outcome are:

1. Student is able to associate anatomical landmarks in the region of interest with cardiac anatomy.
2. Student is able to accurately identify cross sectional cardiac anatomy in ultrasound images as well as in radiologic, CT and MRI images for quality assurance.
3. Student recognizes the sonographic appearance of normal and abnormal cardiac anatomy.

Direct Assessment #1

The faculty assessed this outcome through Competency Evaluations completed by Clinical Instructors on 16 senior students during ECHO 420 externship winter/spring terms 2020. The combined terms reflect the necessity to score the last 6 of 12 proficiencies together as assessment dates in many cases fell during days straddling both winter and spring terms due to student site availability as constraints secondary to COVID-19site mandates were imposed. The proficiency of students was rated using the performance criteria described in Table 9 below.

Performance Criteria	**Assessment Methods**	**Measure Scale**	**Minimum Acceptable Performance**	**Results -% with Target. or higher**
Associates anatomical landmarks with cardiovascular anatomy	Student Competency Evaluation	0-100%	90% with a score of 80 or better	100%
Identifies cross sectional anatomy for QA	Student Competency Evaluation	0-100%	90% with a score of 80 or better	100%
Recognizes normal and cardiovascular anatomy	Student Competency Evaluation	0-100%	90% with a score of 80 or better	100%

Table #9 Assessment Results for PSLO #5, 2020

Strengths: Students performed at or above the minimum acceptable level of performance. In reviewing the scores, assessments from fall term were also reviewed, and as students moved further along in the Externship experience in 2020, progression to increased competency was noted.

Weaknesses: Cross sectional anatomy for QA is infrequently used within many working echocardiography labs and will be reassessed as to whether it needs continued inclusion in this SLO.

As a result of the data, the faculty in the Echo Program decided to continue assessing SLO#5 through externship Competency Evaluations. The evaluation format will be revised over as needed to better reflect industry input on competency items more pertinent to cardiovascular ultrasound imaging.

Indirect Assessment #1
This outcome was also assessed in exit surveys evaluating the Echocardiography Program, completed both by senior students nearing or upon completion of their clinical externship in ECHO 420, and site Clinical Instructors, spring term 2020. Twenty Clinical Instructor Program Evaluations were received. The criteria and results are provided in Table 10 below.

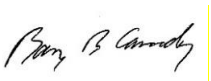
Evaluation scale: (1) Poor (2) Satisfactory (3) Good (4) Excellent (n/a) Not applicable

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Associates anatomical landmarks with cardiac anatomy	Student Program Evaluation	1-4 evaluation scale	90% with a score of 3 or better	100% rated the program 3 or higher
Recognizes normal and abnormal cardiac anatomy	Clinical Site Program Evaluation	1-4 evaluation scale	90% with a score of 3 or better	100% rated the program 3 or higher

Table #10 Exit survey results for PSLO #5, spring 2020

Strengths: The Echocardiography Program was rated by both the externship students and their clinical sites as meeting acceptable levels of performance in providing students with an educational setting promoting the acquisition of clinical knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.

Weaknesses: While no significant weakness was identified, continuing emphasis on, and expansion on opportunities to practice and improve on imaging and interpretation skills will be provided in core echocardiography classes.



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Appendix A – 2017-2020 Program Assessment Report – Curriculum Map

Echocardiography B.S.

Curriculum Map

Table A1 Curriculum Map

Three-year Cycle for Assessment of Program Learning Outcomes

STUDENT LEARNING OUTCOME	2019-20	2020-21	2021-22
1. Demonstrate the ability to communicate effectively in oral, written and visual forms.	F, P, C		
2. Demonstrate the ability to work effectively in teams.	F, P, C		
3. Demonstrate an ability to provide basic patient care and comfort.		F, P, C	
4. Demonstrate professional judgment, discretion, and ethics.			F, P, C
5. Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.	F, P, C		
6. Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.		F, P, C	
7. Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.		F, P, C	
8. Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			F, P, C
9. Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			F, P, C

***Assessment of Program Student Learning Outcomes (2 Directs, 1 Indirect)**

***Assessment of Communication Essential Student Learning Outcome (1 Direct Oral, 1 Direct Written)**

F - Foundation
P - Practice
C - Capstone

Freshman Year N/A

Sophomore Year

	BIO 220	**BIO 346**	**BIO 347**
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.			
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.			
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.			
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.	F	F	F
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.		F	F
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.			
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			
OIT-ESLO 2016-17.1.A Communicate effectively orally.			
OIT-ESLO 2016-17.1.B Communicate effectively in writing.			

	ECHO 225	**ECHO 231**	**ECHO 232**
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.	F	F	P
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.			
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.	F	F	P
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			

OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.		F	P
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.		F	P
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.		F	P
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			F
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			
OIT-ESLO 2016-17.1.A Communicate effectively orally.			
OIT-ESLO 2016-17.1.B Communicate effectively in writing.			

	ECHO 320	**ECHO 332**	**MIT 231**
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.			
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.			
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.			
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.		P	
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.	P		
	ECHO 320	**ECHO 332**	**MIT 231**
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.			F
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.	F		
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			
OIT-ESLO 2016-17.1.A Communicate effectively orally.			
OIT-ESLO 2016-17.1.B Communicate effectively in writing.			

	MIT 232	PHY 217	WRI 227
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.			F
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.			
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.			
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.			
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.			
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.	P	F	
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			
OIT-ESLO 2016-17.1.A Communicate effectively orally.			
OIT-ESLO 2016-17.1.B Communicate effectively in writing.			

Junior Year

	CHE 360	ECHO 321	ECHO 325
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.		P	P
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.			

OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.			
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.		P	F
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.		P	F
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.		P	
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.		P	
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			
OIT-ESLO 2016-17.1.A Communicate effectively orally.		P	P
OIT-ESLO 2016-17.1.B Communicate effectively in writing.		P	P

	ECHO 333	**ECHO 334**	**ECHO 376**
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.	P	P	
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.	P		
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.	P	P	
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.	P	P	F
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.			F
	ECHO 333	**ECHO 334**	**ECHO 376**
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.			
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			
OIT-ESLO 2016-17.1.A Communicate effectively orally.			

OIT-ESLO 2016-17.1.B Communicate effectively in writing.			

	ECHO 385	**ECHO 388**	**SPE 321**
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.	P	P	F
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.	P		F
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.			
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.			
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.			
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.			
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.	F	P	
OIT-ESLO 2016-17.1.A Communicate effectively orally.			
OIT-ESLO 2016-17.1.B Communicate effectively in writing.	P		

	ECHO 385	**ECHO 388**	**SPE 321**
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.	P	P	
OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.			
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.			
	Business Elective	**Communication Elective**	**Humanities Elective**

	Upper Division		
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.			
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.			
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.			
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.			
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.			
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.			F, P
OIT-ESLO 2016-17.1.A Communicate effectively orally.		F, P	
OIT-ESLO 2016-17.1.B Communicate effectively in writing.		P	

Senior Year

	ECHO 420	Student Exit Survey
OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms.	C	C

OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams.	C	C
OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort.	C	C
OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics.	C	C
OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.	C	C
OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.	C	C
OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.	C	C
OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.	C	C
OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.	C	C
OIT-ESLO 2016-17.1.A Communicate effectively orally.	C	C
OIT-ESLO 2016-17.1.B Communicate effectively in writing.	C	C