

Plan - Essential Learning Outcomes

	ESLO	Assessment Activities	Documentation
PLAN Class of 2022	Communication Teamwork Ethical Reasoning	Courses Assessing Communication & Teamwork & Ethics: MLS442, MLS463, MLS472, MLS422	Assignment and Rubric for Communication: MLS442-Lab Report MLS422 - Teach the Class Assignment Assignment and Rubric for Teamwork: MLS463 - Interviewed someone or made a phone call Assignment and Rubric for Ethics: MLS 472 PDE#36
ASSESS Class of 2021	Inquiry & Analysis Quantitative Reasoning	Quantitative reasoning & Inquiry and analysis data: MLS452 88% MLS449 100% MLS415 94% MLS470 100% MLS474 100% MLS464 79% MLS462 77% MLS424 83%	Faculty reflection on the data: Faculty determined that quantitative reasoning and inquiry and analysis processes are discussed in all laboratory courses. Assessment of these items is reflective of student ability to interpret and use laboratory data. Either PSLO1 (competency) or PSLO2 (problem-solving) would be good ways to analyze student progress on this ESLO. Faculty chose PSLO2 data to represent this for class of 2021. Class of 2021 were assessed in multiple subjects by multiple methods to provide this data, some used final exams, some used student interpretations of case study data, and some used laboratory activities to measure PSLO2. Overall reflection indicates that students are meeting this outcome in more classes and subjects than they are not. The classes where they are not meeting are those that measured the outcome too broadly by utilizing entire Final exams as the measurement tool. Faculty take-away for future measure of this outcome is to choose assessments that are related to case interpretations whenever available.
ACT Class of 2020	Diverse Perspectives	Actions taken to include Diverse Perspectives within the curriculum: <ul style="list-style-type: none"> • The wording of PSLO3 was changed to include diversity language 2019 • Diversity of admitted students was compared to state of Oregon Census data 2020. • Privileges exercise was included in HR Corrective Action lab 2020 & 2021 • Diversity of patient history were added to BB and Sim lab patients 2019-21. • Ungraded Diversity Reflection added to Foundations II 2020 & 2021 • Faculty attended diversity CE 2020 & 2021 	Faculty Discussion on how we can measure improvements: Faculty feel that Diversity and Global Awareness is important to MLS students in two aspects of their future career 1) Workplace interactions with coworkers and 2) In treating patients sensitively and fairly. Workplace interactions are adequately addressed in the curriculum through the HR module that includes a reflective journal and a bias analysis. Patients are addressed in the curriculum by specific patient scenarios discussed in IPE. Faculty would request that the Diversity ESLO committee develop a rubric that may be utilized in assessment of student work product on this topic. Faculty felt that giving a grade for student reflection was inappropriate, however a non-graded assessment could be useful to determine how best to enhance teaching of the subject. Faculty would use this to assess student responses on the bias analysis assignment.

Plan – Alignment

Academic Assessment

Section 1- Program Mission and Educational Objectives

The mission of the Medical Laboratory Science Degree, a Bachelor of Science program, is to educate, train, and graduate professionally competent and ethical individuals, committed to life-long learning, and who are prepared to meet current and future workplace challenges in medical laboratory science.

Program Alignment to Oregon Tech Mission and Core Themes

The goals of the Oregon Tech • OHSU MLS program are to:

1. Advance an innovative curriculum that meets current and emergent pedagogical and professional development needs of students.
2. Provide learning experiences rich in opportunities that maximize every student's potential to achieve MLS career entry-level competencies.
3. Graduate competent MLS that meet the workforce needs of Oregon and underserved regions of the nation.
4. Identify, establish, and maintain partnerships with community medical laboratories that provide exceptional educational experiences.
5. Contribute to the advancement of MLS pedagogy and growth of the profession.

Program Educational Objectives

Upon completion of the Oregon Tech • OHSU MLS program, a student will have had the opportunity to acquire the knowledge and skills required to demonstrate professional attributes of a Medical Laboratory Scientist. Successful completion of the program will allow students to pursue career opportunities in various laboratory settings including but not limited to medical, research and development, sales, management and public health.

At the time of graduation, graduates will have the knowledge needed to:

1. Competently perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.
2. Proficiently problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.
3. Participate actively in the development, implementation, and evaluation of test methods
4. Take Responsibility for analysis and decision-making.
5. Apply safety and governmental regulations and standards to medical laboratory practice.
6. Act with Professional and ethical conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.
7. Participate in Interpersonal and interdisciplinary communication interactions with members of healthcare teams, external relations, customer service and patients.
8. Apply knowledge of medical laboratory finance, operations, marketing, human resource management and educational methods.
9. Utilize information technology to effectively and accurately report laboratory-generated information.
10. Apply research design and practice principles to test development and validation.

Section 2 – Program Description and History

History and Locations

Established in 1933 by the Oregon Health and Science University (OHSU) in Portland, Oregon, the nationally accredited* Medical Laboratory Science program is a university-based, 3+1 program of study culminating in a BS in Medical Laboratory Science. In 2001, administrative responsibilities for the program transferred to Oregon Tech through a master collaboration agreement between the two universities. Student diplomas identify both Oregon Tech and OHSU as the degree-granting institutions. In brief, Oregon’s only baccalaureate MLS program retains the brand identity of OHSU with the administrative support of Oregon Tech.

Location: Portland Metro Campus

Today, the program is administered through the Department of MLS which resides on the Oregon Tech Portland Metro campus located in Wilsonville Oregon. Here, students admitted to the last year of the degree program referred to as the “professional year” take coursework that combines a rigorous competency-based science curriculum combined with community-sponsored clinical training. During the first four terms of the professional year, students complete course work as a cohort in state-of-the-art-classrooms that include two well-equipped laboratory classrooms, a smart high- tech lecture hall and an instrumentation room. Upon successful completion of the on-campus coursework, students are assigned to one or more program-affiliated laboratories to complete clinical training in the areas of chemistry, hematology, microbiology, blood bank and management. During the 16-week clinical training period, students spend 40 hours per week applying knowledge and skills to perform a wide variety of testing in an accredited medical laboratory and to further develop discipline-specific competency under supervision of clinical instructors working in the field. Currently, the Department of MLS maintains affiliations with accredited laboratories in Oregon, Washington, Nevada, Idaho, Colorado, Hawaii, Arizona and Alaska.

Enrollment:

	Class of 2020	Class of 2019	Class of 2018	Class of 2017	Class of 2016
Applicants	56	78	77	82	93
Fall Cohort	38	43	46	46	49
Graduated	37	42	46	47	47
Attrition	1 delayed for COVID	1 dismissed	0	1 dismissed	2 delayed until 2017

Outcomes:

	Class of 2020	Class of 2019	Class of 2018	Class of 2017	Class of 2016
Average Certification score	530	547	529 *New BOC published	592	564
Certification Rate	100% total pass rate 84% first time pass rate	95.2% total pass rate 90.5% first time pass rate	96.7% total pass rate 91.3% first time pass rate	95.7% total pass rate 89% first time pass rate	97.9% total pass rate 91.5% first time pass rate
Graduation Rate	100%	97.6%	100%	97.8%	94%
Employment	100%	97.6%	100%	100%	100%

Summary of Accreditation Standards: Graduation Rate, Retention, Attrition, Employment

The Medical Laboratory Science program has consistently maintained one of the highest retention and graduation rates of any program at Oregon Tech, 99% graduation rate over the past five years. Yearly attrition has not been more than 1 or 2 students over the last ten years. These values have consistently been well within the minimum values expected for accreditation.

Graduate employment rate has held steady over the life of the program at 100% of graduates finding employment within 6 months of graduation. Over the past several assessment cycles, evaluation of student placement has begun to include location (within Oregon vs outside of Oregon) and hospital (whether or not students found employment at the clinical site they were assigned to for externship). This data has been a valuable recruitment tool for the program. In a typical year 80% of students report employment within three months of graduation and about 75% of graduates remain in Oregon with about 50% remaining at their clinical externship site. Placement at the clinical externship is a complex process designed to best fit student learning needs and likelihood of pursuing employment at the clinical site they are placed at.

Board of Certification (BOC)

Program graduates are eligible to take the *American Society for Clinical Pathology (ASCP) Medical Laboratory Scientist (MLS)* national board certification examination or the *American Medical Technologists (AMT)* certification exams. The MLS program has held an above national certification passage rate over the last 10 years. Most OHSU/OIT graduates choose to become certified by ASCP BOC exam due to the large recognition it receives in the job market.

Industry Relationships

In addition to contractual relationships with over 60 clinical externship sites, the program maintains contact with several vendors in the field of Medical Laboratory Science. Such vendors include: Grifols, Sysmex, Roche, Abbott, Midarray. Many contacts are alumni of the program. These industry partners support the program through donating reagents or equipment, sitting on career panels, providing interview preparation, and in some cases adjunct teaching.

Staff and students are additionally encouraged to actively become involved in the industry's professional organizations through continuing education events, meetings, board positions and scholarship applications. Some of the organizations students and faculty have become involved with are American Society of Clinical Laboratory Science (ASCLS) both national at the national and local level, American Medical Technologists (AMT), American Society for Clinical Pathology (ASCP).

Program faculty held an Advisory Board Meeting in Summer 2021. The 2020 advisory board meeting had been cancelled due to time constraints brought about by extra work demanded of the clinical site in COVID testing. Discussed at the meeting were pertinent topics such as OIT/ OHSU Vaccination policy, hiring trends, online degree completion proposal, specific curricular and faculty changes and a discussion of student performance in the workplace compared to other programs. Employer survey was prepared for fall 2021 with special focus on program graduate critical thinking and stress management in the workplace as employees.

Externship sites Perspectives from Graduating Class of 2020

The sentiment of our students being good communicators and flexible students was a running theme for the class of 2020 from our externship site surveys.

“He is conscientious with attention to detail and asks thoughtful relevant questions.”

“Asks appropriate questions, recognizes the importance of her work relative to the effect on patient.”

“She has been flexible without training schedule and her willingness to help and learn is refreshing.”

“She is aware of her knowledge gaps and asks appropriate questions.”

“His problem solving is very good for a student and will improve with more experience.”

“He was a model student. He was on time every day, communicated well with staff and worked as a great team player.”

“She asks smart inquisitive questions that demonstrate her want to understand completely what we do and why we do it.”

“He has been patient, self-directed and made the most of this time with us in a particularly challenging year.”

Program Changes

Academic year 2020 began organized and seamlessly. Graduating class of 2020 were out on 9-week externships (shortened due to the pandemic from their original 16-week time frame) where they acted as generalists placed at a single clinical site. These experiences contained one week in blood bank and one week in microbiology with supplemented materials online. Students on externship experienced enhanced PPE training and awareness. Though they weren't allowed to participate in an in-person graduation ceremony, they did meet the requirements to graduate as originally intended at the end of December, with only three students exiting their externships earlier than scheduled due to COVID closures. Class of 2020 was asked an additional question on their exit survey regarding the length of externship experience which helped instructors formulate externship plans for class of 2021.

On campus, class of 2021 held classes entirely synchronously on zoom. Laboratories were performed in person wearing additional protective gear and maintaining social distancing practices. These social distancing practices and synchronous zoom lectures were maintained throughout all course work into summer term despite vaccine availability. Because the program was back to full faculty, the course work schedule reverted to 2018 schedule with microbiology course work taught in winter and spring and blood bank course work taught in spring and summer.

During spring of 2021, classes were disrupted by two situations, one a faculty strike that shut down courses for one and a half weeks and a clinical site visit from NAACLS accreditors. Through these disruptions, faculty utilized online programs put into place during spring of 2020 to provide continuity of course work for the students. All coursework was made up by the end of the term.

Fall term 2021 was scheduled with a shortened externship experience of 12 weeks (3 weeks per subject) to allow for a two-week simulated laboratory experience to be run before students' move date. At this time social distancing and protective wear requirements lightened in surrounding areas. Both externship site coordinators and students feel that this twelve-week time frame is adequate for student learning.

Section 3- Program Student Learning Outcomes

Seven measurable program specific learning outcomes have been defined that encompass both the university standards (Communication, Inquiry & Analysis, Ethical reasoning, Teamwork, Quantitative Literacy, and Global and Diverse Perspectives) and the objectives of the MLS program. Several of the standards also match National Accrediting standards. Students are measured for:

1. **Competency** to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.

This outcome may be measured by the student's work product in all **laboratory** classes taught during the program. Professionally, students will be expected to demonstrate competency at the completion of on-the-job training and annually thereafter. The MLS program gives students knowledge of the subjects required to make clinical decisions, and also the ability to perform analytical testing as they would in the workplace. Each program course contains a demonstration of **competency** through the classroom laboratory exercises. Successful completion of the **externship** is based on a list of **competencies** that must be performed while the student is in the workplace. This programmatic outcome matches NAACLS standard entry level competencies of the Medical Laboratory scientist that state, *"At entry level, the medical laboratory scientist will possess the entry level competencies necessary to perform the full range of clinical laboratory tests in areas such as Clinical Chemistry, Hematology/Hemostasis, Immunology, Immunohematology/Transfusion medicine, Microbiology, Urine and Body Fluid Analysis and Laboratory Operations, and other emerging diagnostics, and will play a role in the development and evaluation of test systems and interpretive algorithms."*

2. **Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.**

This outcome measures student **data analysis and inquiry** skill as well as their **quantitative literacy** or ability to interact with written results. Professionally students will be expected to read and interpret clinical data from automated instrumentation to determine if those results are accurate or to identify problems with instrumentation or samples. Student abilities are measured by performance on a comprehensive Certification exam, laboratory exercises and tests in course work throughout the program. Every class in the program focuses on data analysis and **troubleshooting** to some extent. This outcome matches NAACLS entry level competencies of the Medical Laboratory scientist that state, *"The medical laboratory scientist will have diverse responsibilities in areas of analysis and clinical decision-making."*

3. **Professional and ethical conduct, respecting the culture and diversity of individual preference of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.**

This outcome measures student **ethical reasoning** with a focus on interprofessional interaction of a team caring for a patient. Ethical issues are discussed in most courses throughout the program. **Foundations of Medical Laboratory Science I** at the beginning of the program assigns students a specific **ethics project**. Students are also rated by their **externship** site at the end of the program for ethical understanding. Through the many team exercises provided students become aware of the **diverse perspectives** of the care giving team and the patient perspective. **Global** perspectives are introduced in many classes as reference ranges are discussed that pertain to specific communities. This outcome matches NAACLS entry level competencies of the Medical Laboratory

scientist that state, *“At entry level, the medical laboratory scientist will have skills in principles and practices of professional conduct...”*

4. [Maintaining appropriate composure under stressful conditions.](#)

The program strives to teach this objective during laboratory simulations in student lab and capstone lab before clinical **externship**. Professional Development Evaluations from faculty and externship preceptors provide perspective data on student performance of this particular objective. Specifically, stress may be measured by cortisol levels in **MLS 416 Chemistry II** while the students concentrate on this subject. The program itself is rigorous and stressful; how a student comports themselves in the academic environment may show how they comport themselves in a professionally stressful environment, with heavy workload and emotional demands in the patient care setting.

5. [Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.](#)

This outcome covers the managerial aspects of coursework. Students who graduate from the MLS program will be qualified to manage the clinical laboratory after two years of professional practice. Students are made aware of continuous improvement activities in their Foundations of Medical Laboratory Science courses and are given several tasks to perform on the subjects while out on externship. In course work, this objective may be measured by the completion of **specific projects** on education, quality control or finances. This outcome matches NAACLS entry level competencies of the Medical Laboratory scientist that state, *“At entry level, the medical laboratory scientist will have skills in principles and practices of administration and supervision as applied to clinical laboratory science and educational methodologies and terminology sufficient to train/educate users and providers of laboratory services.”*

6. [Application of safety and governmental regulations and standards as applied to medical laboratory practice.](#)

Since Medical Laboratory science is a highly regulated profession, students are required to become familiar with safety and best practice standards governing their laboratory actions. Students are required to participate in HIPAA education before working with OHSU patient samples. Students learn and perform Quality Control activities for most tests in the classroom laboratories and the Foundations of Medical Laboratory Science II class has an inspection exercise incorporated into the curriculum. This outcome is measured by student performance in quality control activities in the **laboratory** classroom and in **externship**. This outcome matches NAACLS entry level competencies of the Medical Laboratory scientist that state, *“At entry level, the medical laboratory scientist will have skills in application of safety and governmental regulations and standards as applied to clinical laboratory science.”*

7. [Effective communication skills to ensure accurate and appropriate information transfer.](#)

This outcome measures students' ability to **communicate** orally and in the written word. Oral communication is important to **teamwork** and will be necessary when dealing with other health care professionals, during work-load hand offs at shift change and during problem solving. Written communication is measured through the writing of reports and procedures. Students entering the program should already have experience with both types of communication. An **oral presentation** of a comprehensive case study is made during the last term of the didactic portion of the program. Students **work in groups** to organize and present the case study material. Students are also given a variety of reports to write for the various courses simulating those reports written

professionally. This outcome matches NAACLS entry level competencies of the Medical Laboratory scientist that state, *“At entry level, the medical laboratory scientist will have skills in communications sufficient to serve the needs of patients, the public and members of the health care team.”*

NAACLS Requirements

A review of the results of the following outcomes measures from at least the last three active years must be documented, analyzed and used in program assessment and continuous quality improvement of the program to include an annual submission to NAACLS. Minimum standards include: 1) External certification results 2) Graduation rates 3) Placement rates (i.e., employment positions in the field of study or pursuit of further education) 4) Attrition rates

PSLO Changes

PSLO 4 was introduced during review of the assessment report during the class of 2018-19 review cycle. Class of 2019 exhibited quite a bit of stress reactions during the course of the program such that faculty met with the campus psychologist in order to gain tools for better instructing this class. As a measure of student performance under stress in the clinical setting, faculty approved the removal of PSLO4 from PSLO3 where it had previously been measured every other year. Going forward PSLO4 has been measured as its own outcome.

During the class of 2019 review cycle, University ESLOs were linked to the PSLOs in order to ensure that all essential outcomes were being measured in some way during the course work. It was found that Diversity and Global Perspectives hadn't been measured in previous cohorts. So in 2020 in order to rectify this, the wording of PSLO3 was changed to include diversity language.

The biggest change to assessment practices for the 2020-21 report is the change to the assessment cycle. Previous to this document, PSLOs were measured by specific assignments rotating through the course work that the faculty felt best represented the objective. For class of 2021 PSLOs were added to all courses and specific assignments within the course were identified as representing the PSLO. This data was collected by all faculty at the end of each quarter. The courses were then assigned a three-year period over which in-depth analysis would be done. During the first year for a particular course, data would be identified and developed to measure student progress on the objective, during the second year, measurement of the objective would occur and faculty would recommend changes to course work based on the collected data, and during the third year, evaluation of those changes would occur to ensure that the effects of changes made to course work are considered before keeping the changes as permanent.

Course Learning Outcomes

All instructors have been tasked with developing Course Learning Outcomes that align with PSLO and ESLO as listed above. Course Learning Outcomes (CLO) will be listed in the syllabus of each course. Measures of CLO will provide assessment data aligned with individual coursework performed by students. CLO data will be utilized by faculty in the Plan, Assess, Act cycle for course work improvement on the curriculum map. Each course has a completed Learning Outcomes Course Worksheet on file as well as an excel spreadsheet assigned by instructor for tracking purposes. Not every PSLO is measured in every course nor is every ESLO in every course, but the curriculum is scaffolded in such a way that it is possible to take a measurement of each PSLO and ESLO every year. See attachment for specific course learning outcomes.

Section 4 - Curriculum Map

Courses within the program are identified in the Curriculum Map below with which outcome their coursework best provides data for and their expected level of demonstration for each outcome as either foundational outcome development, practice of foundational outcome, or capstone achievement of the outcome. The top line refers to the outcomes as described in the PSLO list above. Much examination of the curriculum map and re-work is done each time faculty come together for discussion. This map is up to date for assignments assessed for class of 2022.

COURSE	PSLO1	PSLO2	PSLO3	PSLO4	PSLO5	PSLO6	PSLO7
University ESLO		Quantitative Literacy and Inquiry and Analysis	Ethical Reasoning and Diversity				Teamwork and Communication
Hematology Series							
MLS442 Hem I	F	F				F	F
MLS 452Hem II	P	P					
MLS 449 UA	F	P		P	P		p
MLS 424 Hemostasis	P	P					P
MLS 471 Externship	C	C	C	C	C	C	C
Chemistry Series							
MLS 415 Chem I	F	F			F		F
MLS 416 Chem II	P	P		F			P
MLS 417 Chem III	P	P					
MLS 470 Externship	C	C	C	C	C	C	C
Foundations Series							
MLS 432 Found I		F	P	F	P	F	
MLS 462 Found II		P	P		P	P	P
MLS 463 Found III		C		C	C	C	C
Microbiology Series							
MLS 464 Parasit/Mycology	P	F					
MLS 444 Micro I	F	F			F		
MLS 445 Micro II	P	P					
MLS 472 Externship	C	C	C	C	C	C	C
Blood Bank Series							
MLS 420 Immunology	F	F					
MLS 443 BB I	F	F	F		F		
MLS 453 BB II	P	P		P		P	P
MLS 473 Externship	C	C	C	C	C	C	C
Stand Alone Courses							
MLS 422 Molecular	P				P		C

Section 5 – Assessment Cycle

Description of Assessment Plan

The assessment of the Medical Laboratory Science program follows a systematic process and timeline concluding with the preparation of this Assessment report that is published with the Office of Academic Excellence. The Medical Laboratory Science professional program is also accredited by the *National Accrediting Agency for Clinical Laboratory Science (NAACLS)*, 5600 North River Road, Suite 720, Rosemont, Illinois 60018-5119. NAACLS requires program assessment data to include certification results, graduation rates, employment rates, and attrition rates from the previous three years and participation in accreditation activities as published in the NAACLS standards. The Oregon Institute of Technology Medical Laboratory Science program has specified additional **Program Specific Learning Outcomes (PSLO)** based on the mission of the program for assessment to be included in this report as well. These PSLOs are aligned with University ESLOs and specific course CLOs. Student data from CLOs supporting the PSLO & ESLO provide evidence of progress on curriculum improvement. The classes supplying assignments that are utilized for data collection on each outcome are assigned to a three-year **continuing process**. Classes in the planning year of the process are those of the incoming class beginning coursework in fall the year of the report publication date. Classes in the assess year are those of the class that is on externship fall the year of the report publication date. Classes in the act year are those of the class that graduated the previous December from the report publication date and to which complete data on outcomes, coursework, and student exit survey exists. Data collection and other assessment activities follow the annual schedule pictured in the figure below.



NAACLS MEASURES

NAACLS Accreditation criteria is assessed annually. Graduation, attrition and placement data is gathered from University graduation records and University **Student Exit Survey reports** that are provided to the assessment coordinator for use in annual assessment reporting. Board Certification Passage is generated in a report from ASCP by the Program Director. Additional placement data is gathered through faculty contact with recent graduates. Data is stored on a shared assessment data file by the assessment coordinator.

OIT/OHSU MLS program has set the following minimum standards for achievement on these data:

	NAACLS Minimum Standards
Certification Passage	75%
Graduation Rate	70%
Placement Rate	70%
Attrition	Must be documented

PSLO MEASURES

Indirect measure of student achievement is typically taken from a *student exit survey* of the December graduating class. The survey asks the students how they felt the program met the state PSLO. Student perspective on their own learning is relevant to demonstrated confidence with the material given and general satisfaction with the instruction given. Student exit survey is meant to evaluate student satisfaction at the end of the program. Minimum acceptability standard for student exit survey is 85% of students rating themselves as impacted “quite a bit” or “very much” by their time in the program for the stated outcome. This year the student exit survey was not sent to graduates of the 2020 class.

Direct measure at the capstone level is made from the *professional development evaluation* (PDE) completed during externship. Students are evaluated for achievement on professional objectives in knowledge, skills, habits and attitudes by the PDE. Objectives are listed on the form and the student is rated for each objective by an evaluation scale with a simple score of 1-3 (Not Met, Met, Exceed). Instructions for the rating scale are listed at the top of all evaluations. During each externship, an evaluation is filled out for the student per department the student rotates in. The externship site is allowed to have as many people as have worked with the student during their 4 weeks in the department to evaluate the student. Minimum acceptability standard for PDE performance is 95% of all students receiving a grade of 2 or greater on the specified criteria. This report contains complete information at the capstone level for class of 2020 using this direct measure. Currently class of 2021 data is being collected and any changes in assessment process of this criteria will impact class of 2022.

The following table summarizes data collection by this process annually.

PSLO #	1	2	3	4	5	6	7
PSLO Wording	Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.	Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.	Professional and ethical conduct, respecting the culture and diversity of individual preference of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.	Maintaining appropriate composure under stressful conditions.	Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.	Application of safety and governmental regulations and standards as applied to medical laboratory practice.	Effective communication skills to ensure accurate and appropriate information transfer.
University ESLO	Quantitative Literacy	Inquiry & Analysis	Ethical Reasoning & Diversity				Teamwork, Communication
PDE Question	10	18	36	8	7	3	50
Direct	Obtains accurate and precise results.	Shows logical thinking and resourcefulness in dealing with problems.	Demonstrates integrity and ethical behavior.	Maintains work Quality and Quantity under stress.	Performs appropriate quality control/ quality assurance procedures.	Follows laboratory institutional safety policies.	Receives/gives information to others effectively & courteously.
Indirect	How has the OIT experience contributed to this outcome?	How has the OIT experience contributed to this outcome?	How has the OIT experience contributed to this outcome?	How has the OIT experience contributed to this outcome?	How has the OIT experience contributed to this outcome?	How has the OIT experience contributed to this outcome?	Please rate your proficiency on this outcome?

Direct measure of PSLO data at the foundational and practice level is completed by data collection on *coursework* for all students in the course. While data is collected every year on coursework, the data is examined in a different way based on the three year cycle of plan-assess-act. Courses in their plan year will be examined by the instructor of the course for the assignment that is the best fit for the CLO and PSLO being measured. Instructors will be developing and changing rubrics based on the previous data collected from the course. Courses in their assess year are actively having the data examined and compared to previous data. These courses generate the development of action plans. Courses in their act year, have had data collected and have implemented action plans and the data collected will inform the efficacy of the action plan.

Below, the curriculum map has been distributed to a three year cycle such that every instructor and every subject is evaluated at every level each year and that all PSLOs are actively measured across the curriculum.

COURSE	PSLO1	PSLO2/ ESLO1	PSLO3/ ESLO 3	PSLO4	PSLO5	PSLO6	PSLO7/ ESLO 2	Year of Assessment
MLS442 Hem I	F	F				F	F	Y3 Plan – Class of 2022
MLS 463 Foundations III		C		C	C	C	C	
MLS 417 Chem III	P	P						
MLS 445 Micro II	P	P						
MLS 472 Externship	C	C	C	C	C	C	C	
MLS 443 BB I	P	P	P		F			
MLS 422 Molecular	P	F			P		C	
COURSE	PSLO1	PSLO2/ ESLO1	PSLO3/ ESLO 3	PSLO4	PSLO5	PSLO6	PSLO7/ ESLO 2	Year of Assessment
MLS 452Hem II	P	P						Y1 – Act Class of - 2020
MLS 449 UA	F	P		P	P	P		
MLS 415 Chem I	P	F			F		F	
MLS 470 Externship	C	C	C	C	C	C	C	
MLS 462 Found II		P	P		P	P	P	
MLS 464 Parasit/Mycology	P	F						
MLS 453 BB II	P	P		F		P	P	
COURSE	PSLO1	PSLO2/ ESLO1	PSLO3/ ESLO 3	PSLO4	PSLO5	PSLO6	PSLO7/ ESLO 2	Year of Assessment
MLS 424 Hemostasis	P	P					C	Y2 – Assess Class of 2021
MLS 416 Chem II	P	P		F			P	
MLS 432 Found I		F	P	F	P	F		
MLS 471 Externship	C	C	C	C	C	C	C	
MLS 444 Micro I	F	F			F			
MLS 420 Immunology	F	F						
MLS 473 Externship	C	C	C	C	C	C	C	

Section 6 & 7 - Assessment Activity and Action Plans

Plan

For Class of 2022, these Objectives will be evaluated in the following courses by the following assignments.

ESLO	PSLO	Courses	CLO	Assignment
Communication & Teamwork	Effective communication skills to ensure accurate and appropriate information transfer.	1)MLS442 2)MLS463 3)MLS472 4)MLS422	1) Effectively communicate in writing to convey necessary information included in a lab report. 2) Communicate in a manner sufficient to serve the needs of patients, the public and members of the health care team. 3)Receives/gives information to others effectively & courteously. 4) Effectively communicate and discuss various testing methodologies and current practices used in the molecular laboratory for the isolation, quantification, qualification and interpretation of DNA, RNA and Protein from patient samples	MLS442-Lab Report MLS472- PDE#50 MLS463 - Interviewed someone or made a phone call MLS422 - Teach the Class Assignment
Ethical Reasoning & Diverse Perspectives	Professional and ethical conduct, respecting the culture and diversity of individual preference of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.	1)MLS472 2)MLS443	1)Demonstrates integrity and ethical behavior. 2) Use probability of antigenic frequency in various populations to choose an appropriate number of potential donors to screen for compatibility for a given patient.	1) MLS472 – PDE#36 2) Midterm 2 exam calculations.
Inquiry and Analysis & Quantitative Reasoning	Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.	1)MLS442 2)MLS463 3)MLS417 4)MLS445 5)MLS472 6)MLS443	1)Calculate and interpret values associated with the CBC and other hematology procedures. 2) Recognize how operations policies impact workflow within the laboratory. 3) Calculate and interpret values associated with TDM and other clinical chemistry procedures 4) Analyze and interpret microbiology culture test results. 5) Shows logical thinking and resourcefulness in dealing with problems. 6) Recognize and perform additional testing that is necessary to appropriately interpret serological results	MLS442 – Specific Questions on Final MLS463 – completed checklist MLS417 – Content Specific Section Quiz MLS445 – Case Study Exam MLS472 – PDE#18 MLS443 – Lab Papers Grade
	Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services.	1)MLS442 2)MLS417 3)MLS445 4)MLS472 5)MLS443 6)MLS422	1) Perform hematology procedures to get accurate patient and QC results. 2) Identify and quantitate TDM biomarkers on a peripheral blood sample 3) Identify, perform, and report appropriate biochemical tests for organism identification. 4) Obtains accurate and precise results. 5) Perform serological testing sufficient to identify an appropriate blood product for transfusion. 6) Perform a nucleic acid amplification	MLS442 – Practical Exam MLS417 – Module Quiz & Media Lab MLS445 – Practical Exam MLS472 – PDE#10 MLS443 – Practical Exam MLS422 – Lab 3

	Maintaining appropriate composure under stressful conditions.	1)MLS463 2)MLS472	1) Work effectively and contribute toward the productivity of the laboratory team. 2) Maintains work Quality and Quantity under stress.	MLS463 – Sim Lab MLS472 – PDE#36
	Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.	1)MLS463 2)MLS472 3)MLS443 4)MLS422	1) Apply knowledge and skills acquired during subject specific coursework to the administrative and supervisory duties conducted within the laboratory department. 2) Performs appropriate quality control/ quality assurance procedures. 3) Perform appropriate Quality Control sufficient to determine that the test system for pretransfusion testing is operational. 4) Discuss and perform quality control and quality assurance practices that are specific to a molecular testing laboratory	MLS463 – Reviewed a policy MLS472 – PDE#7 MLS443- Lab 1 Grade MLS422 – PCR contamination
	Application of safety and governmental regulations and standards as applied to medical laboratory practice.	1)MLS442 2)MLS463 3)MLS472	1) Adhere to established safety policies and practices 2) Adhere to established safety policies and practices to minimize injury to self and others. 3) Follows laboratory institutional safety policies	MLS442 – Safety Scenarios MLS463 – Safety training or Inspection MLS472 – PDE#3

Assess

Direct Measure of student performance on outcomes by student performance on designated coursework for class of 2021.

PSLO	Assessment data	Previous data	Action plan
Competency	MLS452 76% MLS449 97% MLS415 100% MLS470 100% MLS474 97% MLS464 65% MLS424 94%	MLS452 69% MLS 464 69%	MLS 452 <ul style="list-style-type: none"> Final exam performance: reviewing exams with students who perform poorly on formative assessments frequently throughout the term New Tool: Unknown CBC performance MLS 464 <ul style="list-style-type: none"> Practical Mycology Exam Performance: fewer organisms covered, topic not paired with any other subject. New Tool: Photo exam not microscopy.
Problem Solving	MLS452 88% MLS449 100% MLS415 94% MLS470 100% MLS474 100% MLS464 79% MLS462 77% MLS424 83%	MLS464 77% MLS462 90% MLS424 79%	MLS 464 <ul style="list-style-type: none"> Practical Mycology Exam Performance: fewer organisms covered, topic not paired with any other subject. New Tool: Cases on Exam. MLS 462 <ul style="list-style-type: none"> Schedule Assignment performed in-person in groups as before. MLS424 New Tool: Select Questions on Final Exam

Professionalism	MLS 470 100% MLS 462 91% MLS 424 100%		None
Stress	MLS449 97% MLS470 100% MLS424 100%		None
Quality Assurance	MLS449 100% MLS470 100% MLS474 100% MLS462 100% MLS424 94%		None
Safety	MLS470 100% MLS474 94% MLS462 94% MLS424 100%		None
Communication	MLS449 100% MLS452 97% MLS470 100% MLS464 100% MLS462 100% MLS424 100%		None

2021 All Course Work Data.

COURSE	PSLO1	PSLO2	PSLO3	PSLO4	PSLO5	PSLO6	PSLO7
University ESLO		Quantitative Literacy and Inquiry and Analysis	Ethical Reasoning and Diversity				Teamwork and Communication
Hematology Series							
MLS442 Hem I	F	F	F	F	P	P	F
MLS 452Hem II	P	P					P
MLS 449 UA	F	P		P	P		
MLS 424 Hemostasis	P	P		P	P	P	P
MLS 471 Externship	C	C	C	C	C	C	C
Chemistry Series							
MLS 415 Chem I	F	F					
MLS 416 Chem II	P	P		F			P
MLS 417 Chem III	P	P					
MLS 470 Externship	C	C	C	C	C	C	C
Foundations Series							
MLS 432 Found I	F	F	P	F	P	F	F
MLS 462 Found II		P	P		P	P	P
MLS 463 Found III		C		C	C	C	C
Microbiology Series							
MLS 464 Parasit/Mycology	P	F			P	P	P
MLS 444 Micro I	F	F			P		
MLS 445 Micro II	P	P			P		
MLS 472 Externship	C	C	C	C	C	C	C
Blood Bank Series							
MLS 420 Immunology	F	F					
MLS 443 BB I	F	F	F		P		
MLS 453 BB II	P	P		P		P	P
MLS 473 Externship	C	C	C	C	C	C	C
Stand Alone Courses							
MLS 422 Molecular	P	F			P		C

Faculty Reflection on the data:

PSLO1 - Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.

Data from class of 2021 indicate that **the coursework has NOT MET this outcome** for 2 out of 7 courses measured. A lookback on the data from previous years indicate that this outcome has been met in multiple

subjects by multiple instructors consistently, and that those courses continue to meet minimum standards. This was the first year data has been collected from MLS452 and MLS464 specifically.

In discussion, faculty determined that overall this objective was measured inconsistently and often too broadly in the varied courses. Going forward faculty feel that the best measure of competency is through student performance on practical laboratory examinations in the various subject areas.

Regarding student performance on these particular assignments, faculty plan to review the contents of the exam to ensure that students have adequate time to absorb material assessed by these exams. Often, the exams covered too broad of subject areas, students required more opportunities to gauge their performance before these exams.

MLS 452 – The final exam might not be the best assessment tool for this, as this is too broad. Unknown CBC performance instead of final exam serves as a better competency tool. To assist students with final exam performance, the instructor plans on reviewing exams with students who perform poorly on formative assessments frequently throughout the term.

MLS 464 – Mycology and Virology were split into two different courses. Mycology will now be paired with parasitology, virology will be paired with molecular. Identification of clinically significant organisms in mycology will be moved from a microscopy practical exam to photo images with case studies.

[PSLO2 - Proficiency to **problem-solve**, troubleshoot, and interpret results, and to use statistical approaches when evaluating data](#)

Data from [class of 2021](#) indicate that **the coursework has NOT MET this outcome** for 2 out of 8 courses measured. A lookback on the data from previous years indicate that this outcome has been met in multiple subjects by multiple instructors consistently and that those courses continue to meet minimum standards. This was also the first year that these two courses measured this objective.

In discussion, faculty determined that this outcome and PSLO1 utilized interchangeable methods of assessment. In order to better align assessment methods for coursework, faculty felt that PSLO2 should in future be measured by assignments that were case studies that required students to interpret results or manipulate data through calculations.

Regarding student performance on these particular assignments, faculty plan to provide more examples in class of how to interpret results and manipulate data.

MLS 464 – Mycology and Virology were split into two different courses. The assignment used for assessment was the final exam that combined both topics in the original course. Faculty felt that the exam contained too much information for the short period of learning. New exams will be topic specific and in separate courses. The new curriculum will streamline the organisms covered so that more emphasis is placed on fewer organisms. The topic of mycology has moved from summer to fall and combined with a more similar topic of parasitology.

MLS 462 – The assignment was formerly given in laboratory and performed in groups. Students previously did well on the assignment. The assignment was determined to be too much for one person to handle and didn't adapt well to the online environment. Student discussion was deemed a valuable aspect of this assignment. The assignment will be given in person and students will work in groups.

MLS424 – Determine a better tool for assessment of this outcome

PSLO3 - Professional and ethical conduct, respecting the culture and diversity of individual preference of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients

Data from class of 2021 indicate that the **coursework has MET this outcome** for all courses measured. A lookback on the data from previous years has indicated that this objective is an objective that has been the focus of some work over the years. Whereas previous years measured this objective by student performance on the Ethics Exam in MLS432, this is the first year that it was measured by any other coursework. The ethics exam was improved in 2019 when Ethics was an ESLO measured. Students have consistently performed well on the ethics exam, including class of 2021. No action plan is necessary at this time for this particular outcome.

PSLO4 - Maintaining appropriate composure under stressful conditions

Data from class of 2021 indicate that this **coursework has MET this outcome** for both courses measured. This is the first year that coursework has been able to support the indirect data for this outcome. No action plan is necessary at this time for this particular outcome.

PSLO5 - Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.

Data from class of 2021 indicate that this **coursework has MET this outcome** for all five courses measured. This is the first year that coursework has been provided on this outcome from any other course than MLS462 and MLS432. It is gratifying to note that other coursework supports the outcomes seen in the previous data. No action plan is necessary at this time for this particular outcome.

PSLO6 - Application of safety and governmental regulations and standards as applied to medical laboratory practice.

Data from class of 2021 indicate that this **coursework has MET this outcome** for all three courses measured. All courses measured on this objective have demonstrated consistent performance over the past three years that data was collected. In 2019 MLS 462 measured this outcome by the inspection quiz and found performance to be lower than expected. Work on both the instruction and rubric evaluation of the material has produced a measurable increase. No action plan is necessary at this time for this particular outcome.

PSLO7 - Effective communication skills to ensure accurate and appropriate information transfer.

Data from class of 2021 indicate that this **coursework has MET this outcome** for all five courses measured. For many of the courses providing data, this was the first they were evaluated for this outcome. It is gratifying to note that data previously collected demonstrated consistent performance on this objective. In 2020 MLS 462 measured this outcome by the SOP assignment and found performance to be lower than expected. Much work went into improvement of the assignment write up and instruction and current performance has produced a measurable increase. No action plan is necessary at this time for this particular outcome.

Act

Indirect Measure of PSLO from Exit Survey of class of 2020 not available.

Direct measure of accreditation outcomes for class of 2020.

	NAACLS Minimum Standards	Class of 2020	National Average for MLS programs reported to NAACLS in 2020
BOC Score	NA	530	485
Certification Passage	75%	97%	77.4%
Graduation Rate	70%	100%	95%
Employment Rate	70%	92%	96%
Attrition	Must be documented	0	Not reported

Direct Measures of PSLO from Coursework for class of 2020.

PSLO1	PSLO2	PSLO3	PSLO4	PSLO5	PSLO6	PSLO7
PDE: Obtains accurate and precise results.	PDE: Shows logical thinking and resourcefulness in dealing with problems.	PDE: Demonstrates integrity and ethical behavior.	PDE: Maintains work Quality and Quantity under stress.	PDE: Performs appropriate quality control/ quality assurance procedures.	PDE: Follows laboratory institutional safety policies.	PDE: Receives/gives information to others effectively & courteously.
100% of student reports returned received >2 on PDE.	100% of student reports returned received >2 on PDE.	100% of student reports returned received >2 on PDE.	97% of student reports returned received >2 on PDE.	100% of student reports returned received >2 on PDE.	100% of student reports returned received >2 on PDE.	100% of student reports returned received >2 on PDE.
MLS443 MLS420	MLS464 MLS415	MLS432	MLS416	MLS432	MLS432	MLS462 MLS422
100% scored B or greater on BB practical 92.3% scored B or greater on Immunology practical.	Direct: 94.9% of students scored B or greater on cases in both Parasitology and Chemistry.	Direct: 100% scored B or greater on Ethics project.	Direct: unmeasured due to COVID closures.	Direct: 100% scored B or greater on QC/QA exam	Direct: 100% scored B or greater on Safety Exam	Direct: 83.3% received B or greater on SOP assignment. 100% scored B or greater on Molecular teach the class assignment
	Previous Action plan from class of 2019 MLS452 80% with B or greater on assignment: 1) evaluate the assignment and grading criteria to make sure the assignment reflects problem solving ability, and 2) Give students more case studies to work through during hematology instruction. 2020 data: 82% 2021 data: 88%		Action taken: Student opportunity to become involved with Research project on Cortisol levels.		Previous Action plan from class of 2019 MLS462 79% with B or greater on assignment:1) Improve Assignment rubric 2) Improve course instruction on compliance activities. 2020 data: 100% 2021 data: 94%	Action taken: SOP assignment was accompanied by a pre-recorded lecture and examples for class of 2021. Class of 2021 data: 100%

Faculty Discussion on improvements:

[PSLO1 - Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.](#)

Data from class of 2020 indicate that **the program is meeting this outcome** directly, indirectly and externally in multiple subjects. Further, if students were not competent in all areas of the laboratory, they could not pass the Board Certifying Exam or have as excellent job placement as they do. No action plans have been completed on this outcome in the past. Faculty feel that the improvements to the assessment process have highlighted some areas for improvement within the curriculum. Given the success on previous action plans, faculty are excited to see the results of action plans put into place for class of 2022.

[PSLO2 - Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data & ESLO Inquiry and Analysis & Quantitative Literacy](#)

Data from class of 2020 indicate that **the program is meeting this outcome**. External measures from student externship experience point to satisfaction of this criteria. Previous action plans have focused on coursework in Hematology. The program added cameras to all microscopes used in hematology in 2020. Use of these cameras allowed faculty to problem solve techniques in microscopy quicker than in years past. The hematology instructor also spent considerable time in the curriculum adding additional case studies. The 2021 data indicate that these efforts have demonstrated improvements.

Regarding **Inquiry and Analysis** which the university defines as “posing meaningful questions about situations and systems, gathering and evaluating relevant evidence and articulating how that evidence justifies decisions” the students’ ability to problem solve, choose and perform tests to gather data and make a decision regarding diagnosis exemplifies the objective posed by the university. The ability to problem-solve has come up as a request on student exit surveys, alumni surveys and employer surveys in the past. The program spent considerable effort to implement a simulation laboratory as a capstone experience to demonstrate problem solving ability. This experience will remain a core part of the curriculum to aid in student problem-solving and trouble-shooting ability. Assessment of this experience has demonstrated growth throughout the experience and feedback on student performance in externship has supported these conclusions. Regarding **Quantitative Literacy** which the university defines as “the ability to appropriately extract, interpret, evaluate, construct, communicate, and apply quantitative methods to solve problems” the post-analytical interpretation of data gathered during these student laboratory exercises demonstrates student quantitative literacy. Performance on BOC exams also supports the students’ ability to interpret lab produced data as do their scores from externship and student experience from survey.

[PSLO3 - Professional and ethical conduct, respecting the culture and diversity of individual preference of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients & ESLO Ethical Reasoning](#)

Data from class of 2020 indicate that **the program is meeting this objective** both in external evaluations of student ethical behavior and in student academic work. Previous years indicated that graduates of the program did not consider OIT to have contributed to their ethical training. Much work went into improving curriculum and evaluation of this criteria in MLS432 and through programmatic ventures such as Orientation and Interprofessionalism. Student exit survey responses demonstrated improvements up to the most recent year of measure.

The **diversity** component was added to this outcome in 2020 through the wording change that included recognition of individual preference based on culture and diversity. The program continues to find ways to improve instruction and assessment of diversity and global awareness. The attempt to measure this outcome with blood bank coursework in 2021 highlighted the need for this focus for future years. Work done has included the addition of a privilege chains exercise in MLS462, a journal reflection in the same course and additional discussion in courses related to normal values in different populations. Faculty are eager to develop ways to assess this in partnership with the University.

PSLO4 - Maintaining appropriate composure under stressful conditions

Data from class of 2020 indicate that **the program is meeting this objective**. Faculty met in 2019 with the campus counselor to gain training on stressful student interactions. Faculty also attended continuing education trainings on stress management in the healthcare setting. Additional focus on stress management has been added to the orientation materials and several courses in the program including MLS 462 Foundations II and the Simulated laboratory debrief discussions. For 2022 faculty opened the opportunity for students to participate in research on cortisol levels and their relation to stress.

PSLO5 - Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.

Data from class of 2020 indicate that **the program is meeting this outcome** directly, indirectly and externally in multiple subjects. This objective does encompass quite a bit of material. A student must understand quality assurance and quality control which is asked about on their PDE and is demonstrated in their daily laboratory activities. A student must also show abilities in fiscal management which they aren't expected to do in practice until they are in management positions. Then, proficiency in laboratory education which they might do more than a year after graduation and after their own training is complete. The rotation of assignments to demonstrate these different aspects of the single objective revealed that though students were lacking confidence in their abilities to perform these tasks, their work performance proves that they are competent. Class of 2018 was assessed on educational methods, class of 2019 was assessed on fiscal management, and class of 2020 was assessed on QC/QA. All cohorts met the criteria set by the program. Class of 2021 continues to demonstrate acceptable performance on this objective in their coursework where even the expanded data collection found no gaps in performance.

PSLO6 - Application of safety and governmental regulations and standards as applied to medical laboratory practice.

Data from class of 2020 indicate that **the program is meeting this outcome** directly, indirectly and externally in multiple subjects. Class of 2020 demonstrated improvement on this particular objective through the addition of coursework on inspections and government relations in MLS462. Both class of 2020 and 2021 met minimum standards of performance.

Additionally, student performance on this outcome is reflected from the number of **student safety events** that occurred in student lab and/or on externship. Class of 2018 had **2 adverse events** related to eye contamination. Class of 2019 was required to wear protective eye wear during all laboratory activities in student labs, and no further incidents occurred in student lab. On externship, **one exposure** to an infectious agent occurred for class of 2019 unrelated to eye exposure.

For class of 2020 and 2021 extra precautions in infection prevention were instituted to student labs and at hospital sites due to the global pandemic COVID-19. Students experienced virtual lectures but met in person in small groups of less than 14 students for laboratories. Students were required to wear cloth masks covering noses and mouths, protective eye wear, gloves and lab coats at all times both in student lab and on externship. Faculty implemented additional signage regarding these safety precautions and developed of a safety video. Students that had home exposures were required to stay home until being cleared. Both classes have had no workplace exposures, and thus far no COVID cases have been attributed to student laboratory exposure in any class participated in by the now three cohorts that have been on campus.

PSLO7 - Effective communication skills to ensure accurate and appropriate information transfer & ESLOs Teamwork and Communication

Data from class of 2020 indicate that **the program is meeting this outcome** directly, indirectly and externally in multiple subjects. Previously this outcome was measured both by performance on an independent written assignment and a group oral presentation. Students in the program have consistently performed well on the oral presentation but 2020 cohort did not meet on the independent written assignment. Action plan was implemented within the course to provide extra examples on the written assignment and it appears to have worked given class of 2021 data.

Oral assignment grades are dependent on how well the team works together to produce the final product. Class of 2020 had a difficult time on group projects toward the end of their coursework as the ability to meet in groups was limited. Despite these additional challenges, students performed adequately on the oral presentations required. **Communication** amongst team members being a valuable life skill for working within the laboratory and within interdisciplinary health care teams. The 2020 and 2021 curriculum has spent much time emphasizing the team aspect of laboratory medicine in Orientation, Coursework and in simulated laboratory. Group exercises continue to be especially important when working within the academic cohort. As the academic year progresses, curriculum emphasizes group work to a greater degree culminating in an onslaught of group projects assigned in the summer term. The university defines **teamwork** as “the ability to accomplish group tasks and resolve conflict within groups”. Especially important to the program and the profession is the ability of individuals from different factions (nursing vs laboratory) to be able to listen to each other courteously and learn from each other. The MLS program introduced curriculum around active listening to the Orientation in 2017. For Orientation of class of 2021, MLS faculty reinforced teambuilding concepts, based on recommendations from class of 2020, by assigning groups for the first group assignment for fall coursework and assigning the practice of group dynamics. The fruits of this labor were realized in summer coursework as students appeared to have less stressful interactions in their groups because of the practice in assigning roles.

Section 8 – Closing the Loop

The table below compares the assessment data for PSLOs and NAACLS requirements over the last 5 years. Looking at the current data compared to previous, demonstrates that student perspectives on their own progress within the program of PSLOs and individual courses have improved in all categories since it has been measured. PDE evaluations also demonstrated a steady state of high scores of professionalism across the categories. While graduation rates and Certification scores have held steady over the last several years. Only in the last couple of years has employment begun to dip. The addition of coursework to the measurements more directly illustrates where improvement efforts should be focused.

Outcomes	Class of 2021 (Preliminary) *added courses	Class of 2020	Class of 2019 *Added PSLO 4	Class of 2018 *Changed direct measure of outcome	Class of 2017 *Changed minimum standard of Indirect measure	Class of 2016
PSLO1	Met for: [redacted] MLS470, MLS474 MLS449 MLS415 Not Met for: [redacted] MLS452, MLS464	Direct: 100% scored B or greater on BB practicals and 92.3% scored B or greater on Immunology practical. Outside: 100% of student reports returned received >2 on PDE. Indirect NA	Direct: 100% scored B or greater on Parasitology. 100% scored B or greater on Chem II. Outside: 100% of student reports returned received >2 on PDE. Indirect: 100% of student responses rated Quite a bit or very much	Direct: 100% scored B or greater on UA final. 85% scored B or greater on Heme II Assignment. Outside: 100% >2 on PDE. 78% received highest score possible. Indirect: 100% rated "Quite a bit" or "very much"	Direct: BOC 95.7% pass rate Outside: 100% >2 on PDE. 66% received highest grade possible. Indirect: 96.5% rated "Quite a bit" or "very much"	Direct: BOC 97.9% pass rate Indirect: 94.3% student exit survey rated above "somewhat"
PSLO2	Met for: [redacted] MLS452, MLS470 MLS474, MLS449 MLS415 Not Met for: [redacted] MLS462, MLS464	Direct: 94.9% of students scored B or greater on cases in both Parasitology and Chemistry. Outside: 100% of student reports returned received >2 on PDE. Indirect NA	Direct: 100% scored B or greater on UA project. 80.4% scored B or greater on Heme project. Outside: 100% of student reports returned received >2 on PDE. Indirect: 90% of student responses rated Quite a bit or very much	Direct: 100% scored B or greater on Micro II project. 100% scored B or greater on Mycology project. Outside: 97.4% >2 on PDE. 77% received highest score possible. Indirect: 93.8% rated "Quite a bit" or "very much"	Direct: BOC 95.7% pass rate Outside: 100% >2 on PDE. 67% received highest grade possible. Indirect: 89.7% rated "Quite a bit" or "very much"	Direct: BOC 97.9% pass rate Indirect: 82.9% student exit survey rated above "somewhat"
PSLO3	Met for: [redacted] MLS470, MLS462	Direct: 100% scored B or greater on Ethics project. Outside: 100% of student reports returned received >2 on PDE. Indirect NA	Direct: 100% scored B or greater on Ethics project. Outside: 100% of student reports returned received >2 on PDE. Indirect: 93% of student responses rated Quite a bit or very much	Direct: 100% scored B or greater on Ethics project. Outside: 100% >2 on PDE. Indirect: 84.4% rated "Quite a bit" or "very much"	Direct: BOC 95.7% pass rate Outside: 98.8% >2 on PDE. Indirect: 82.8% rated "Quite a bit" or "very much"	Direct: BOC 97.9% pass rate Indirect: 60% student exit survey rated above "somewhat"
PSLO4	Met for: [redacted] MLS470, MLS449	Direct: unmeasured due to COVID closures. Outside: 97% of student reports returned received >2 on PDE. Indirect NA	Direct: Stress Test not given (no measurement) Outside: 100% of student reports returned received >2 on PDE. Indirect: 90% of student responses rated Quite a bit or very much	Outside: 100% >2 on PDE	Not assessed	Not assessed

PSLO5	Met for: MLS462 MLS474 MLS470 MLS462 MLS449	Direct: 100% scored B or greater on QC/QA exam Outside: 100% of student reports returned received >2 on PDE. Indirect NA	Direct: 100% scored B or greater on Finances Quiz Outside: 100% of student reports returned received >2 on PDE. Indirect: 90% of student responses rated Quite a bit or very much	Direct: 93.5% scored B or greater on Education Project Outside: 100% >2 on PDE Indirect: 84.4 % rated "Quite a bit" or "very much"	Direct: BOC 95.7% pass rate Outside: 100% >2 on PDE Indirect: 86.2 % rated "Quite a bit" or "very much"	Direct: BOC 97.9% pass rate Indirect: 82.8% student exit survey rated above "somewhat"
PSLO6	Met for: MLS462 MLS474 MLS470	Direct: 100% scored B or greater on Safety Exam Outside: 100% of student reports returned received >2 on PDE.	Direct: 79% received B or greater on Inspection Quiz. Outside: 100% of student reports returned received >2 on PDE. Indirect: 90% of student responses rated Quite a bit or very much	Direct: 100% received B or greater on Safety project. Outside: 100% >2 on PDE Indirect: 96.8 % rated "Quite a bit" or "very much"	Direct: BOC 95.7% pass rate Outside: 100% >2 on PDE Indirect: 93.1 % rated "Quite a bit" or "very much"	Direct: BOC 97.9% pass rate Indirect: 91.2% student exit survey rated above "somewhat"
PSLO7	Met for: MLS462 MLS470 MLS452 MLS464	Direct: 83.3% received B or greater on SOP assignment. 100% scored B or greater on Molecular teach the class assignment Outside: 100% of student reports returned received >2 on PDE.	Direct: 100% received B or greater on Oral Case Study and Written Validation Project. Outside: 100% of student reports returned received >2 on PDE. Indirect: 90% of student responses rated Quite a bit or very much	Direct: 97.8% received B or greater on SOP Assignment. 97.8% received B or greater on Chem II project. Outside: 100% >2 on PDE. 84% received highest score possible Indirect: 100% rated "Quite a bit" or "very much"	Direct: BOC 95.7% pass rate Outside: 100% >2 on PDE. 79% received highest grade possible. Indirect: 96.5% rated "Quite a bit" or "very much" *Changed Survey Question reviewed	Direct: BOC 97.9% pass rate Indirect: 68.5% student exit survey rated above "somewhat"
Average Certification score	NA	530	547	529 *New BOC published	592	564
Certification Rate	NA	100% total pass rate 84% first time pass rate	95.2% total pass rate 90.5% first time pass rate	96.7% total pass rate 91.3% first time pass rate	95.7% total pass rate 89% first time pass rate	97.9% total pass rate 91.5% first time pass rate
Graduation Rate	NA	100%	97.6%	100%	97.8%	94%
Employment	NA	100%	97.6%	100%	100%	100%
Attrition #	0	1/39; 1 delayed to graduate with class of 2021	2/44; 1 dismissed during 2021, 1 left before second half	0/44	1/46 1 dismissed before second half	0/49; 2 enrolled to graduate with class of 2017

Looking at the data since 2017, the additions to the coursework and focuses seem to have increased student confidence in their education and abilities. Student exit survey responses increased from below the 85% threshold to clearly in range at 90-100% of the 2019 cohort feeling like their course work increased their abilities in all areas measured. Two cohorts of students have participated in interprofessionalism coursework, safety incidences have been documented and demonstrated a decrease, diverse perspectives curriculum was designed and implemented, and all courses have procedures on the laboratory tablets. The addition of simulation laboratory to curriculum has provided a capstone experience that is adaptable and focused on student problem solving ability and stress management, two areas where assessment data demonstrates improvement is needed. Overall, it seems that once improvement opportunities are identified, faculty take them seriously in their development of action plans and those action plans have demonstrated success.

Assessment process changes have been evaluated over the years as well. The addition of coursework to assessment processes has really brought forth focused coursework change. As the assessment processes continue to grow and change, the program has been recognized by both the national accrediting agency and the university for the quality of the assessment process.

Budget Alignment

MLS department budget continues to focus on long term goals of producing students that are employable in the field of Medical Laboratory Science. To that end, the program maintains an annual subscription to Media Lab, an online service that includes learning modules, simulation case studies and test bank database meant to mimic certifying exam environment. This program is used throughout the year and to give students practice on taking the certifying exam that allows them to work in the field, before graduation.

Faculty development is supported through the expense of conference registration. Attendance at continuing education and professional conferences allows faculty to maintain current with trends in the profession.

Specific expenses made in the past two years have supported the outcomes measured by the program both in the purchase of safety equipment (PSLO6) and support of the simulation laboratory (PSLO2). These as needed expenses for programmatic improvement are instituted by faculty engagement with the curriculum and the overall goals of the program.

Equity in the Program

The program has identified no equity gaps by gender, race, or economic background have been identified in retention, graduation, placement, certification passage, for any MLS students. This program has an excellent retention from all backgrounds. Self-identified students of color have been retained in the program for the past 5 years at greater than 90%, likewise with Pell Grant recipients and first-generation individuals. Women which have made up the vast majority of students, have been in the upper 80% of retention. Faculty discussion of this data indicates that most likely this lack of equity gap is attributed to the large support for all students during the program by the close-knit faculty, and the strict admission criteria.

Faculty would like to examine equity gaps in individual coursework performance for students that have English as a second language. A tab will be added to the assessment data collection sheets so that student performance can be filtered based on this criteria. Should a gap be identified, faculty will look to university support for developing ways to encourage these students to communicate with faculty before they have academic difficulties.

Looking at admission data is where the diversity of the class is lacking. Students admitted to the program over the past several years have been between 60% and 65% white and greater than 65% female. Class of 2020 was the first year that women only made up 51% of the cohort, however the cohort persistently remains 66% white. Given that the Oregon 2020 census found that 84% of Oregon's population is white, this data is not unexpected. Further, Oregon census data found that 2% of Oregon's population identifies as Black, 4% identifies as Asian and 11% identifies as Latino. This breakdown is not represented in the cohorts graduated from the MLS program of which roughly 12% on average identify as Asian and 3-7% as Hispanic. If the program is to be representative of Oregon's population, recruitment must be conducted both in the Latinix and Black communities. These recruitment efforts seem to have been successful in the Latinix population of class of 2022 which for the first time has 15% of students identifying themselves as Hispanic. Given, retention data, it is expected that once students (even those of color) are admitted, this program will see them through to graduation.

Summary Statement

The Medical Laboratory Science Department continues to review the process of assessment and make reasonable changes in order to mine the data that will give useful information regarding student performance. Faculty are actively involved in the process and are committed to maintaining high standards of performance for their students. Student performance in the program has been stable for many years despite faculty and location changes. Faculty are also committed to making improvements in their own knowledge of laboratory science, teaching processes and presentation of curriculum to keep current and to allow their students to perform to the highest standards. The budget has allowed this commitment to see fruition through support of faculty travel and the purchase of vital program equipment that modernizes student learning. The student experience of the program is a respected element of the performance of the program and will continue to be reviewed in order to provide an excellent source for improvement ideas to individual courses. Student work in individual courses that represent program outcomes has been the most informative change to program assessment and continues to express student achievement across the courses that is reinforced by student performance on outside measures of student competence in externship and on certifying exams.