

## Section 1 – Program Mission

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.

## Section 2 – 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.

## Faculty Review of Objectives

Faculty annual review of these objectives changed the objectives from "demonstrated" abilities to acquiring the "knowledge needed to" in recognition of the fact that students require time in the field to become proficient at all of the listed activities. The objectives of the program are to prepare the students for their career as life long learners in the field of medical laboratory science.

## Section 3 – Program Description and History:

### History

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.

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 and Arizona.

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 and an almost 100% graduation rate over the last 10 years. Yearly attrition has not been more than 1 or 2 students over the last ten years as well. Most OHSU/OIT graduates choose to become certified by ASCP BOC exam due to the large recognition it receives in the job market.

The Medical Laboratory Science professional program is 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.

### Enrollment

The campus program can accommodate laboratory experiences for a maximum cohort of 50 students. The admitted class size is limited by two factors: 1) externship site availability and 2) qualified applicant pool.

Though Oregon Tech maintains affiliations with more than 50 clinical laboratories, the actual availability of externships varies by year and department. Some sites do not take students every year due to staffing levels or budget constraints. Many clinical laboratories are consolidating testing to regional laboratories and thus do not provide opportunities for all learning required of our students while out on externship.

As demonstrated in the below table, the applicant pool has decreased over the last several years. It is important to maintain strict standards for acceptable candidates to the program. Work being done to increase applications include communication with Oregon Tech marketing department, MLS program presence at community career fairs and events, program faculty participation in Pre-MLS programs at Oregon Tech, Clackamas Community College and Warner Pacific College. It is also of note that in 2017 over one thousand inquiries to the program went unanswered due to a communication glitch that has since been repaired.

Academic Year	# of Applications	New cohort fall term	Externship students registered for fall term – scheduled to graduate in December	# Graduated in December
2013-14	125	50 students	35 students	35
2014-15	102	45 students	49 students	48
2015-16	93	50 students	45 students	45
2016-17	82	46 students	47 students	47
2017-18	77	46 students	46 students	46

## Yearly Attrition

Our program consists of 5 consecutive quarter-terms. Students start in the fall and complete the program at the end of the following fall term. Accordingly, the program determined the final half of the program to be when students begin the spring or third term of the five terms of the program.

Very few students admitted to the program do not successfully complete it. Some students have decelerated the program for personal reasons and then gone on to graduate with a later cohort. In graduating class of 2017, one student was found not to meet the required elements of the program for microscopic work. After failure to meet requirements of remediation, he was dismissed from the program.

## Graduates

Our program retention and overall graduation rate for the MLS classes of 2011 – 2017 is 98.2%.

Academic Year Class of	Students in new cohort	Students Graduating	Graduation Rate
2010-11	34	34	100%
2011-12	27	27	100%
2012-13	35	35	100%
2013-14	50	48 (1 withdrew/1 died)	96%
2014-15	50	50	100%
2015-16	50	47 (1 withdrew) 1 decelerated + 1 withdrew for USAF will graduate 2017	94%  (98% if you include the 2 that will graduate in 2017)
2016-17	46	47 (1 dismissed + 2 from previous cohort)	98%

## Employment

Graduates of the program who pass the certifying exam go on to be employed on average 80% by laboratories affiliated with the university program. Further, 85% of students are employed in Oregon within the first year from graduation. Most students report employment within three months of graduation. More than 50% take employment from their externship site.

The data in the following table has been developed as a combination of Graduate Exit Survey and the MLS program contact with graduates.

Academic year Class of	Student reported placement rate within 1 year of graduation	Average student reported salary	Median Student reported salary
2013-2014	97.8%	\$52,083	\$55,000
2014-2015	100%	\$56,950	\$55,000
2015-2016	100%	\$56,688	\$56,000
2016-2017	100% ( 2 non-reported)	\$57,400	\$56,000

## Board Exam Results

ASCP Board of Certification Exam Scores for **Graduating class of 2017** exceed national averages. See assessment data for trends.

	Mean Scaled Scores (First Time)	Total Pass Rate	First Time Pass Rate
OIT/OHSU MLS Program – Class of 2017	592	95.7%	89.0%
University based programs	516	75%	81%
National-All programs	514	74.3%	80.5%

## Industry Relationships

Program faculty held a meeting with their Advisory Board on Tuesday June 5<sup>th</sup> 2018 from 1:00pm-5:00pm. Members of industry clinical affiliates and the affiliated college program at Clackamas Community College have been included on the Advisory Board. The meeting of Board members and program faculty reviewed the Program Mission and Objectives, Assessment data, and industry trends.

Please see meeting minutes attached for complete discussion notes.

The program maintains contact with several vendors in the field of Medical Laboratory Science. Some contacts are alumni of the program, some are industry partners donating reagents or equipment to foster learning. Much support of the program has been provided through career panel, interview prep, and externship affiliation.

Staff and students are encouraged to actively become involved in the industry's professional organizations through continuing education events and meetings. Students have been invited to participate in the following industry provided events:

- Northwest Medical Laboratory Symposium
- American Society of Clinical Laboratory Science (ASCLS) state and national conferences
- Student Representative for the state chapter of ASCLS
- American Society of Clinical Pathology (ASCP) National Conference

The 2017-2018 academic year was the first time the program became involved in an interdisciplinary program at OHSU that aims to further communication between medical professionals during patient care. Involvement of the students of the 2018-2019 class in the Interprofessional Practice was deemed a valuable experience to pursue for the future of the profession and completing the students' comprehension of their role in the workforce. MLS program faculty have completed the training and will be acting as facilitators in this program for the 2018-2019 academic year.

## Student Perspectives from Graduating Class of 2017

"I developed a greater understanding of what was important by doing the externship"

"The labs and the workload really made me learn the subject. I used it every day during my rotation."

"[My instructor] not only taught course material but gave personal advise to survive the program and work in the industry – knowledge that went beyond the classroom was excellent."

"What served me most was learning quality control. I was actually given scenarios in my job interview and was asked how I would respond upon the information given. I hope that my ability to answer correctly was just one important piece that contributed to getting the job at my preferred site."

"While some classes it feels that the theory doesn't apply, knowing that theory is helpful both for the BOC and having an idea why a doctor has ordered that test. It also might help with troubleshooting if a result doesn't seem to match what diagnosis has been made."

## Externship sites Perspectives from Graduating Class of 2017

The sentiment of our students being an asset to their work environment has been repeated through many different student evaluations. The following are representative comments from the students' clinical affiliated externship sites.

"He is highly respected by all trainers and displays a cooperative spirit."

"She has a good foundation for learning in a fast- paced environment."

"She has knowledge of the material, initiative, and is comfortable working independently after a reasonable amount of instruction."

"I wish her the best of luck in her future, I have no doubts she will be an asset to whichever work group she joins!"

## Section 4 – Program Student Learning Outcomes

Program Educational Objectives refers to items graduates of the program will have knowledge or experience with from their time in the program. Assessment of the program's success in achieving its objectives is measured both by student progress on program specific student learning outcomes (PSLO) and certain requirements by the program's accrediting agency NAACLS.

### Assessment changes for class of 2016-2017

Program Assessment for the last several years only included data required of the accrediting agency: graduation, attrition and certification exam rates. Though PSLOs were identified, they were not measured individually. Class of 2016 assessment cycle introduced the student exit survey as a tool to be utilized in assessing the PSLOs. Data being collected for assessment of class of 2018 will also include examples of student work from classes to assess the PSLOs.

### Program Specific Student Learning Outcomes (PSLO)

Six measurable learning outcomes have been defined that encompass both the university standards (communication, Inquiry & Analysis, Ethical reasoning, Teamwork, Quantitative Literacy 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 the students' knowledge of the subjects required to make clinical decisions, and also the ability to perform the analytical testing as they would in the workplace. Each program course has 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.

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.

3. 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. Maintaining appropriate composure under stressful conditions.

This outcome measures student ethical reasoning with a focus on interprofessional interaction of a team caring for a patient. The students in the MLS program are given an opportunity to work with first year medical, RN, PA, dentistry, nutrition, EMS and/or pharmacy students from OHSU as an interprofessional team to work through ethical reasoning scenarios that affect patient care. This project extends the length of the MLS program; the groups meet officially three times on the OHSU campus, then twice on their own time as small groups to complete projects and presentations.

Ethical issues are discussed in all courses throughout the program. Foundations of Medical Laboratory Science I at the beginning of the program assigns students a specific ethics project that will be utilized for this year's ESLO measure. Students are 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.

*Note: This Learning outcome was changed this year to include "maintaining composure under stressful conditions". Faculty review of objectives determined that stress management belonged with this objective rather than with administrative skills.*

4. 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.

*Note: This learning outcome was changed this year to remove "maintaining composure under stressful conditions." It was felt that a measurement of stress management better belonged to the previous objective rather than one measuring administrative skills.*

5. 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 classroom and in externship.

6. 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.

## 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

## Section 5 & 6 – Curriculum Map & Assessment Cycle

Assessment methods have gradually changed over the years in order to be a more useful evaluation tool for the program. Initially, the program was only assessed on graduation and certifying exam passage as required by the accrediting agency. Student survey results were introduced in evaluation of class of 2016. These results were found to be a meaningful starting point for making improvements to the program. The outside evaluation was added for evaluation of class of 2017. This information seems to give some perspective on the survey results on student outcomes. For class of 2018, student outcomes will be assessed not only by their graduation statistics but also by their work performed during the program and the professional development evaluation from an outside source. Utilizing work performed during the program will accurately demonstrate student performance on the specified program outcomes beyond their test taking abilities.

### Graduating class of 2017 Assessment Cycle

PSLO assessment is taken from student exit survey as an **indirect measure**. Faculty review of the professional development evaluation (a document filled out about the student from the externship site) identified questions on the survey to be **direct measures** of the PSLO at the capstone level. This data and NAACLS required data completed the assessment cycle for 2016-2017 class.

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 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. 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.
PSLO #	1	2	3	4	5	6
Direct	Obtains accurate and precise results.	Shows logical thinking and resourcefulness in dealing with problems.	Demonstrates integrity and ethical behavior.	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?	Please rate your proficiency on this outcome?



## Graduating class of 2018 Assessment Cycle

In an effort to provide more data regarding specific elements of the program that need improvement, a coursework element was introduced for assessment of graduating class of 2018. All faculty were asked to identify in each of their courses a project or exam from 2017-2018 academic year that would measure each of the listed outcomes. All identified exams and projects were necessary components to the courses and were graded by the instructor of the course according to their classroom specific rubric. Some courses did not lend themselves to every outcome.

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. Questions on the Professional Development Evaluation given every year, that apply to the outcome are specified. The top line refers to the outcomes as numbered in the PSLO list above.

This data is beginning to be tracked for class **graduating in 2018** but will not be complete until December 2018.

### MLS Program Learning Objectives Curriculum Map

**F – Foundation**

**P – Practice**

**C – Capstone**

COURSE	PSLO1	PSLO2	PSLO3	PSLO4	PSLO5	PSLO6
MLS442 Hem I	F	F		P	P	
MLS 420 Immunology	F	F		P	P	
MLS 432 Found I	F	F	P	P	F	
MLS 474 Parasit	P	F		P	P	
MLS 415 Chem I	P	F		P	P	
MLS 452Hem II	P	P		P	P	
MLS 444 Micro I	F	F		P	P	
MLS 462 Found II		F	P	C	C	C
MLS 449 UA	F	P		P	P	
MLS 443 BB I	F	F		P	P	
MLS 445 Micro II	P	P		P	P	
MLS 416 Chem II	P	P		P	P	
MLS 417 Chem III	P	P		C	P	
MLS 424 Hemostasis	P	P		P	P	C
MLS 422 Molecular	P	F		P	P	C
MLS 453 BB II	P	P		P	P	
MLS 464 Myco/Viro	P	F		P	P	
MLS 457 Research		C	C	C	C	C
MLS 463 Found III		C		C	C	C
MLS 470	C	C	C	C	C	C
MLS 471	C	C	C	C	C	C
MLS 472	C	C	C	C	C	C
MLS 473	C	C	C	C	C	C
PDE Question	10	18	36	7	3	50

Utilizing the best fit course to the outcome, an assessment cycle map was created. As much as possible, two courses are assigned to give data for the outcome each year. As many courses as were best fit for demonstration of the outcome were rotated through the cycle map giving data on the courses from different cohorts. This information should give the program data that can be more directed toward specific coursework as the focus of improvement. University Student Learning Outcomes are included in the cycle map as well.

Outcomes	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
PSLO1	MLS 449 UA MLS 452 Heme II	MLS 474 Parasitology MLS 417 II	MLS 420 Immunology MLS 453 Immunoematology II	MLS 422 Molecular MLS424 Hemostasis	MLS 464 Mycology/virology MLS 445 Micro II
PSLO2	MLS 464 Mycology/virology MLS 445 Micro II	MLS 449 UA MLS 452 Heme II	MLS 474 Parasitology MLS 417 Chem II	MLS 420 Immunology MLS 453 Immunoematology II	MLS424 Hemostasis MLS 422 Molecular
PSLO3	MLS 432 Ethics Project	MLS 416 Stress Test	MLS 432 Ethics Project	MLS 416 Stress Test	MLS 432 Ethics Project
PSLO4	MLS 462 Education Project	MLS 462 Fiscal Management Project	MLS 432 QC/QA project	MLS 462 Education Project	MLS 462 Fiscal Management Project
PSLO5	MLS 432 Safety Project	MLS 462 CAP Inspection Project	MLS 432 Safety Project	MLS 462 CAP Inspection Project	MLS 432 Safety Project
PSLO6	MLS 462 SOP project (written) MLS 416 Chem II Presentation (oral)	MLS 417 Method Validation (written) MLS 472 Case Study (oral)	MLS 462 SOP project (written) MLS 422 Teach the class Assignment (oral)	MLS 417 Method Validation (written) MLS 472 Case Study (oral)	MLS 462 SOP project (written) MLS 422 Teach the class Assignment (oral)
University ESLO	Inquiry & Analysis:  <i>MLS 416 Chem II case study presentation</i>	Ethical Reasoning:  Foundations I MLS 432 Ethical Reasons Project	Teamwork:  Foundations III MLS 472 Case Study	Quantitative Literacy:  MLS 457 Research Seminar	Diverse Perspectives:  TBA

## Section 7 – Methods for Assessment

### Professional Development Evaluations

Professional development evaluations (PDE) are given to students during the didactic 12- month course work by all of their instructors after Spring Term. Some courses do professional development evaluations earlier in the year to measure student progress throughout the program. Students may rate themselves utilizing the form and then instructors give input to the student after review. If an instructor recognizes an issue with a particular student, a PDE may be filled out before the end of spring term. These evaluations are meant to highlight student strengths and weaknesses in professional conduct and laboratory activities before they are released to externship. During each externship, an evaluation is filled out for the student per department. 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. The student scores are averaged per subject area (microbiology, chemistry, Hematology and Immunohematology) by the instructors after the PDE documents are returned. Minimum acceptability standard for this is 95% receiving a grade of 2 or greater on the specified professional criteria. Students receiving less than a 2 will require review by the program's progress and promotion committee. This may result in remediation of the student. Scores from externship site evaluations only are utilized as a capstone measure of the specified outcome.

### Student Exit Survey Data

As an indirect measure, student exit survey from the class **graduating in December of 2017** asked each student how they felt the program met the stated outcomes. Student perspective on their own learning is relevant to demonstrate 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 90% of students rating themselves as impacted quite a bit or very much by their time in the program for the stated outcome.

# Graduating Class of 2017 Data

Meets Criteria Department Meeting

## Minimum Criteria

**Direct:** Meet NAACLS standards

**Outside:** 95% receive a score of 2 or greater.

**Indirect:** 90% choose "Quite a bit" or "Very Much"

Student Learning Outcome	Measures	Results
PSLO 1	<p><b>Direct:</b> BOC score</p> <p><b>Outside:</b> Externship PDE performance on action item #10 "obtains accurate and precise results"</p> <p><b>Indirect:</b> Student Exit survey question "How has the OIT experience contributed to this outcome?"</p>	<p>Direct: BOC 95.7% pass rate</p> <p>Outside: 100% &gt;2 on PDE. 66% received highest grade possible</p> <p>Indirect: 96.5% rated "Quite a bit" or "very much"</p>
PSLO 2	<p><b>Direct:</b> BOC Score</p> <p><b>Outside:</b> Externship PDE performance on action item #18 "Shows logical thinking and resourcefulness in dealing with problems"</p> <p><b>Indirect:</b> Student Exit survey question "How has the OIT experience contributed to this outcome?"</p>	<p>Direct: BOC 95.7% pass rate</p> <p>Outside: 100% &gt;2 on PDE. 67% received highest grade possible</p>
PSLO 3	<p><b>Direct:</b> BOC Score</p> <p><b>Outside:</b> PDE performance on action item #36 "Demonstrates integrity and ethical behavior"</p> <p><b>Indirect:</b> Student Exit survey question "How has the OIT experience contributed to this outcome?"</p>	<p>Direct: BOC 95.7% pass rate</p> <p>Outside: 98.8% &gt;2 on PDE</p>
PSCLO 4	<p><b>Direct:</b> BOC score</p> <p><b>Outside:</b> Externship PDE performance on action item #7 "performs appropriate quality control/quality assurance procedures"</p> <p><b>Indirect:</b> Student Exit survey question "How has the OIT experience contributed to this outcome?"</p>	<p>Direct: BOC 95.7% pass rate</p> <p>Outside: 100% &gt;2 on PDE</p>
PSLO 5	<p><b>Direct:</b> BOC Score</p> <p><b>Outside:</b> Externship PDE performance on action item #3 "follows laboratory institutional safety policies"</p> <p><b>Indirect:</b> Student Exit survey question "How has the OIT experience contributed to this outcome?"</p>	<p>Direct: BOC 95.7% pass rate</p> <p>Outside: 100% &gt;2 on PDE</p> <p>Indirect: 93.1% rated "Quite a bit" or "very much"</p>
PSLO 6	<p><b>Direct:</b> BOC score</p> <p><b>Outside:</b> Externship PDE performance on action item #50 "Receives/gives information to others effectively &amp; courteously"</p> <p><b>Indirect:</b> Student Exit survey question "How do you feel your overall proficiency with this goal is?"</p>	<p>Direct: BOC 95.7% pass rate</p> <p>Outside: 100% &gt;2 on PDE. 79% received highest grade possible</p> <p>Indirect: 96.5% rated "Quite a bit" or "very much"</p>

## NAACLS Outcomes

NAACLS reported outcomes for **graduating class of 2017** are listed separately from PSLO outcomes. Minimum NAACLS accreditation standards are included in the table below for each item listed. Data for class **graduating in 2018** is not yet available.

Board of Certification scores demonstrate student overall knowledge of the subject of Medical Laboratory Science and student test taking ability at the Capstone level. Students will not be allowed to work as Medical Laboratory Scientists unless they pass the BOC exam. Therefore, the success of the program overall hinges on these scores. Instructors write exams designed to familiarize students with standard board exam questions, and students are required to study using a Board Exam approved study guide during their externship.

Graduation rates are determined as a percentage of students who have begun the final half of the program who go on to successfully graduate from the program. Our program consists of 5 consecutive quarter-terms. Students start in the fall and complete the program at the end of the following fall term. Accordingly, the program determined the final half to be when students begin the spring or third term of the five terms of the program. Attrition is determined as the number of students admitted to the program that do not go on to graduate within in the 15-months.

The employment data has been developed as a combination of Graduate Exit Survey and the MLS program contact with graduates. NAACLS requires MLS programs to report yearly average placement rates of students who found employment in the field/ closely related field or who are continuing their education within one year of graduation. They do not include students for which we do NOT have information on or those that choose to not look for employment in the field.

	NAACLS Minimum Standards	<b>Class of 2017</b>	National Average for MLS programs reported to NAACLS in 2017
Certification Passage	75%	<b>95.7%</b>	88%
Graduation Rate	70%	<b>98%</b>	94%
Employment Rate	70%	<b>100%</b>	96%
Attrition	Must be documented	<b>1</b>	Not reported

# Graduating Class of 2018 Preliminary data

Meets Criteria Does Not Meet Criteria

## Minimum Criteria

**Direct:** 85% of students receive a B or Greater

**Outside:** 95% receive a score of 2 or Greater.

Student Learning Outcome	Measures	Results
PSLO 1	<p>Direct: MLS 449 UA Final</p> <p>Direct: MLS 452 Heme II Assignment</p> <p>Outside: Externship PDE performance on action item #10 "obtains accurate and precise results"</p>	<p>Direct: 100% scored B or greater on UA assignment.</p> <p>Outside: 100% &gt;2 on PDE. 78% received highest score possible.</p>
PSLO 2	<p>Direct: Mycology Project</p> <p>Direct: Microbiology II project</p> <p>Outside: Externship PDE performance on action item #18 "Shows logical thinking and resourcefulness in dealing with problems"</p>	<p>Direct: 100% scored B or greater on Micro II project. 100% scored B or greater on Mycology project.</p> <p>Outside: 97.4% &gt;2 on PDE. 77% received highest score possible.</p>
PSLO 3	<p>Direct: Ethics Project score</p> <p>Outside: Externship PDE performance on action item #36 "Demonstrates integrity and ethical behavior"</p>	<p>Direct: 100% scored B or greater on Ethics project.</p> <p>Outside: 100% &gt;2 on PDE.</p>
PSCLO 4	<p>Direct: Education Project from Foundations II</p> <p>Outside: Externship PDE performance on action item #7 "performs appropriate quality control/quality assurance procedures"</p>	<p>Direct: 93.5% scored B or greater on Education Project.</p> <p>Outside: 100% &gt;2 on PDE.</p>
PSLO 5	<p>Direct: Safety project from Foundations I</p> <p>Outside: Externship PDE performance on action item #3 "follows laboratory institutional safety policies"</p>	<p>Direct: 100% received B or greater on Safety project.</p> <p>Outside: 100% &gt;2 on PDE.</p>
PSLO 6	<p>Direct: SOP Assignment from Foundations II (written)</p> <p>Direct: Chem II Presentation (oral)</p> <p>Outside: Externship PDE performance on action item #50 "Receives/gives information to others effectively &amp; courteously"</p>	<p>Direct: 97.8% received B or greater on SOP Assignment. 97.8% received B or greater on Chem II project.</p> <p>Outside: 100% &gt;2 on PDE. 84% received highest score possible.</p>

## Assignments Measuring the Outcomes

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.

**MLS 449 UA Final:** Demonstration of competency to perform manual microscopic urinalysis is graded against actual expected results. See attached assignment in the Appendix.

**MLS 452 Heme II Assignment:** Demonstration of competency to perform microscopic hematology/ differentials is graded against actual expected results. See attached assignment in the Appendix.

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

**Mycology Assignment:** students interpret diagnostic data and prepared slides to identify diagnosis.

**Microbiology II:** students work individually on interpreting data from biochemical workups to arrive at a diagnosis on a microbiology case study.

3. 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. Maintaining appropriate composure under stressful conditions.

**Ethics Project:** Students work together in groups to assess the ethical quandaries on the fictional laboratory scenarios. As an added element, students then make up their own scenario that might have some ethical questions involved and submit for instructor review.

4. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.  
**Education project:** Students work in groups to create a 3 hour educational module on a subject of choice as relates to medical laboratory science. Select students go on to utilize their module in the MLS107 class presented to high school student in the summer term. See assignment in the appendix.
5. Application of safety and governmental regulations and standards as applied to medical laboratory practice.

**Safety Project:** Students work in groups to create an exam to test a person's knowledge of clinical laboratory safety standards. See assignment in the appendix.

6. Effective communication skills to ensure accurate and appropriate information transfer.  
Written communication is demonstrated by students on a Standard Operating Procedure assignment. Students write directions to perform laboratory testing in a format matching the professionally accepted format for standard operating procedures. See assignment attached in the appendix.  
Oral communication is demonstrated by student presentations in Chem II on pathophysiology case study of their choice. See assignment attached in the appendix.

## 7. Evidence of Improvement in Student Learning.

The below table 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 has improved in all categories. PDE evaluations also demonstrated an increase in high scores of professionalism across the categories from class of 2017 to 2018. While graduation rates and employment rates have held steady over the last several years, Certifying exam passage dipped slightly for class of 2017.

Outcomes	Class of 2018	Class of 2017	Class of 2016	Class of 2015	Class of 2014
PSLO1	<p>Direct: 100% scored B or greater on OA assignment.</p> <p>Outside: 100% &gt;2 on PDE. 78% received highest score possible.</p>	<p>Direct: BOC 95.7% pass rate.</p> <p>Outside: 100% &gt;2 on PDE. 66% received highest grade possible.</p> <p>Indirect: 96.5% rated "Quite a bit" or "Very much".</p>	<p>Direct: BOC 97.9% pass rate.</p> <p>Indirect: 94.3% student exit survey rated above "somewhat".</p>	Not assessed	Not assessed
PSLO2	<p>Direct: 100% scored B or greater on Micro II project. 100% scored B or greater on Mycology project.</p> <p>Outside: 97.4% &gt;2 on PDE. 77% received highest score possible.</p>	<p>Direct: BOC 95.7% pass rate.</p> <p>Outside: 100% &gt;2 on PDE. 67% received highest grade possible.</p> <p>Indirect: 96.5% rated "Quite a bit" or "Very much".</p>	<p>Direct: BOC 97.9% pass rate.</p> <p>Indirect: 94.3% student exit survey rated above "somewhat".</p>	Not assessed	Not assessed
PSLO3	<p>Direct: 100% scored B or greater on Ethics project.</p> <p>Outside: 100% &gt;2 on PDE.</p>	<p>Direct: BOC 95.7% pass rate.</p> <p>Outside: 98.8% &gt;2 on PDE.</p> <p>Indirect: 96.5% rated "Quite a bit" or "Very much".</p>	<p>Direct: BOC 97.9% pass rate.</p> <p>Indirect: 94.3% student exit survey rated above "somewhat".</p>	Not assessed	Not assessed
PSLO4	<p>Direct: 98.5% scored B or greater on Education Project.</p> <p>Outside: 100% &gt;2 on PDE.</p>	<p>Direct: BOC 95.7% pass rate.</p> <p>Outside: 100% &gt;2 on PDE.</p> <p>Indirect: 96.5% rated "Quite a bit" or "Very much".</p>	<p>Direct: BOC 97.9% pass rate.</p> <p>Indirect: 94.3% student exit survey rated above "somewhat".</p>	Not assessed	Not assessed
PSLO5	<p>Direct: 100% received B or greater on Safety project.</p> <p>Outside: 100% &gt;2 on PDE.</p>	<p>Direct: BOC 95.7% pass rate.</p> <p>Outside: 100% &gt;2 on PDE.</p> <p>Indirect: 96.5% rated "Quite a bit" or "Very much".</p>	<p>Direct: BOC 97.9% pass rate.</p> <p>Indirect: 91.2% student exit survey rated above "somewhat".</p>	Not assessed	Not assessed
PSLO6	<p>Direct: 97.8% received B or greater on SOP Assignment. 97.8% received B or greater on Chem II project.</p> <p>Outside: 100% &gt;2 on PDE. 84% received highest score possible.</p>	<p>Direct: BOC 95.7% pass rate.</p> <p>Outside: 100% &gt;2 on PDE. 79% received highest grade possible.</p> <p>Indirect: 96.5% rated "Quite a bit" or "Very much".</p>	<p>Direct: BOC 97.9% pass rate.</p> <p>Indirect: 94.3% student exit survey rated above "somewhat".</p>	Not assessed	Not assessed



Average Certification score	N/A	592	564	538	530.5
Certification Rate	N/A	95.7% total pass rate 89% first time pass rate	97.9% total pass rate 91.5% first time pass rate	96% total pass rate 91.1% first time pass rate	91.7% first time pass rate
Graduation Rate	N/A	98%	94%	100%	96%
Employment	N/A	100%	100%	88.9%	89.7%
Attrition #	1/44	1/46	0/49; 2 enrolled to graduate with class of 2017	1/46	1/50

## 9. Data-driven Action Plans: Changes Resulting from Assessment

Faculty met on October 8 to discuss the assessment data to be presented to the university. Of main interest to faculty was if the right items were being measured to assess the learning outcomes for the program and the right questions being asked on the exit survey. Faculty agreed that utilizing the professional development evaluation (PDE) and student work to demonstrate outcomes was key to acquiring good assessment data. Some items measured on the PDE had only "meet" or "does not meet" available assessments. A suggestion was made to look at different questions or allow ratings of "exceeds expectations" to be utilized in assessment data. These will be reviewed again by faculty going forward.

Regarding exit survey, it was noted that there might be more data available for assessment of the individual courses if the right questions were asked. One question on the exit survey asked whether the individual courses were important to their future employment. It was noted that not all students were employed in all areas of the laboratory, so this might not be the best evaluation of courses. The question was changed to include the phrase "supporting the knowledge of the subject" to better evaluate individual courses for the class of 2018. Opportunities for data to help evaluate individual courses might also include the Certifying exam results breakdown by subject area and a review of externship survey data. Though ASCP has ruled that this data may not be statistically relevant enough to report, it can be reviewed internally to make a general statement regarding student course work.

Data on the individual PSLOs indicate that PSLO 2,3,&4 failed to meet minimum standards of 90% of students feeling that the program met the outcome. On recommendation of faculty, an inquiry was made of the university assessment coordinator group if the 90% range was a good minimum standard for that particular item. Response received from the university suggested that most other university departments set the standard at 80% or use the current data to set a minimum threshold slightly above. Action plans for this data are two-fold 1) Change the minimum threshold to a more achievable level of 85% and 2) Evaluate the courses most closely associated with the PSLOs being measured.

Curriculum updates are currently underway for class of 2018 and 2019 that will affect these PSLOs. The foundations courses are common to PSLO 2,3&4. Foundation course curriculum were reorganized for class of 2018 when new faculty were hired. Curriculum changes emphasized administrative skills specifically outlined in PSLO4. New for class of 2019 is inclusion of an Interprofessional practice (IPE) course given in tandem with OHSU students to the Foundations of Medical Laboratory Science curriculum. This course is designed to organize interprofessional discussions of patient ethics scenarios which should affect student perspectives on PSLO3. Problem solving and troubleshooting scenarios have been added as a laboratory element to Foundations of Medical Laboratory science curriculum and to the curriculums of Chemistry III and Immunohematology II. Success of these curriculum changes will be judged by assessment cycle 2018-2019. The new MLS faculty continue to update and design new curricular materials. Their teaching skills continue to develop resulting in improved course delivery.

# APPENDIX

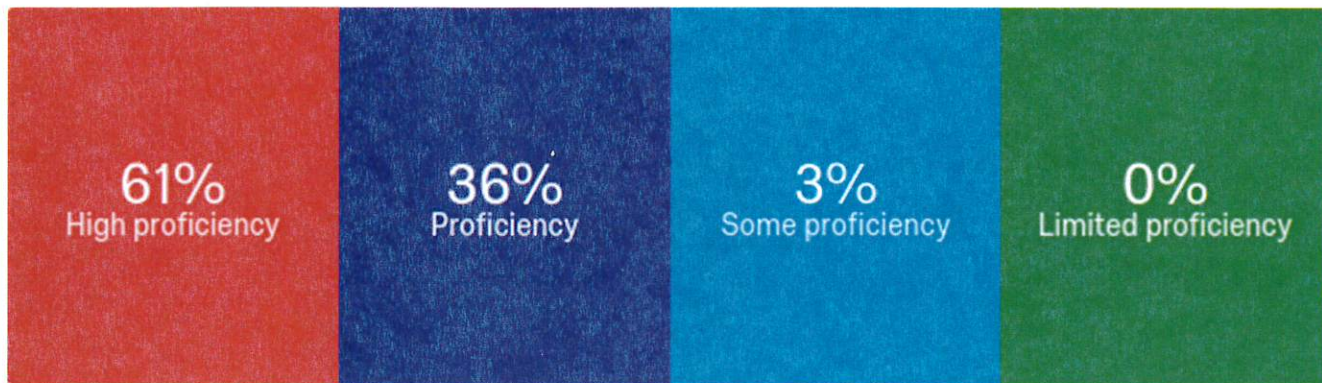
1. Advisory Board Meeting Minutes – to come
2. BOC results
3. Student Exit Survey
4. PDE spreadsheet
5. NAACLS 2017 Report
6. Assignment Descriptions
  - a. Education Project
  - b. Safety Exam
  - c. Ethics Project
  - d. Hematology Practical Exam
  - e. Urinalysis Practical Exam
  - f. SOP project

# Program Report: BMLS

2017-18 Student Exit Survey

July 25th 2018, 10:20 am PDT

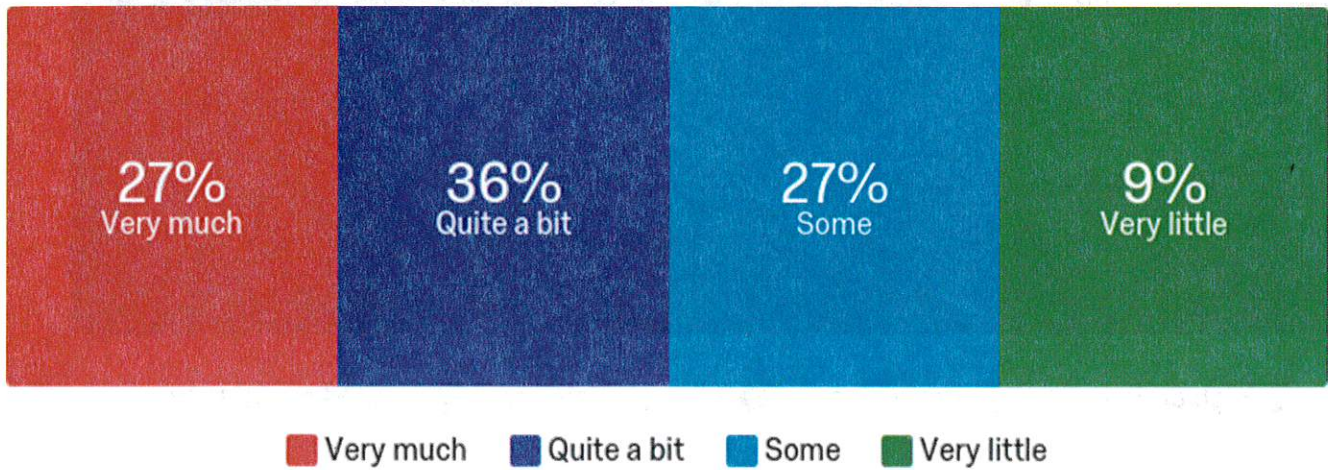
**Q ESLO 1 - Oregon Tech Essential Student Learning Outcomes Please rate your proficiency in the following areas.**



■ High proficiency  
 ■ Proficiency  
 ■ Some proficiency  
 ■ Limited proficiency

#	Question	High proficiency	Proficiency	Some proficiency	Limited proficiency	Total
1	ESLO 1a. Communication: Writing effectively	60.61% 20	36.36% 12	3.03% 1	0.00% 0	33
2	ESLO 1b. Communication: Speaking effectively	48.48% 16	39.39% 13	12.12% 4	0.00% 0	33
3	ESLO 2. Inquiry & Analysis: Thinking critically and analytically	63.64% 21	36.36% 12	0.00% 0	0.00% 0	33
4	ESLO 3. Ethical Reasoning: Making ethical judgements	72.73% 24	24.24% 8	3.03% 1	0.00% 0	33
5	ESLO 4. Teamwork: Work effectively with groups and teams	60.61% 20	36.36% 12	3.03% 1	0.00% 0	33
6	ESLO 5. Quantitative Literacy: Using quantitative/numerical information to solve problems, evaluate claims, and support decisions	57.58% 19	42.42% 14	0.00% 0	0.00% 0	33
7	ESLO 6. Diverse Perspectives: Understanding of diverse perspectives to improve interactions with others	57.58% 19	36.36% 12	6.06% 2	0.00% 0	33

**Q ESLO 2 - Oregon Tech Essential Student Learning Outcomes** How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal development in these areas?



#	Question	Very much	Quite a bit	Some	Very little	Total				
1	ESLO 1a. Communication: Writing effectively	27.27%	9	36.36%	12	27.27%	9	9.09%	3	33
2	ESLO 1b. Communication: Speaking effectively	33.33%	11	39.39%	13	24.24%	8	3.03%	1	33
3	ESLO 2. Inquiry & Analysis: Thinking critically and analytically	54.55%	18	33.33%	11	12.12%	4	0.00%	0	33
4	ESLO 3. Ethical Reasoning: Making ethical judgements	42.42%	14	42.42%	14	15.15%	5	0.00%	0	33
5	ESLO 4. Teamwork: Work effectively with groups and teams	57.58%	19	33.33%	11	9.09%	3	0.00%	0	33
6	ESLO 5. Quantitative Literacy: Using quantitative/numerical information to solve problems, evaluate claims, and support decisions	50.00%	16	40.63%	13	9.38%	3	0.00%	0	32
7	ESLO 6. Diverse Perspectives: Understanding of diverse perspectives to improve interactions with others	31.25%	10	28.13%	9	37.50%	12	3.13%	1	32



Q BMLS 1 - Program Student Learning Outcomes for Medical Laboratory Science B.S.

Please rate your proficiency in the following areas.



■ High proficiency  
 ■ Proficiency  
 ■ Some proficiency  
 ■ Limited proficiency

#	Question	High proficiency		Proficiency		Some proficiency		Limited proficiency		Total
5	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 hematology, hemostasis, chemistry, immunology, microbiology, urinalysis, body fluids, molecular diagnostics, phlebotomy, and immunohematology.	51.72%	15	37.93%	11	10.34%	3	0.00%	0	29
6	2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.	34.48%	10	55.17%	16	10.34%	3	0.00%	0	29
7	3. Professional conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and not allowing personal concerns and biases to interfere with the welfare of patients. Maintaining appropriate composure under stressful conditions.	72.41%	21	24.14%	7	3.45%	1	0.00%	0	29
8	4. Administrative skills	27.59%	8	58.62%	17	10.34%	3	3.45%	1	29

	consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, and fiscal resource management.									
9	5. Application of safety and governmental regulations and standards as applied to medical laboratory practice.	55.17%	16	31.03%	9	13.79%	4	0.00%	0	29
10	6. Effective communication skill to ensure accurate and appropriate information transfer.	51.72%	15	44.83%	13	3.45%	1	0.00%	0	29

**Q BMLS 2 - Program Student Learning Outcomes for Medical Laboratory Science B.S.**  
 How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal development in these areas?



■ Very much   
 ■ Quite a bit   
 ■ Some   
 ■ Very little

#	Question	Very much	Quite a bit	Some	Very little	Total				
5	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 hematology, hemostasis, chemistry, immunology, microbiology, urinalysis, body fluids, molecular diagnostics, phlebotomy, and immunohematology.	65.52%	19	31.03%	9	3.45%	1	0.00%	0	29
6	2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.	51.72%	15	37.93%	11	6.90%	2	3.45%	1	29
7	3. Professional conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and not allowing personal concerns and biases to interfere with the welfare of patients. Maintaining appropriate composure under stressful conditions.	55.17%	16	27.59%	8	17.24%	5	0.00%	0	29
8	4. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, and fiscal resource management.	34.48%	10	51.72%	15	13.79%	4	0.00%	0	29
9	5. Application of safety and governmental regulations and standards as applied to medical laboratory practice.	62.07%	18	31.03%	9	6.90%	2	0.00%	0	29
10	6. Effective communication skill to ensure accurate and appropriate information transfer.	51.72%	15	37.93%	11	10.34%	3	0.00%	0	29

Foundations Curriculum change. Instructor comments

*OK based on skills coming in*



Contribute to your knowledge of the subject and

**Q BMLS 3 - To what extent did each of the courses listed below prepare you to enter the medical lab workforce as a competent, skilled professional?**



■ It was essential ■ A fair amount ■ Some ■ Not at all

#	Question	It was essential	A fair amount	Some	Not at all	Total
4	CLS 415 Clinical Chemistry I	37.93% 11	20.69% 6	31.03% 9	10.34% 3	29
13	CLS 416 Clinical Chemistry II	34.48% 10	20.69% 6	34.48% 10	10.34% 3	29
25	CLS 417 Clinical Chemistry III	31.03% 9	24.14% 7	31.03% 9	13.79% 4	29
6	CLS 420 Clinical Immunology/ Infectious Serology	31.03% 9	20.69% 6	31.03% 9	17.24% 5	29
19	CLS 457 Advanced Chemistry/Immunology Concepts	27.59% 8	20.69% 6	34.48% 10	17.24% 5	29
7	CLS 422 Molecular Diagnostic Methods	27.59% 8	55.17% 16	17.24% 5	0.00% 0	29
9	CLS 424 Hemostasis	89.66% 26	6.90% 2	3.45% 1	0.00% 0	29
10	CLS 442 Hematology I	93.10% 27	3.45% 1	3.45% 1	0.00% 0	29
16	CLS 452 Hematology II	93.10% 27	3.45% 1	3.45% 1	0.00% 0	29
15	CLS 449 Principles of Urinalysis	86.21% 25	10.34% 3	3.45% 1	0.00% 0	29
11	CLS 443: Immunohematology I	58.62% 17	24.14% 7	13.79% 4	3.45% 1	29
17	CLS 453 Immunohematology II	60.71% 17	28.57% 8	10.71% 3	0.00% 0	28
12	CLS 444 Microbiology I	79.31% 23	17.24% 5	3.45% 1	0.00% 0	29
18	CLS 445 Microbiology II	79.31% 23	17.24% 5	3.45% 1	0.00% 0	29
8	CLS 464 Mycology / Virology	55.17% 16	27.59% 8	13.79% 4	3.45% 1	29
14	CLS 474 Parasitology	55.17% 16	27.59% 8	13.79% 4	3.45% 1	29
20	CLS 432 Foundations of CLS I	44.83% 13	34.48% 10	17.24% 5	3.45% 1	29



21	CLS 462 Foundations of CLS II	24.14%	7	41.38%	12	24.14%	7	10.34%	3	29
23	MLS 463 Foundaitons of CLS III	34.48%	10	31.03%	9	31.03%	9	3.45%	1	29
22	MLS 470, 471, 472, 473 Externships	93.10%	27	0.00%	0	6.90%	2	0.00%	0	29

**Q BMLS 4 - Please describe the the most valuable course you took or describe the most valuable experience you had during your time in the OIT-OHSU Medical Laboratory Science program.**

Please describe the the most valuable course you took or describe the most valuable experience you had during your time in the OIT-OHSU Medical Laboratory Science program.

Hematology, Urinalysis and Hemostasis provided critical knowledge in working in a clinical lab setting. Learning how to perform a differential, doing counts on cells, and testing the body fluids was a good practice before we had to do our externships.

It's difficult to pinpoint the most valuable course. I would say hematology and microbiology both conveyed a large portion of the information I need to master to be a good MLS. They delved into the science that centers on MLS more than any previous chemistry and biology I had taken previously.

Hematology

Micro and heme. Much of the lab is automated but these two classes taught manual techniques that are still preformed routinely in the lab.

Heme, because it was vital to get the experience in identifying cells,

The Externship is the most valuable experience for the MLS program. Though it is essential to understand the intuition behind the processes/tests, it is equally important to have context in order to develop judgement concerning the value of any information learned. I developed a greater understanding of what was important by doing the Externship.

Hematology and Bloodbank were both essential and seem to be the two courses I learned the most from.

The most valuable course that I took was taught by Dawn Taylor. Both Hemostasis and Hematology I and II were very valuable. The most valuable experience was the externship.

Hematology I think was the most valuable course I took during my time there. The labs and the work load really made me learn the subject. I used it every day during my rotation.

The externship were the most value in linking all we had learned to the real world side.

Hematology and Microbiology were probably the most valuable courses.

Most valuable course was the foundations I by Caroline Daughy - it was the basics but she helped build a foundation for learning all the other subject. Not only taught course material but gave personal advise to survive the program an work in the industry - knowledge that went beyond the classroom that was excellent. Also most well taught class for the subject range.

I can't choose a single valuable course, they all seemed very valuable to me.

I felt like hematology prepared me the most for my career and I learned above and beyond what was expected of me as a new lab tech.

Hematology is the most valuable to me. My instructor is awesome. She gave us a lots of information that need to be focused.

It's difficult to choose a single most valuable experience. All of the information contained within the hematology, UA, micro/parasitology/virology, and hemostasis coursework went above and beyond what we needed in order to pass the BOC and be successful in the field. These courses were well thought out and delivered in a way that, despite the complexity of the material, was easy to understand and retain.

Hematology Courses I & II

It is difficult to decide which course was most valuable in this program as all subjects are needed and valuable to be a successful MLS tech. If I had to choose, I would say the externships because that where students were able to take

what they learned and used it in the field.

The Hematology courses were very useful. All of the differentials that we did were helpful.

What has served me the most is/was learning quality control; ie. Westgard rules, and how to interpret that information correctly. I was actually given scenarios in my job interview and was asked how I would respond or act upon the information given. I hope that my ability to answer correctly was just one important piece that contributed to the getting the job at my preferred site.

I feel as though I retained the most knowledge from Hematology, Hemostasis, and Urinalysis. I readily used what I learned in those courses on externship.

I think hematology had prepared us very well for what we do in a real lab.

## Q BMLS 5 - What course(s) or experience(s) do you think should be added to the Medical Laboratory Science program? Why?

What course(s) or experience(s) do you think should be added to the Medical Laboratory Science program? Why?

Instrument/ troubleshooting- just so people get an idea on how to tackle a machine once they do go down.

I previously had taken Human Anatomy and Physiology 200/300 sequences so I felt very comfortable learning about disease states as I already had the A&P background. I think those course would help an MLS student

Instrumentation. This job had changed over time and is now largely operating/ repairing instruments. Having some basic troubleshooting skills would be incredibly helpful.

Replace a Foundations class with a Lab Technology class that familiarizes students with MediTech or other software used within the lab. Much of what we learned in labs were manual methods that were extremely helpful in understanding principles but there is so much automation currently in use that some familiarity would allow Externship students to focus on gaining analytical judgment rather than learning how the hardware/analyzers work with software to report out patient samples.

Chemistry is seriously lacking real world application. Computer software and instrumentation are not being covered appropriately. I have no idea how to operate the software and that is 90% of your job in the Chemistry department! Learning the science of how it each type of instrument works and every assay is a daunting task and as we already know, the entire course was and is in the process of revamping.

I think a lab simulation would be helpful. I felt that the student lab was very different than the real clinical lab. The information was the same, however the environment of a real hospital lab was different than the student lab.

I can not think of anything that needs to be added to this program, it is very well put together.

I feel extending the program out to 2 years would be very helpful. I would eliminate the feeling of being rushed through everything.

Chemistry analyzer (even bench top) needed for Chem labs. Foundations could also include hands on Lab experience with processing samples (centrifuging, evaluating for lipemia, hemolysis, etc.)

I think a visit to a chemistry lab or immunology laboratory would be great - to let students know how chemistry & immunology is really done in the lab, before the externship. Especially since the school doesn't have (can't afford) a chemistry analyzer. I also think a little more of "troubleshooting" with machinery would be an asset.

From my externship experience, I believe looking at more albumin slides in Heme 2 may be useful.

I think a specific phlebotomy course or clinical rotation would have been helpful in my educational experience. I feel like compared to other programs, this one lacks in that category and I do not feel sufficiently prepared to perform phlebotomy on a patient.

N/A

More information on machinery used in the field would be helpful. Entering the externship without prior experience using machinery is very intimidating. It would have been nice to have a bench-top analyzer, especially for chemistry, to help solidify the concepts of standards, controls, reagents, and levey-jennings charts. I found the concepts taught in chemistry to be incredibly removed from the actual work done on the job. An analyzer of some sort would have been nice to tie everything together.

More business courses about how to manage labs or run departments, competencies, working with department leads. The dynamics and management of a lab are different than those of past jobs I've had and it would be beneficial to have some knowledge of how labs are typically run so we can be prepared for competency checks, meetings and working with other techs.

More experience with instrumentation would be helpful.

I don't feel anything was missing from my education. I arrived at my externship sites fully prepared.

I feel like we had enough classes. I just wish our labs were more in depth.

I think they covered everything a generalist would get into.

**Q BMLS 6 - What course(s) or experience(s) do you think should be removed from to the Medical Laboratory Science program? Why?**

What course(s) or experience(s) do you think should be removed from to the Medical Laboratory Science program? Why?

None.

Chemistry is absolutely necessary but needs to be revamped. I learned very little that i didn't read from the text or research outside of class.

foundations 2 had nothing to offer

Condense the 3 Foundations classes into 2. There was wasted time in two of these classes discussing matters at a level of detail that was unnecessary, e.g. ACA, HIPAA.

When I attended Foundations courses Cara was a faculty member and our group projects were overwhelming. Adding her group projects on top of Abraham's and other class presentations was unnecessary pain. I don't know if it is still the same but group projects need to be dispersed evenly as not every student is able to commit to that level of group work (requiring meetups) outside of classroom time.

MLS III could be removed.

Foundations 2 was the class that was the hardest to understand the need for, still not sure of it now. Also chemistry and immunology need major updates and the labs need to be updated as well.

Foundations II and Advanced Chem Concepts. Both seemed to have information that was unneeded or presented in a manner that was irrelevant

A new or better Chemistry teacher. The whole experience with him was awful (cannot put into words how horrible the chemistry classes were). Once I reviewed for the BOC, I realized how much I had to learn on my own; and for the amount of money paid for those classes alone, it was just really frustrating to know that it was not well spent money or time. Also, all the team projects at the end. Please space those out or remove some team projects, or make team projects OPTIONAL. I get you want us to work together and learn to work together, but it really was obsessive. Not all 47 people are going to like each other or get along well, but by forcing us to work together, it really pushed us all apart.

I don't think anything should be removed but rather modified. I understand the need to have the Foundations courses, but maybe 2 larger classes during the morning and afternoon may be easier for people to attend. Having the last Foundations class of the day makes it simpler for people to skip or just not to pay attention since the subject can be dull.

None

N/A

Research seminar- I don't know if this course was a requirement for accreditation or not, but it often felt like busy work. This may have been avoided if it had been taught by a more experienced professor, had more thoughtful content, or was more closely related to testing/instrumentation. I would have gained more useful information from this course had it explained the process of creating reagents- ie the research/explanations/math/reviews that go along with created MSDS or a package insert.

Writing papers about CAP and CLIA did not seem very beneficial but making the presentations to other students about them would be, especially if everyone had a different topic (as apposed to hearing the same presentations over and over).

The Foundations of MLS 2 mostly went over things that were already covered in depth during mandatory training at the beginning of the program.

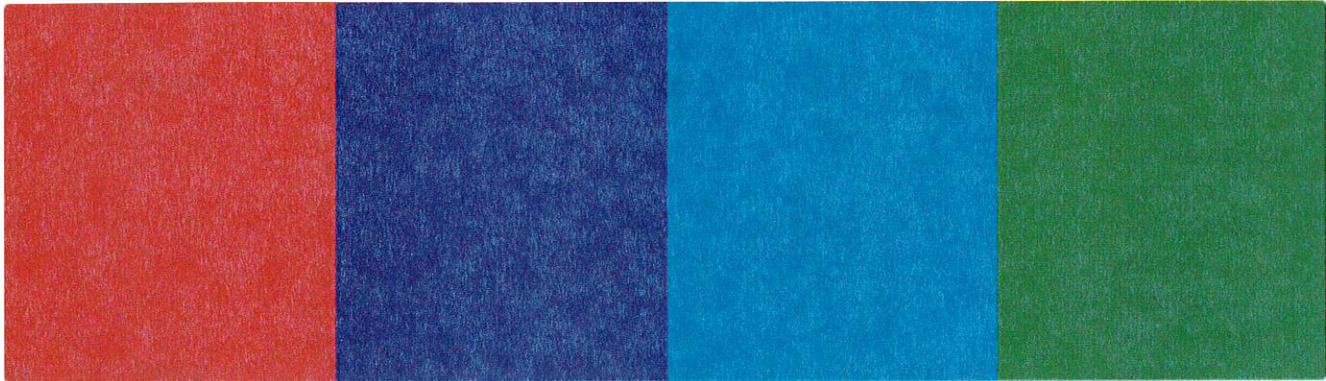
None



Probably one of the Foundations courses. We can compile it all into one term.

None. While some classes it feels that the theory doesn't apply, knowing that theory is helpful both for the BOC and having an idea why a doctor has ordered that test. It also might help with troubleshooting if a result doesn't seem to match what diagnosis has been made.

**Q BMLS 7 - The Medical Laboratory Science program's curriculum (including your externship) is designed so that graduates gain knowledge and skills to perform a broad range to testing and develop the professional attributes of a MLS professional. Please indicate the gains you made in knowledge, skill, and professionalism by selecting the rating that best describes your competency at graduation for the skills and activities listed.**



**■ I exceed the competency standard for this skill or activity; I require no assistance to perform this activity or skill.**

**■ I meet the competency expectation for this skill or activity; I am confident in performing this skill or activity with minimal supervision.**

**■ I meet the minimal competency expectation for this skill or activity with supervision**

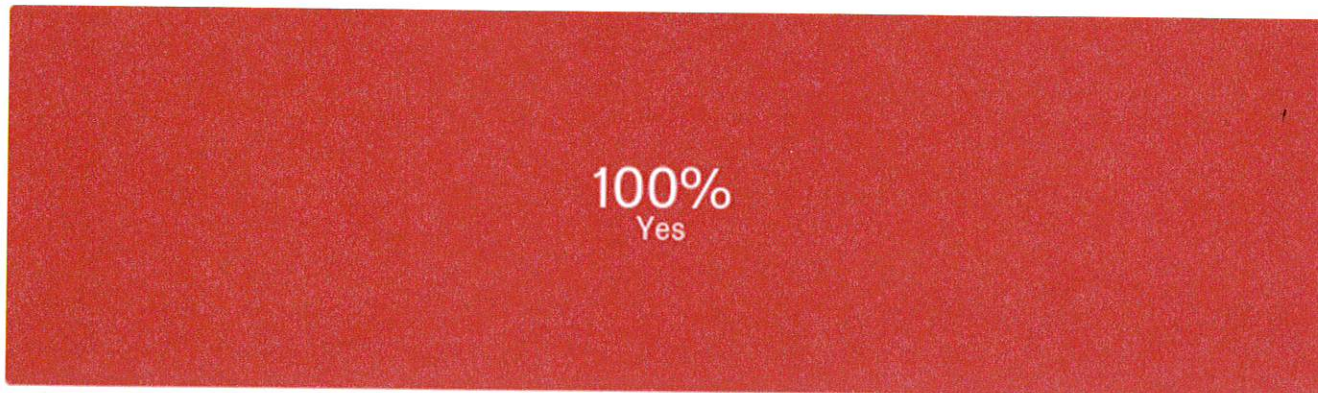
**■ I do not meet the competency expectation for this skill or activity**

#	Question	I exceed the competency standard for this skill or activity; I require no assistance to perform this activity or skill.		I meet the competency expectation for this skill or activity; I am confident in performing this skill or activity with minimal supervision.		I meet the minimal competency expectation for this skill or activity with supervision		I do not meet the competency expectation for this skill or activity		Total
1	Collect and safely handle samples for analysis	53.57%	15	35.71%	10	10.71%	3	0.00%	0	28
2	Perform accurate laboratory testing	50.00%	14	42.86%	12	7.14%	2	0.00%	0	28



3	Evaluate and interpret laboratory test data	35.71%	10	50.00%	14	14.29%	4	0.00%	0	28
4	Identify problems and take corrective action	21.43%	6	60.71%	17	17.86%	5	0.00%	0	28
5	Apply quality assurance principles and methods to monitor procedures, equipment and technical competency	28.57%	8	50.00%	14	21.43%	6	0.00%	0	28
6	Operate equipment properly and perform preventive maintenance and repairs	35.71%	10	50.00%	14	10.71%	3	3.57%	1	28
7	Comply with established laboratory safety regulations	71.43%	20	25.00%	7	3.57%	1	0.00%	0	28
8	Use laboratory computers and technology effectively	42.86%	12	46.43%	13	10.71%	3	0.00%	0	28
9	Evaluate the efficacy of new procedures and instrumentation for a given setting	25.00%	7	46.43%	13	28.57%	8	0.00%	0	28
10	Demonstrate ethical behavior and maintain confidentiality of patient results	75.00%	21	21.43%	6	3.57%	1	0.00%	0	28
11	Interact professionally with patients and other personnel	75.00%	21	21.43%	6	3.57%	1	0.00%	0	28
12	Apply principles of educational methodology	50.00%	14	42.86%	12	7.14%	2	0.00%	0	28
13	Possess relevant experience in medical lab	25.00%	7	42.86%	12	25.00%	7	7.14%	2	28

Q BMLS 8 - The educational mission of the OIT-OHSU Medical Laboratory 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. Mission accomplished?



■ Yes ■ No

#	Answer	%	Count
1	Yes	100.00%	27
2	No	0.00%	0
	Total	100%	27

2016-2017 Data

Student #	Hematology	Chemistry	Microbiology	Immunohematology	#3	#2	#1	#NA
a	3	3	3	3	0	0	0	0
b			2		1	0	0	0
c	3	3	2	2	1	0	0	0
d	2	2	2	2	2	0	0	0
e	3	3	3	3	0	0	0	0
f	2	2	2	2	2	0	0	0
g	2	3	3	2	1	0	0	0
h	3	3	3	3	0	0	0	0
hh	3	2	2	1	1	0	0	0
i	2	2	3	1	1	0	0	0
j			2		1	0	0	0
k		3	2	1	1	0	0	0
l			2	0	1	0	0	0
m			3	1	0	0	0	0
n		2	2	0	1	0	0	0
o	3	2	2	1	2	0	0	0
p		3	3	2	0	0	0	0
q		3	2	1	1	0	0	0
r			2	0	1	0	0	0
s		3	3	2	0	0	0	0
t	3	2	3	2	1	0	0	0
u		3	3	2	0	0	0	0
v		3	2	1	1	0	0	0
w		2	3	1	1	0	0	0
x		3	3	2	0	0	0	0
y	2	2	2	0	2	0	0	0
z		3	3	2	0	0	0	0
aa		3	2	1	1	0	0	0
bb	3	3	2	2	1	0	0	0
zz		3	3	2	0	0	0	0
cc		3	3	2	0	0	0	0
dd		3	3	2	0	0	0	0
ee		3	3	2	0	0	0	0
ff			2	0	1	0	0	0
gg		3	3	2	0	0	0	0
oo		2	3	1	1	0	0	0
rr		3	3	2	0	0	0	0
gg		3	3	2	0	0	0	0
tt		3	2	1	1	0	0	0
pp	3	3	2	2	1	0	0	0
ll				0	0	0	0	0
jj				0	0	0	0	0
kk				0	0	0	0	0
ll				0	0	0	0	0
mm				0	0	0	0	0
nn				0	0	0	0	0
Totals					54	28	0	0

Competency to perform a full range of testing in the contemporary medical laboratory encompassing preanalytical analytical and post analytical components of laboratory services, including immunology, hematology, chemistry, microbiology, immunohematology, urinalysis, body fluids, molecular diagnostics, hemostasis, parasitology, mycology and virology is Measured by scores of Externship PDE performance on action **item #10** "obtains accurate and precise results" & Grades on UA and Heme II assignments.

Criterion: 95% receive a score of 2 or greater.  
 Criterion: 85% receive a grade of B or greater.

2016-2017 Data

Student #	Hematology	Chemistry	Microbiology	Immunohematology	#3	#2	#1	#NA
a	3	3	3	3	0	0	0	0
b					1	0	0	0
c	3	3	3	3	0	0	0	0
d		2	3	1	1	0	0	0
e	3	3	3	3	0	0	0	0
f	2	3	2	1	1	0	0	0
g	3	3	3	2	1	0	0	0
h		2	2	2	1	0	0	0
hh		2	3	1	1	0	0	0
i		2	3	1	1	0	0	0
j			3	1	0	0	0	0
k		2.5	2.5	0	0	0	0	0
l			3	1	0	0	0	0
m			3	1	0	0	0	0
n			3	1	0	0	0	0
o	3	2	2	1	2	0	0	0
p		3	3	2	0	0	0	0
q		3	2	1	1	0	0	0
r			3	1	0	0	0	0
s		3	3	2	0	0	0	0
t	3	2	2	1	2	0	0	0
u		3	3	2	0	0	0	0
v		3	2	1	1	0	0	0
w		2	3	1	1	0	0	0
x		3	3	2	0	0	0	0
y	2		2	0	2	0	0	0
z		3	2	1	1	0	0	0
aa		2	2	0	2	0	0	0
bb	2	3	2	1	2	0	0	0
zz		3	2	1	1	0	0	0
cc		3	3	2	0	0	0	0
dd		3	3	2	0	0	0	0
ee		3	3	2	0	0	0	0
ff			2	0	1	0	0	0
gg		3	2	1	1	0	0	0
oo		3	2	1	1	0	0	0
rr		3		2	0	0	0	0
qq	3	3	3	2	0	0	0	0
tt		3	2	1	1	0	0	0
pp		3	3	3	0	0	0	0
ll				0	0	0	0	0
jj	3			1	0	0	0	0
kk				0	0	0	0	0
ll	2			0	1	0	0	0
mm				0	0	0	0	0
nn				0	0	0	0	0
Totals			3	1	57	26	0	0

Proficiency to evaluate data, interpret results, problem solve and troubleshoot is Measured by scores of Externship PDE performance on action **Item #18** \*Shows logical thinking and resourcefulness in dealing with problems\* & grades on Micro II and Mycology Assignments.

Criterion: 95% receive a score of 2 or greater.  
 Criterion: 85% receive a grade of B or greater.

2016-2017 Data

Student #	Hematology	Chemistry	Microbiology	Immunohematology	#3	#2	#1	#NA
a	2	2	2	0	3	0	0	0
b								
c	2	2	2	0	1	0	0	0
d	2	2	2	0	3	0	0	0
e	2	2	2	0	2	0	0	0
f	2	2	2	0	3	0	0	0
g	2	2	2	0	3	0	0	0
h	2	2	2	0	3	0	0	0
i								
j								
k								
l								
m								
n								
o	2	2	2	0	1	0	0	0
p	2	2	2	0	2	0	0	0
q	2	2	2	0	0	0	0	0
r								
s								
t	2	2	2	0	1	0	0	0
u								
v								
w								
x								
y	2	2	2	0	2	0	0	0
z								
aa								
bb	2	2	2	0	3	0	0	0
cc								
dd								
ee								
ff								
gg								
hh								
ii	2	2	2	0	2	0	0	0
jj								
kk								
ll								
mm								
nn								
Totals					1	80	0	0

Professional and ethical conduct maintaining composure under stressful conditions, respecting the feelings and needs of others, protecting the confidence of patient information and not allowing personal concerns and biases to interfere with the welfare of patients is Measured by scores of Externship PDE performance on action **item #36** "Demonstrates integrity and ethical behavior" & grades on Ethics assignment from Foundations I.

Criterion: 95% receive a score of 2.  
 Criterion: 85% receive a grade of B or greater.

2016-2017 Data

Student #	Hematology	Chemistry	Microbiology	Immunohematology	#3	#2	#1	#NA
a	2	2	2	0	3	0	0	0
b	2	2	2	0	1	0	0	0
c	2	2	2	0	3	0	0	0
d	2	2	2	0	2	0	0	0
e	2	2	2	0	3	0	0	0
f	2	2	2	0	2	0	0	0
g	2	2	2	0	3	0	0	0
h	2	2	2	0	3	0	0	0
hh	2	2	2	0	2	0	0	0
i	2	2	2	0	2	0	0	0
j	2	2	2	0	1	0	0	0
k	2	2	2	0	2	0	0	0
l	2	2	2	0	1	0	0	0
m	2	2	2	0	1	0	0	0
n	2	2	2	0	1	0	0	0
o	2	2	2	0	3	0	0	0
p	2	2	2	0	2	0	0	0
q	2	2	2	0	2	0	0	0
r	2	2	2	0	1	0	0	0
s	2	2	2	0	2	0	0	0
t	2	2	2	0	3	0	0	0
u	2	2	2	0	2	0	0	0
v	2	2	2	0	2	0	0	0
w	2	2	3	1	1	0	0	0
x	2	2	2	0	2	0	0	0
y	2	2	2	0	2	0	0	0
z	2	2	2	0	2	0	0	0
za	2	2	2	0	2	0	0	0
bb	2	2	2	0	3	0	0	0
zz	2	2	2	0	2	0	0	0
cc	2	2	2	0	2	0	0	0
dd	2	2	2	0	2	0	0	0
ee	2	2	2	0	2	0	0	0
ff	2	2	2	0	1	0	0	0
gg	2	2	2	0	2	0	0	0
oo	2	2	2	0	2	0	0	0
rr	0	2	2	0	1	0	0	0
qq	2	2	2	0	2	0	0	0
tt	2	2	2	0	2	0	0	0
pp	2	2	2	0	2	0	0	0
ii				0	0	0	0	0
jj				0	0	0	0	0
kk				0	0	0	0	0
ll				0	0	0	0	0
mm				0	0	0	0	0
nn				0	0	0	0	0
Totals				1	79	0	0	0

Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education and fiscal resource management is Measured by scores of Externship PDE performance on action **Item #7** "performs appropriate quality control/quality assurance procedures" & grade on Education Project from Foundations I class.

Criterion: 95% receive a score of 2.  
 Criterion: 85% receive a grade of B or better.

2016-2017 Data

Student #	Hematology	Chemistry	Microbiology	Immunohematology	#3	#2	#1	#NA
a	2	2	2	0	3	0	0	0
b			2	0	1	0	0	0
c	2	2	2	0	3	0	0	0
d			2	0	2	0	0	0
e	2	2	2	0	3	0	0	0
f			2	0	2	0	0	0
g	2	2	2	0	3	0	0	0
h	2	2	2	0	3	0	0	0
hh	2	2	2	0	2	0	0	0
i			2	0	2	0	0	0
j			2	0	1	0	0	0
k			2	0	2	0	0	0
l			2	0	1	0	0	0
m			2	0	1	0	0	0
n			2	0	1	0	0	0
o	2	2	2	0	3	0	0	0
p			2	0	2	0	0	0
q			2	0	2	0	0	0
r			2	0	1	0	0	0
s			2	0	2	0	0	0
t	2	2	2	0	3	0	0	0
u			2	0	2	0	0	0
v			2	0	2	0	0	0
w			3	1	1	0	0	0
x			2	0	2	0	0	0
y	2	2	2	0	2	0	0	0
z			2	0	2	0	0	0
aa			2	0	2	0	0	0
bb	2	2	2	0	3	0	0	0
zz			2	0	2	0	0	0
cc			2	0	2	0	0	0
dd			2	0	2	0	0	0
ee			2	0	2	0	0	0
ff			2	0	1	0	0	0
gg			2	0	2	0	0	0
oo			2	0	2	0	0	0
rr	2	2	2	0	2	0	0	0
qq			2	0	2	0	0	0
tt			2	0	2	0	0	0
pp	2	2	2	0	3	0	0	0
h				0	0	0	0	0
ii				0	0	0	0	0
kk				0	0	0	0	0
ll				0	0	0	0	0
mm				0	0	0	0	0
nn				0	0	0	0	0
Totals					1	81	0	0

Application of safety and governmental regulations and standards as applied to medical laboratory practice is Measured by scores of Externship PDE performance on action **item #3** "follows laboratory institutional safety policies" & grades on the Safety assignment in Foundations I.

Criterion: 95% receive a score of 2.

Criterion: 85% receive a grade of B or better.

2016-2017 Data

Effective communication skills to ensure accurate and appropriate information transfer is measured by scores of Externship PDF performance on action **item #50** "Receives/gives information to others effectively & courteously" & grades on SOP written assignment in Foundations II and grades on Chem II Oral presentation.

Criterion: 95% receive a score of 2 or greater.  
 Criterion: 85% receive a grade of B or better.

0.7

Student #	Hematology	Chemistry	Microbiology	Immunohematology	#3	#2	#1	#NA
a	3	3	3		3	0	0	0
b			3		1	0	0	0
c	2	3	3		2	1	0	0
d		3	3		1	1	0	0
e	3	3	3		3	0	0	0
f	3	2	3		1	1	0	0
g	3	3	3		3	0	0	0
h	3	3	3		3	0	0	0
hh	2	3	3		1	1	0	0
i	2	2	3		1	1	0	0
j		3	3		1	0	0	0
k		3	3		2	0	0	0
l		3	3		1	0	0	0
m			2		0	1	0	0
n			2		0	1	0	0
o	2.5	2	2.5		0	1	0	0
p		3	3		2	0	0	0
q		3	2		1	1	0	0
r		3	3		1	0	0	0
s		3	3		2	0	0	0
t	3	2	3		2	1	0	0
u		3	3		2	0	0	0
v		3	2		1	1	0	0
w		2	3		1	1	0	0
x		3	3		2	0	0	0
y	2		2		0	2	0	0
z		3	3		2	0	0	0
aa		3	3		2	0	0	0
bb	2	3	2		1	2	0	0
cc		3	3		2	0	0	0
dd		3	3		2	0	0	0
ee		3	3		2	0	0	0
ff		3	3		1	0	0	0
gg		3	3		2	0	0	0
oo		3	3		2	0	0	0
rr	3	3	3		2	0	0	0
qq		3	3		2	0	0	0
tt		3	2		1	1	0	0
pp	3	3	3		3	0	0	0
ii					0	0	0	0
jj					0	0	0	0
kk					0	0	0	0
ll					0	0	0	0
mm					0	0	0	0
nn					0	0	0	0
Totals					63	17	0	0



# THE NAACLS NEWS

*"YOUR HOME BASE FOR ALL NAACLS ANNOUNCEMENTS, NEWS AND SPECIAL FEATURES"*

## March 1, 2018 CEO'S CORNER: Findings from the 2017 Annual Survey

By Dianne M. Cearlock, Chief Executive Officer, Elizabeth Swartz, IT Manager

The Annual Survey of Programs was disseminated to program directors of 613 NAACLS accredited and approved programs in late 2017. Submission of the completed survey is required annually by the accreditation and approval standards. Presented here are data indicating numbers of NAACLS accredited and approved programs and graduates, certification examination pass rates, graduation rates, and placement rates. Also included are data reflecting trends in program resources and program director turnover.

Ten (10)-year longitudinal data for the numbers of programs by program type appear in Table 1. The data reveal increases in the total number of programs from 479 accredited and 63 approved programs in 2008 to 544 accredited and 67 approved programs in 2017 and that trend is seen for all program types except Cytogenetics (CG). In terms of the percentages of total programs, the most concentrated areas of growth are seen with Medical Laboratory Technician (MLT) (16% increase from 2008-2017) and Histotechnician (HT)/Histotechnologist (HTL) (24% increase over the decade) programs. The numbers of Medical Laboratory Scientist (MLS) programs grew by 5%; the number of Phlebotomy (PBT) programs is essentially stable. The numbers of Diagnostic Molecular Science (DMS), Pathologists' Assistant (PathA), and Clinical Assistant (CA) programs increased during the 10-year period but the statistical significance, if any, is difficult to determine based on the smaller numbers of programs.

**TABLE 1- NAACLS ACCREDITED AND APPROVED PROGRAMS BY TYPE FROM 2008-2017  
(CLICK ON CHART TO ENLARGE).**

ing. Graduate numbers are highest for most program types in the years from 2010-2013 and that have been a socioeconomic response to the recession of 2008 followed by a slow, multi-year recovery. Slower economies and sluggish job markets tend to encourage more people to pursue higher education degrees. Other factors could include administrative pressure on program officials to increase enrollments, more effective student recruitment strategies, increased demand for alternative education delivery models, and the development of innovative approaches to the provision of the clinical experiences.

On the annual survey of programs, NAACLS collects data regarding program/student outcomes and has set benchmarks for certification exam pass rates, graduation, and placement rates. The benchmarks are:

- CERTIFICATION EXAM PASS RATES – THREE YEAR ROLLING AVERAGE OF 75% PASS RATE ON BOC EXAMINATIONS TAKEN WITHIN THE FIRST YEAR AFTER GRADUATION. SEVERAL OTHER EXAMINATION PROVIDERS ARE APPLICABLE FOR GRADUATES OF PHLEBOTOMY PROGRAMS.
- GRADUATION RATES – THREE YEAR ROLLING AVERAGE OF 70% GRADUATION RATE FOR STUDENTS WHO HAVE BEGUN THE FINAL HALF OF THE PROGRAM.
- PLACEMENT RATES – BENCHMARK: THREE YEAR ROLLING AVERAGE OF 70% FINDING EMPLOYMENT OR CONTINUING EDUCATION WITHIN ONE YEAR OF GRADUATION.

In Table 3 are 3-year retrospective data of average percentage rates for programs for the three benchmarked outcomes. These percentages are stable throughout the 3-year period of 2015-2017. (click on chart to enlarge)

<b>Table 3. Average % Rates for Benchmarked Program Outcomes 2015-2017</b>			
<b>Benchmark (3-year rolling average)</b>	<b>2017 Average % Rate for Programs</b>	<b>2016 Average % Rate for Programs</b>	<b>2015 Average % Rate for Programs</b>
Certification exam pass rate (75%)*	88	89	89
Graduation rate (70%)	94	97	97
Placement rate (70%)	96	96	95
*For accredited programs –BOC For approved programs – BOC, AMT, NHA, or NCCT			

A 3-year retrospective of the number of programs that failed to meet the benchmarks is shown in Table 4. The data suggest that certification exam pass rates remain a challenge for some programs while the great majority of students successfully graduate from programs and find relevant employment or continue with additional education. (click on chart to enlarge)

## Foundations II Educational Methods Project

**Learning Goals addressed in this project. A student will:**

1. Learn the key concepts involved in basic educational methodology.
  - Goals and Objectives
  - Teaching Strategies
  - Evaluating Performance
2. Work as a team.
3. Design an entire learning module.
4. Develop a student performance evaluation (assessment) methodology.

**MLS student groups will be expected to design and document an entire learning module. This will include the following:**

- Determine audience or intended learners
- Determine time needed for instruction
- Goals
- Learning Objectives
- Method of Instruction (including any PowerPoints, handouts, procedures, etc. that are used).
- Student Evaluation or Assessment Process

**The possible topics include:**

- Point of Care Testing (POCT)
- Continuing Education Experience – any topic (CE)
- New Employee Training in Urinalysis (UA)
- STEM High School Course – MLS 107 – Medical Detectives
- Others

**Project specifics:**

- Entire learning experience developed should take approximately 3 - 5 hours
- Goals: Develop a minimum of 6 Goals.
- Objectives: Develop a minimum of
  - 9 cognitive objectives
  - 4 affective objectives
  - 6 psychomotor objectives (if appropriate)
  - Make sure to include some upper taxonomy level objectives.
- Method of Instruction – Develop at least one method of instruction to meet learning objectives
- Student Evaluation and Assessment- Develop at least one process to evaluate students' knowledge and skills following instruction **AND** one method for student assessment of their educational experience.

**Teaching Presentation Rubric:**

**Names:** \_\_\_\_\_ **Topic:** \_\_\_\_\_ **Date:** \_\_\_\_\_

<b>Criteria</b>	<b>Exceeds Expectations (Excellent) 5 points</b>	<b>Meets Expectations (Satisfactory) 4 points</b>	<b>Below Expectations (Fair or Poor) 0-2 points</b>
<b>Knowledge of Subject Matter</b>	Demonstrates masterful knowledge of the subject matter.	Demonstrates adequate/ average knowledge of the subject matter.	Demonstrates below average knowledge of the subject matter.
<b>Goals</b>	Appropriately identifies and thoroughly describes important and meaningful learning goals.	Generally identifies and describes learning goals with some explanation.	Identifies and describes learning goals that are vague, trivial, or unessential
<b>Objectives</b>	Objectives are measurable and use appropriate verbs. They include specific information about what the student will be able to do, how well, how many, to what degree. Objectives reflect high levels of cognition according to Bloom's Taxonomy where appropriate.	Objectives are too general and don't always use appropriate verbs. They don't always include specific information on what the student will be able to do, how well, how many, to what degree. Many of the objectives use only low levels of cognition according to Bloom's Taxonomy.	Objective are not measurable. They use poor verbs and they don't describe what the student will be able to do. Many of the objectives use only low levels of cognition according to Bloom's Taxonomy.
<b>Method of Instruction</b>	Instructional activities are creative, interesting and engaging. They are appropriate for subject matter and knowledge level of the learner. They follow a logical sequence. They are do-able... They meet any time and resource constraints.	Instructional activities are appropriate for subject matter and knowledge level of the learner. They follow a somewhat logical sequence. They are do-able... They meet any time and resource constraints.	Instructional activities are inappropriate for subject matter and knowledge level of the learner. They do not follow a logical sequence. They are not do-able... They do not meet any time and resource constraints.
<b>Student Evaluation Process</b>	Evaluation process is of superior quality and is designed to best measure the knowledge and skills found in the learning objectives. It is accompanied by clear criteria or rubric to determine student learning.	Evaluation process is of adequate quality and is appropriate to measure the knowledge and skills found in the learning objectives. It is accompanied by somewhat clear criteria or rubric to determine student learning.	Evaluation process provides an unclear, insufficient measure of the knowledge and skills found in the learning objectives. It is accompanied by minimal criteria or rubric to determine student learning.
<b>Assessment of Educational Experience</b>	Assessment is of superior quality and is designed to best measure the worth of the educational experience.	Assessment is of adequate quality and is appropriate to measure the worth of the educational experience.	Assessment is designed to only minimally identify the worth of the educational experience.

**Total Points:** \_\_\_\_\_ = \_\_\_\_\_ % **Comments:**

## “Create an exam” project (15%)

The 1<sup>st</sup> exam of the semester will be a “create an exam” project in which students may partner up (2-4 students) to create a 30-50 question exam. The exam must consist of

- 50-75% multiple-choice questions
- 25-50% short answer/matching/essay questions
- The exam must include an answer key with the correct answers.
- The exam, if taken by a student, should take approximately 1-2 hours
- The exam questions and the exam key must be typed
- The exam must include questions pertaining to the following material:

### Laboratory Safety-

- Safety standards and appropriate workplace practices
- Universal and standard precautions
- Prevention of workplace infections, infection disease transmission
- Proper type and use of personal protective equipment
- Safe work practices for infection control
- Hand washing, work area disinfection
- Bloodborne and airborne pathogens
- Biohazard waste and sharps handling and disposal
- Chemical, electrical, and fire safety
- Chemical fume hood and biological safety cabinet use,
- Laboratory reagent and chemical labeling requirements
- Elements of a chemical hygiene plan
- Use of Material Safety Data Sheets (MSDS) and CFR documentation

### Microscopy-

- Fundamentals of microscopy
- Parts of a microscope
- Focusing a microscope
- Calculating magnification

The complexity of the exam questions should follow the accepted ASCP Board of Certification criterion-referenced examination model, which consists of three interrelated taxonomy levels: recall, interpretive skills and problem solving.

Turn in only 1 copy of the exam with all partners' names at the top (by the given due date).

# Ethics Project

Names: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## EXAM 4

SCORE: \_\_\_\_\_/58

Take home- Due Dec 5<sup>th</sup> at 10am

Directions: Work in groups of 2-5 people. Exam answers must be typed. Please be as concise as possible. The exam consists of 3 scenarios and 1 "make your own" scenario. Read the first 3 scenarios and complete the questions after each scenario. For the "make your own scenario", make up a potential ethically challenging scenario you might face in the lab and answer the questions for the scenario.

### Scenario #1

While working as a student in your microbiology externship you go over to the safety hood to inoculate some media plates with a wound culture and you notice that the UV light in the hood is on. You turn off the UV light and are about to start inoculating your plates when you notice that there is a CSF specimen sitting in the hood. You realize that the CSF specimen must have been sitting under the UV light – which could have killed any bacteria in the specimen and compromise the integrity of the sample. Just as you are about to ask your trainer about the specimen, another tech comes by and asks you to hand them the CSF specimen so they can process it. You notify the tech that when you came to the hood to do your work that the UV light was on and that the CSF specimen was under the UV light. The tech says not to worry, the specimen will be fine because she (the tech) just left the specimen in the hood for "a few minutes". The tech then grabs the CSF specimen from the hood and sits down at another hood and proceeds to inoculate some media plates with the CSF specimen.

What would you do?

1. State the problem (1 point): CSF was under uv light which compromises the integrity of the sample and could lead to false negative results, tech responsible for this denies to take fault or do corrective action
2. List 3 alternative solutions (3 points): 1. Do nothing 2. Inform a supervisor of the situation. 3. Discuss the repercussions of a compromised sample with the tech and try to convince the tech not to use the sample.
3. Frame a choice (pick a solution) (1 point)
4. Discuss how your solution/choice aligns with your values. (2 point): Student must discuss a value and compare the value to their choice

5. List potential short-term consequences of your solution (2 points): Student must list at least 2 possible consequences- either a consequence related to patient, themselves, other staff, or society. The consequence can be negative or positive.

6. List possible long term consequences of your solution. (2 points) Student must list at least 2 possible consequences- either a consequence related to patient, themselves, other staff, or society. The consequence can be negative or positive.

### Scenario #2

You are working in the coagulation department and you receive a prothrombin time test on a patient. (A prothrombin time is a blood test that measures how long it takes for blood to form a clot.) As per your procedure, before you can run the test you must check to make sure that the specimen is not already clotted. You check the blood specimen and see that it is clotted. As per your protocol you reject the specimen and call the patient's nurse to have the specimen redrawn. When you tell the nurse that you need to have the specimen redrawn because it is clotted, the nurse refuses to redraw the patient. The nurse says that the doctor is requesting that you run the test regardless and release the results. What do you do?

1. State the problem (1 point) A nurse wants a potentially false coag result to be released.

2. List 3 alternative solutions (3 points). 1. Call the doctor and discuss the situation- explain the problem with clotted specimens and coagulation testing. 2. Try to explain to the nurse the repercussions of releasing a possible false result. 3. Contact your supervisor to handle the issue. 4. Contact the nurse supervisor. 5. Redraw the specimen yourself, or send it to redraw regardless of the nurse's request. Release the results as requested

3. Frame a choice (pick a solution) (1 point)

4. Discuss how your solution/choice aligns with your values. (2 point)

5. List potential short-term consequences of your solution (2 points)

6. List possible long term consequences of your solution. (2 points)

7. If you choose not to release the results, what would you say to the Doctor? (you must answer this question regardless of whether or not it was the solution you picked) (2 points). PT is a test that measures the ability of plasma to clot. If the sample is already clotted before running the PT test, the clotting factors are already used up and the plasma will have a falsely elevated clotting time. The results would be erroneous and thus a new sample (not clotted) is needed in order to give accurate results.

### Scenario #3

You are in the lab performing an automated CBC with reticulocyte count on the sysmex machine (hematology analyzer). The sysmex reports out the CBC but there is an error flag for the reticulocyte count. As per the lab's written protocol, if a reticulocyte count on the analyzer flags for an error you must perform a manual reticulocyte count. Performing a manual reticulocyte count is very time



consuming (30 minutes) and you are in the middle of a very busy morning draw run. Performing this manually will most certainly delay other patients' tests. As you are about to prep for the manual reticulocyte count on the blood specimen, your lead technical specialist for hematology stops you. The lead tech specialist advises you to just report out the machine's automated reticulocyte count and forego the manual count because it is going to delay other patients' results. What do you do?

1. State the problem (1 point). Disagreement in procedure between a tech and a supervisor- could affect TAT and patient result values (false results)
2. List 3 alternative solutions (3 points): 1. Do as supervisor tells you. 2. Do as you originally planned. 3. Discuss with the supervisor the repercussions of a possible false result. 3. Bring the topic to a manager for a decision. 4. Wait to perform the manual retic, till after the morning run, then when slow perform the manual test.
3. Frame a choice (pick a solution) (1 point)
4. Discuss how your solution/choice aligns with your values. (2 point)
5. List potential short-term consequences of your solution (2 points)
6. List possible long term consequences of your solution. (2 points)

#### Scenario #4

(10 points for made up scenario)

Make up a short 1-2 paragraph scenario that might happen in the lab. Answer the following questions using your made up scenario.

1. State the problem (1 point)
2. List 3 alternative solutions (3 points)
3. Frame a choice (pick a solution) (1 point)
4. Discuss how your solution/choice aligns with your values. (2 point)
5. List potential short-term consequences of your solution (2 points)
6. List possible long term consequences of your solution. (2 points)
7. Using the ASCLS code of ethics, what solution/choice should an MLS professional make? How does this choice align with the MLS professional code of ethics? (2 points)

## HEMATOLOGY UNKNOWNNS EXERCISE

1. All reference materials can be used EXCEPT your instructor and your neighbor. Each day some students will know the answers to some unknowns. Therefore, I depend on your personal integrity to keep the answers private.
2. Your answers to each assigned set are due at the end of each day. All answers should be written on the sheet provided. **Please write only on the front side of each sheet.**
3. Each number represents one patient. If a patient has more than one slide, the slide will be numbered and labeled with a description or the preparation type (ex: #5 BM SBB). Unless otherwise stated on the slide, assume the preparation is a Wrights stained peripheral blood smear.
4. You will be given the patients age, Red blood cell count, Hemoglobin and Hematocrit values.
5. Each complete "Diagnosis" is worth 10 points:

**Please record answers in this order.**

**Patient # \_\_\_\_\_**

**a) Diagnosis : \_\_\_\_\_**

- Be as specific as possible with the information you have - 2 points

**b) List Abnormalities seen** - include special stain results here – 3 points

**c) List all other Possible Diagnoses and / or Sub-categories of your Diagnosis-** BE COMPLETE - 2 points

**d) List Confirming Tests and other Helpful Data that confirm your diagnosis and / or rule out your other possible diagnoses.** You may need to use tests from other laboratory departments - BE COMPLETE - 3 points

# UA project

## READ the following Directions:

For this laboratory practical you will be performing various microscopic and macroscopic analysis of urine samples. There are 3 tasks to this practical, all 3 tasks must be completed within the allotted 3 hour exam time. The 3 sections do NOT need to be done in any specific order, it is up to you how you allocate your time. Be aware that some supplies will need to be shared and you may need to wait your turn in order to use the piece of equipment/reagent.

You may use any class room materials (notes, computers, books) but you may **not** talk to each other. You are only allowed to talk to another student if it pertains to sharing a piece of equipment (centrifuge) or asking if the other student is done with a reagent. Any other talking in the exam will result in a failure on the test.

**Report all results on this worksheet.**

## Grading Rubric and Microscopic Enumeration for UA

Element	Acceptable Range	Minus 1 point	Minus 2 points
WBC	+/- 1 only when within clinically significant range (6-25, 26-100, >100)	-if it is clinically significant but marked within 1-5 range -if it is <b>not</b> clinically significant but marked in the 6-25 range	
RBC	+/- 1 only when within clinically significant range (3-25, 26-100, >100)	-if it is clinically significant but marked within 1-2 range -if it is <b>not</b> clinically significant but marked in the 3-25 range	
Bacteria	+/- 1	+/- 2 or -Marked "not-present" but are present	+/- 3
Yeast	+/- 1	+/- 2	+/- 3
Amorphous	+/- 1	+/- 2	+/- 3
Mucus	+/- 1	+/- 2	+/- 3
Crystals (type and #)	+/- 1 (with correct ID)	- Incorrect ID or - +/- 2	+/- 3
Casts (type and #)	+/- 1 (with correct ID)	- Incorrect ID or - +/- 2	+/- 3

## Foundations II SOP Project

Learning Goals addressed in this project. A student will:

1. Learn the key headings for a CLSI appropriate Standard Operating Procedure.
  - Purpose
  - Reagents/Supplies
  - Safety precautions
  - Sample requirements
  - Quality Control
  - Procedure
  - Expected Results/Interpretation/calculations
  - Results reporting
  - Method specifications/limitations
  - Signatures
2. Work as an individual.
3. Write a procedure for one process performed in any lab class during the MLS program.

**MLS students will be expected to write an appropriate procedure. This will include the following:**

- Determine the process or procedure subject.
- Research the methods and materials used in the procedure.
- Utilize CLSI guidelines for the structure.
- Utilize appropriate literature regarding critical values and/or reference ranges.
- Record steps in a clear and functional fashion.
- Use pictorial representations when appropriate.
- Use appropriate grammar and writing skills.

**The possible topics include:**

- Use of hematology analyzer
- Maintenance of hematology analyzer
- Urinalysis
- Serology tests in microbiology

SOP Project Rubric:

Name: \_\_\_\_\_ Topic: \_\_\_\_\_ Date: \_\_\_\_\_

Criteria	Exceeds Expectations (Excellent) 5 points	Meets Expectations (Satisfactory) 3-4 points	Below Expectations (Fair or Poor) 0-2 points
<b>Subject</b>	Topic is appropriate to MLS work in an actual clinical laboratory. Student seems knowledgeable about the topic.	Topic is appropriate to MLS work in a clinical laboratory but it may be too broad for a single procedure or the student does not seem to be appropriately knowledgeable regarding the topic.	Topic is not performed in a clinical laboratory.
<b>CLSI Headings</b>	Sample requirements and materials are researched and appropriate to the test. Reference ranges are listed and accurate according to the literature available. QC steps are listed.	Sample requirements and/or materials are generic or may not include everything. One or more heading may not be thorough or complete.	Sample requirements and materials are not listed or are not appropriate to the test. Reference ranges are not listed. QC not appropriate or too much.
<b>Procedure steps</b>	Steps are concise, reasonable and complete for the process.	Steps are complete for the process but may be lacking in organization or description.	Steps for the process are incomplete or difficult to follow.
<b>Written product</b>	Written product contains all subjects standard for SOP by CLSI guidelines: Purpose Reagents/Supplies, Safety precautions, Sample requirements, Quality Control Procedure, Expected Results/Interpretation/calculations Results reporting Method specifications/limitations There are not grammatical or structural errors.	Written product contains most subjects standard by CLSI guidelines or has significant grammatical or structural errors.	Written products does not address CLSI guidelines and has significant grammatical and structural errors.

**Total Points:** \_\_\_\_\_ = \_\_\_\_\_ % **Comments:** \_\_\_\_\_