

Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: Medical Lab Sciences
Academic Year of Report: 2021 and 22 (covering Summer 2020 through Spring 2022)
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The Institutional Effectiveness website hosts a page for each program that displays assessment reports and information. All available biennial assessment and program review reports are located at the bottom of the program's page on our site. As a part of the biennial report process, we ask that you please review your page for completeness and accuracy, and indicate below the changes that need to be made.

Program page link: https://www.weber.edu/ie/Results/Medical_Lab_Science.html

A. Mission Statement

Information is current; no changes required.

Update if not current:

B. Student Learning Outcomes

(Please include certificate and associate credential learning outcomes)

Information is current; no changes required.

Update if not current:

The MLA Certificate and Associate Degree Outcomes are correct; the Post-Baccalaureate Certificate is new, and the BS outcomes need updated (9, 10, and 11).

The MLS department has developed specific program goals and applied each of the goals to a curriculum map and evidence of learning rubric for each of the program courses.

Post-Baccalaureate Certificate

Students completing the Technologist in Microbiology Post-Baccalaureate Certificate will:

1. Knowledge Goal: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.
2. Knowledge Goal: Apply mathematical calculations to laboratory situations.
3. Laboratory Skill: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.
4. Laboratory Skill: Correlate laboratory theory and terminology to practical laboratory work.
5. Laboratory Skill: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.
6. Diagnostic Skill: Relate laboratory findings to common disease processes. Professionalism and Ethics:
7. Demonstrate professional conduct and ethical behavior.

8. Communication Skill: Demonstrate effective communication skills and behaviors with colleagues in the program and in a laboratory setting for the best new technologies to integrate organization's business processes.

Bachelor Degree

1. Knowledge Goal: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.
2. Knowledge Goal: Apply mathematical calculations to laboratory situations.
3. Laboratory Skill: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.
4. Laboratory Skill: Correlate laboratory theory and terminology to practical laboratory work.
5. Laboratory Skill: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.
6. Diagnostic Skill: Relate laboratory findings to common disease processes. Professionalism and Ethics:
7. Demonstrate professional conduct and ethical behavior.
8. Communication Skill: Demonstrate effective communication skills and behaviors with colleagues in the program and in a laboratory setting for the best new technologies to integrate organization's business processes.
9. Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.
10. Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.
11. Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.

NOTE: the below outcomes are reflected on the website for the AAS and BS degrees but the are not ours and I am not sure where they came from, so I have replicated them for completeness.

Chemistry learning outcomes associated with the BS:

1. Knowledge and comprehension of the core concepts of Chemistry
2. Problem-solving skills. Chemistry majors should be competent problem-solvers. They should be able to identify the essential parts of a problem and formulate a strategy for solving the problem. They should be able to estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of their solution, interpret their result and connect it to related areas of chemistry.
3. Laboratory skills. Chemistry majors should be competent experimentalists. They should be able to design and set up an experiment, collect and analyze data, identify sources of error, interpret their result and connect it to related areas of chemistry.
4. Presentation skills. Chemistry majors should be able to express (orally and in writing) their understanding of core chemical principles, the results of experiments, the analysis of problems and their conclusions.
5. Computer skills. Chemistry majors should be competent users of basic software, such as word processing, spreadsheet, and graphing programs. Strong presentation and organizing skills are complimented with computer knowledge in graphing and spreadsheets.

Health Sciences learning outcomes associated with the BS:

1. Scientific knowledge and skills in scientific reasoning
2. Understanding of medical terminology and fluency in medical English
3. Content knowledge of human body systems
4. Understanding of the relationship between normal human physiology and disease

Microbiology learning outcomes associated with the BS:

1. Model Systems for Basic Biology
2. Role in Disease and Human Health
3. Ubiquitous in Nature
4. Integration of Science and Society
5. Role in Environment and Ecology
6. Nature of Science
7. Laboratory Skills
8. Critical Thinking
9. Data Analysis
10. Problem Solving
11. Communication
12. Cooperation
13. Values

C. Curriculum Grid

 Information is current; no changes required.

Update if not current

Core Courses	Learning Outcomes										
	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Goal 11
MLS 1010 Core Clinical Laboratory Skills	A	U	A	A	E	U	A	E	NA	NA	NA
MLS 1001 Online Orientation for AAS Degree*	NA	NA	NA	NA	NA	NA	E	E	NA	NA	NA
MLS 1113 Introduction to Laboratory Practices	A	U	A	A	E	U	A	E	NA	NA	NA
MLS 1114 Principles of Hematology and Hemostasis	A	A	A	A	E	A	E	E	NA	NA	NA
MLS 2211 Principles of Clinical Chemistry I	A	A	A	U	E	U	U	U	NA	NA	NA

MLS 2212 Principles of Clinical Microbiology I	A	U	A	U	U	A	U	U	NA	NA	NA
MLS 2213 Principles of Clinical Chemistry II	A	A	A	U	E	U	U	U	NA	NA	NA
MLS 2214 Principles of Clinical Microbiology II	A	U	A	U	U	A	U	U	NA	NA	NA
MLS 2210 Principles of Clinical Immunohematology	A	U	A	A	A	E	E	E	NA	NA	NA
MLS 3301 Online Orientation for BS Degree*	NA	NA	NA	NA	NA	NA	E	E	NA	NA	NA
MLS 3302 Biostatistics, Research Methods, and Laboratory Practices	A	A	NA	U	U	NA	E	A	A	A	NA
MLS 3310 Advanced Immunohematology	A	U	A	A	A	E	E	E	NA	A	A
MLS 3312 Clinical Immunology and Virology	A	U	A	U	I	E	I	E	NA	E	I
MLS 3313 Advanced Hematology and Hemostasis	A	A	A	A	E	A	E	E	NA	I	NA
MLS 3314 Advanced Clinical Chemistry	A	U	I	E	A	A	U	E	NA	NA	NA
MLS 3316 Advanced Clinical Microbiology and Molecular Diagnostics	A	U	A	U	A	A	U	U	NA	NA	NA
MLS 4409 Clinical Correlation	E	I	NA	I	E	A	U	NA	NA	NA	NA
MLS 4410 Interdisciplinary Healthcare Teams	U	U	NA	U	E	E	A	A	NA	NA	A
MLS 4411 MLS Simulated Laboratory I	U	U	A	U	A	U	A	A	A	NA	NA
MLS 4412 MLS Simulated Laboratory II	U	A	U	U	E	NA	U	A	A	A	NA
MLS 4415 Laboratory Teaching and Supervision	NA	NA	NA	NA	U	NA	A	A	A	NA	NA
MLS 4803 Research Projects in MLS I	U	U	E	E	NA	NA	A	A	NA	A	NA
MLS 4804 Research Projects in MLS II	A	A	A	A	A	U	A	A	NA	A	NA
MLS 5201 Clinical Microbiology I	A	A	NA	A	A	A	U	U	NA	NA	NA
MLS 5202 Clinical Microbiology II	A	A	NA	A	A	A	U	U	NA	NA	NA
MLS 5203 Applied Laboratory Mathematics and Operations	A	A	NA	A	A	NA	NA	U	NA	NA	NA
MLS 5204 Supervised Clinical Experience	A	A	A	A	A	A	U	A	NA	NA	NA

Program Outcomes

1. Knowledge Goal: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.
2. Knowledge Goal: Apply mathematical calculations to laboratory situations.
3. Laboratory Skill: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.
4. Laboratory Skill: Correlate laboratory theory and terminology to practical laboratory work.
5. Laboratory Skill: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.
6. Diagnostic Skill: Relate laboratory findings to common disease processes.
7. Professionalism and Ethics: Demonstrate professional conduct and ethical behavior.

8. Communication Skill: Demonstrate effective communication skills and behaviors with colleagues in the program and in a laboratory setting.
9. (BS Level Courses Only) Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.
10. (BS Level Courses Only) Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.
11. (BS Level Courses Only) Communication Skill: Demonstrate effective communication skills and behaviors with colleagues in the program and in a laboratory setting.

Key:

I = Introduced

E = Emphasized

U = Utilized

A = Assess comprehensively

NA = Not Addressed

*The MLS 1001 and 3301 online orientation courses are designed to provide the online MLS student with some keys to online success. The online environment is different than the traditional classroom in many respects. These courses were developed in response to student issues regarding online success. Knowing what to expect and having the resources and contacts available help minimize frustrations and allow the new online student to be successful in their coursework and degree completion. These two courses are specific to getting our online only students started and do not contain any MLS core learning material. These courses are designed to prepare the student for the online environment and specifics of the MLS program. Course components include: study and computer skills, learning styles, MLS student handbook, library tutorial, faculty introductions, contact and troubleshooting information, and academic advisement tailor-made specifically for AAS degree and BS MLS students online. MLS 1001 & MLS 3301 are identical courses, with the exception of academic advisement. MLS 1001 is geared toward the AAS degree, MLS 3301 towards the BS degree.

D. Program and Contact Information

 Information is current; no changes required.

Update if not current:

Medical laboratory scientists, sometimes referred to as medical technologists or medical laboratory technicians, are vital members of the health care team who play a central role in the detection, diagnosis, and treatment of disease. To accomplish this, medical laboratory scientists must have a thorough understanding of a wide range of subjects including hematology, clinical chemistry, immunohematology (transfusion medicine), clinical microbiology, and immunology. Laboratory scientists appreciate investigative work and problem solving and are counted on to provide physicians with information critical to the successful diagnosis and treatment of patients. Medical laboratory scientists and technicians are employed by hospitals, clinics, research facilities, universities, and in lab-related commercial industry.

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E. Assessment Plan

 Information is current; no changes required.

Update if not current:

Assessment plan:

1. Knowledge Goal: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.	All courses except MLS 1001, 3301	A, B, C
2. Knowledge Goal: Apply mathematical calculations to laboratory situations.	All courses except MLS 1001, 3301, 4409, and 4415	A, B, C
3. Laboratory Skill: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	All courses except MLS 1001, 3301, 4409, and 4415	A, B, C
4. Laboratory Skill: Correlate laboratory theory and terminology to practical laboratory work.	All courses except MLS 1001, 3301	A, B, C
5. Laboratory Skill: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	All courses except MLS 1001, 3301, and 4415	A, B, C
6. Diagnostic Skill: Relate laboratory findings to common disease processes.	All courses except MLS 1001, 3301, 3302, 4415, and 4803	A, C
7. Professionalism and Ethics: Demonstrate professional conduct and ethical behavior.	All MLS courses	A, B
8. Communication Skill: Demonstrate effective communication skills and behaviors with colleagues in the program and in a laboratory setting.	All MLS courses except 4409	B, D
9. (BS Level Courses Only) Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	MLS 3302, 4411, 4412, 4415	A, B

10. (BS Level Courses Only) Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.	MLS 3302, 3310, 3312, 3313, 4412, 4803, and 4804	A, D
11. (BS Level Courses Only) Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	MLS 3310, 3312, 4410	A, B, D

A: ChiTester / Canvas assessment data

B: Laboratory exercises and practical evaluations

C: National Certification Exam (ASCP MLT and MLS)

D: Presentation and publications

The main program level student assessments used by the Department of Medical Laboratory Sciences are graduate certification rates, graduation rates, and post-graduation placement rates defined as: The number who found employment (in the field or related field) and/or continued their education within one year of graduation. These values are reported yearly to our accrediting organization the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Benchmarks represent NAACLS standard national rates.

AAS – MLT

Graduate Certification Rates

The following table shows the pass rate for those who take the ASCP-BOC MLT exam within the first year of graduation.

Academic Year	Number of Graduates Attempting	Number of Graduates Passing	Certification Percentage
2021-2022*	113*	100*	88%*
2020-2021	56	54	96%
2019-2020	42	38	90%
2018-2019	61	58	95%
		Average	94%

Benchmark = 75% pass rate calculated by the most recent three-year period.

*Data not complete

Graduation Rate

This table shows the number of students who began the final half of the MLT program and graduated, defined at Weber State University as those progressing past the first semester of the second year (campus) and student's enrollment in Clinical Chemistry II or Clinical Microbiology II (online).

Academic Year	Students Starting the Final Half of the MLT Program	Number who did not Complete Final Semester	Number of Students Graduating from the Program	Graduation Percentage
2021-2022	111	5	110	95%
2020-2021	56	3	52	98%
2019-2020	80	2	68	91%
			Average	95%

Benchmark = 70% graduation rate for those students who have begun the final half of the program calculated by the most recent three-year period

Post-graduate Placement Rate

The post-graduation placement rate as defined by NAACLS is the number of AAS graduates who found employment (in the field or related field) and/or continued their education within one year of graduation.

Academic Year	Placement Percentage
2021-2022	100%
2020-2021	100%
2019-2020	100%
Average	100%

BS – MLS

Graduation Certification Rates

This table shows the pass rate for those who take the ASCP-BOC MLS exam within the first year of graduation.

Academic Year	Number of Graduates Attempting	Number of Graduates Passing	Certification Percentage
2021-2022*	81*	68*	84%*
2020-2021	87	70	80%
2019-2020	92	81	88%

2018-2019	94	80	85%
		Average	86%

Benchmark = 75% pass rate calculated by the most recent three-year period.

*Data not complete

Graduation Rate

This table shows the number of students who began the final half of the MLS program and graduated, defined at Weber State University as those enrolled in Advanced Hematology (campus) and students enrolled in MLS 4412 Sim Lab II (online).

Academic Year	Students Starting the Final Half of the MLS Program	Number who did not Complete Final Semester	Number of Students Graduating from the Program	Graduation Percentage
2021-2022	91	2	91	100%
2020-2021	105	3	100	97%
2019-2020	60	1	58	98%
			Average	97%

Benchmark = 70% graduation rate for those students who have begun the final half of the program calculated by the most recent three-year period

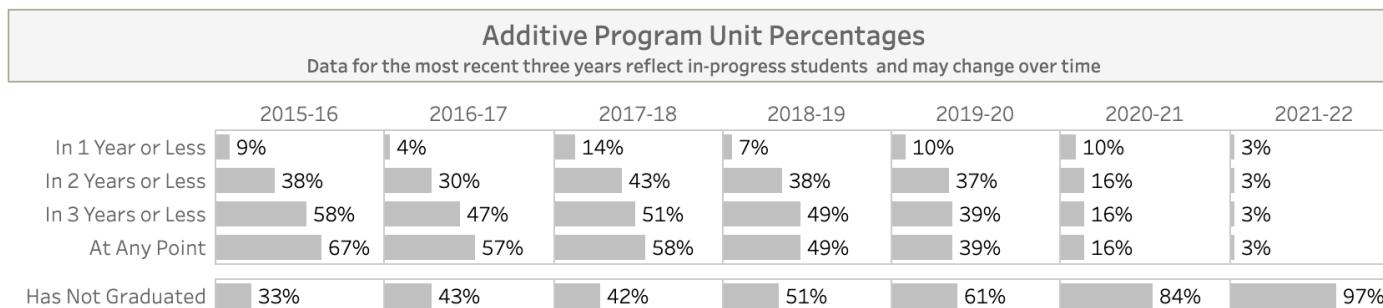
Post-graduation Placement Rate

The post-graduation placement rate as defined by NAACLS is the number of BS graduates who found employment (in the field or related field) and/or continued their education within one year of graduation.

Academic Year	Placement Percentage
2021-2022	100%
2020-2021	100%
2019-2020	100%
Average	100%

F. Student Achievement

F.A: For undergraduate programs only: Percent of students completing degrees after 90 credit hours within 2 years and a reflection on that metric. Here are instructions on how to access this information:



The MLS Department measures students’ success as shown above with our main program level assessments: pass, graduation, and placement rates. The values represented in the dashboard screen shot above reflect the stacked structure of our campus programs and the flexible structure of our online programs.

Campus students enter our AAS program after completing two introductory courses in MLS along with some support and general education classes. Our grad-map lays out a route where students would enter the AAS program in their sophomore year, but students are often advised to take few credit hours and, in many cases, they are advised to pursue and earn a useless AS degree in Health Sciences. This adds substantial time and credit hours to their totals and as such, by the time they progress through our stacked AAS/BS degree many students hit the 90-credit hour benchmark far before they are ready to graduate. We offer three accelerated options of matriculation at the BS program level to accommodate for this inflated credit hour and matriculation time. We have also been working, unsuccessfully, to change the advising at the university and college levels.

The online AAS and BS degrees are offered with flexible schedules to accommodate working professionals and as a consequence students’ progress at a much slower pace. Many have prior degrees, and I would assume this transfers to their total credit hours as shown in this table. The median semesters to completion is seven and nine for the AAS and BS degree respectively, which I can only assume contributes to the values in the above table. In general, these numbers are not surprising, but we are always looking for ways to streamline our programs and to matriculate students as efficiently and quickly as possible.

F.B: For Graduate Programs Only: Of the students that were enrolled in your program last year, what percentage of students failed to persist? Here are instructions on how to access this information:

NA – The MLS department has no graduate programs

G: Evidence of Learning

The MLS Department uses a variety of approaches to assess evidence of learning along with a minimum competency policy for all major related courses. Here we will present a narrative of our overall competency approach to learning along with detailed course-based worksheets for all degree and certificate courses in section G.B.

The MLS Department institutes a minimum competency of 80% on all unit exam and laboratory practical assessments along with final course grades. If a student fails to achieve this level, they are allowed to retake the assessment a set number of times until they achieve the desired competency level. If a student still fails to meet a single assessment competency upon retake, they are not allowed to earn a grade higher than a 79% on the course which will result in the student being put on academic probation and will have to retake the course. If student has to retake a course or fails competency in another course while on probation, they will be dismissed from the program. After dismissal the student is allowed to reapply with sound reasoning on how they will be successful moving forward in the degree program. The department has used this competency approach for decades to help ensure students are prepared to pass the board of registry certification examinations after graduation which is required to be employed as a laboratorian in the US. This may seem stringent, but it has resulted in years of above average exam pass rates for the vast majority of students who complete our various degree programs. We feel the old saying of C's get degrees is not appropriate for students training to work in a healthcare environment.

G.A: Evidence of Learning: Courses within the Major
(This is a sample page for purpose of illustration only;

I am not sure if anything was intended to go here other than the example. I have removed it for clarity, but Evidence of Learning Worksheets will be included for all our degree courses in section G.B.

G.B Evidence of Learning Worksheet: Courses within the Major

Evidence of Learning: MLS 1010 Core Laboratory Skills

Evidence of Learning: Courses within the Major: MLS 1010					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: 6 Unit exams and one comprehensive final where students are assessed through multiple choice questions and case study scenarios	Measure 1: Students are expected to score 80% or better to prove knowledge and competency	Measure 1: The majority of students were able to achieve 80% or higher competency	Measure 1: Only the students who achieve competency are eligible to be admitted to the MLS program.	Measure 1: No changes needed at this time
	Measure 2 12 laboratory sessions that focus on concept application and practical work	Measure 1: Students are expected to score 80% or better to prove knowledge and competency	Measure 1: The majority of students were able to achieve 80% or higher competency	Measure 1: Only the students who achieve competency are eligible to be admitted to the MLS program.	Measure 1: No changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Multiple choice questions in Exam 4 assess absolute and raw sperm counts	Measure 1: Students will score 80% or better on 50 questions.	Measure 1: The majority of students scored 80% or better on Exam 4.	Measure 1: Most students successfully applied mathematical calculations to	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 1010

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*			laboratory situations.	
	Measure 2: Formative assessment in the form of a group quiz during lecture following the sperm count lecture assesses calculating absolute and raw sperm counts.	Measure 2: Students will correctly perform mathematical calculations in class and answer questions as a group and be able to apply to laboratory situations.	Measure 2: The majority of the students correctly performed mathematical calculations in class.	Measure 2: Students understand the concept and are able to apply it in laboratory situations.	Measure 2: No changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Unit 4 Exam tests knowledge theory of Phlebotomy	Measure 1: The majority of the students will score 80% or better on 50 questions	Measure 1: The majority of students scored 80% or better on Exam 4.	Measure 1: Students successfully demonstrated their understanding of phlebotomy theory.	Measure 1: No changes needed at this time
	Measure 2: Demonstrate knowledge of phlebotomy by successfully performing a syringe and a vacutainer draw on a classmate.	Measure 2: Students will correctly perform phlebotomy on a classmate.	Measure 2: The majority of students were able to successfully perform phlebotomy.	Measure 2: Most students were able to apply the theory learned and successfully draw blood.	Measure 2: No changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology	Measure 1: Exam 3 uses 50 multiple choice questions to assess	Measure 1: Students will score 80% or better on 50 questions.	Measure 1: The majority of students scored	Measure 1: Most students successfully correlated	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 1010

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
to practical laboratory work	theory on reagent test strips and correlate it with urine microscopic analysis.		80% or better on 50 questions	laboratory theory of reagent test strips to microscopic urinalysis performed as practical work.	
	Measure 2: Five laboratory sessions requiring students to perform urine microscopic examination and reagent test strips.	Measure 2: Students must score 80% or better on laboratory assignments.	Measure 2: The majority of students scored 80% or better on urine microscopic and reagent test strips laboratory assignments.	Measure 2: The majority of students performed the required skills during their laboratory assignments demonstrating proficiency in urinalysis.	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: A set of Urinalysis Case Studies from Unit 2.	Measure 1: Students will score 80% or better on 6 case studies.	Measure 1: The majority of students scored 80% or better on 6 case studies.	Measure 1: The majority of students successfully demonstrated theory underlying urinalysis and how it relates to renal disease.	Measure 1: No changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: A set of Urinalysis Case Studies from Unit 2.	Measure 1: Students will score 80% or better on 6 case studies.	Measure 1: The majority of students scored 80% or better on 6 case studies.	Measure 1: The majority of students successfully demonstrated theory underlying	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 1010

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*			urinalysis and how it relates to renal disease.	
	Measure 2: 50 questions on Exam 3 dealing with renal disease.	Measure 2: Students will score 80% or better on the Unit 2 exam.	Measure 2: The majority of students were able to score 80% or better.	Measure 2: The majority of students correctly related laboratory findings to common renal diseases.	Measure 2: No changes needed at this time.
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus.	Measure 1: Students will attend laboratory section and be punctual.	Measure 1: The majority of students attended laboratory sessions unless previously excused.	Measure 1: The majority of students attended laboratory sessions and most were punctual.	Measure 1: No changes needed at this time.
	Measure 2: Adherence to laboratory dress code and safety procedures through viewing safety videos and discussions during the first lab session.	Measure 2: Students will comply with dress code and safety procedures.	Measure 2: All students complied with dress code and safety procedures.	Measure 2: Most students were in compliance with dress code and safety procedures. OSHA compliant dress was a problem at times.	Measure 2: For campus students, addition of a self-assessment tool for OSHA compliance, worth points OR require all students wear scrubs to lab.
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the	Measure 1: Class discussions and open-ended questions	Measure 1: Students will participate in class discussions when open ended questions are asked	Measure 1: Students are able to communicate their knowledge through class discussion	Measure 1: All students were able to communicate their knowledge through class discussions.	Measure 1: No changes needed at this time.

Evidence of Learning: Courses within the Major: MLS 1010					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
program and in the laboratory		regarding the material.			
	Measure 2: Reflective questions as part of phlebotomy lab competency.	Measure 2: Students will be able to respond to 2 reflective questions and evaluate their own performance.	Measure 2: Students will evaluate themselves and offer suggestions on how they can improve their phlebotomy skills.	Measure 2: Students reflected on their skills and self-evaluated allowing them to find ways to improve.	Measure 2: No clinical changes needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 1010: Core Laboratory Skills

This course encompasses principles and applications to laboratory testing including safe practices for the laboratory practitioner, specimen quality assurance, phlebotomy, urinalysis, basic concepts in clinical immunology, and clinical approaches to immunological testing. Laboratory session addresses the principles and applications to laboratory testing including safe practices for the laboratory practitioner, specimen quality assurance, phlebotomy, urinalysis, basic concepts in clinical immunology, and clinical approaches to immunological testing. This course along with 6 months of clinical experience qualifies students to sit for the MLA (ASCP) exam under route 6. Data based on instruction from 2014-present by Janice Thomas.

Evidence of Learning: Courses within the Major: MLS 1113

Evidence of Learning: Courses within the Major: MLS 1113

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: 6 Unit exams and one comprehensive final where students are assessed through multiple choice questions and case study scenarios	Measure 1: Students are expected to score 80% or better to prove knowledge and competency	Measure 1: The majority of students were able to achieve 80% or higher competency	Measure 1: Only the students who achieve competency are eligible to be admitted to the MLS program.	Measure 1: No changes needed at this time
	Measure 2: 12 laboratory sessions that focus on concept application and practical work	Measure 1: Students are expected to score 80% or better to prove knowledge and competency	Measure 1: The majority of students were able to achieve 80% or higher competency	Measure 1: Only the students who achieve competency are eligible to be admitted to the MLS program.	Measure 1: No changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Multiple choice questions in Exam 4 assess absolute and raw sperm counts	Measure 1: Students will score 80% or better on 50 questions.	Measure 1: The majority of students scored 80% or better on Exam 4.	Measure 1: Most students successfully applied mathematical calculations to laboratory situations.	Measure 1: No changes needed at this time
	Measure 2: Formative assessment in the form of a group quiz during lecture following the sperm count lecture assesses calculating	Measure 2: Students will correctly perform mathematical calculations in class and answer questions as a group and be able	Measure 2: The majority of the students correctly performed mathematical calculations in class.	Measure 2: Students understand the concept and are able to apply it in laboratory situations.	Measure 2: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 1113

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	absolute and raw sperm counts.	to apply to laboratory situations.			
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Unit 4 Exam tests knowledge theory of Phlebotomy	Measure 1: The majority of the students will score 80% or better on 50 questions	Measure 1: The majority of students scored 80% or better on Exam 4.	Measure 1: Students successfully demonstrated their understanding of phlebotomy theory.	Measure 1: No changes needed at this time
	Measure 2: Demonstrate knowledge of phlebotomy by successfully performing a syringe and a vacutainer draw on a classmate.	Measure 2: Students will correctly perform phlebotomy on a classmate.	Measure 2: The majority of students were able to successfully perform phlebotomy.	Measure 2: Most students were able to apply the theory learned and successfully draw blood.	Measure 2: No changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Exam 3 uses 50 multiple choice questions to assess theory on reagent test strips and correlate it with urine microscopic analysis.	Measure 1: Students will score 80% or better on 50 questions.	Measure 1: The majority of students scored 80% or better on 50 questions	Measure 1: Most students successfully correlated laboratory theory of reagent test strips to microscopic urinalysis performed as practical work.	Measure 1: No changes needed at this time
	Measure 2: Five laboratory sessions requiring	Measure 2: Students must score 80% or better	Measure 2: The majority of students scored	Measure 2: The majority of students performed	Measure 2: No clinical changes needed at this time

Evidence of Learning: Courses within the Major: MLS 1113

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	students to perform urine microscopic examination and reagent test strips.	on laboratory assignments.	80% or better on urine microscopic and reagent test strips laboratory assignments.	the required skills during their laboratory assignments demonstrating proficiency in urinalysis.	
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: A set of Urinalysis Case Studies from Unit 2.	Measure 1: Students will score 80% or better on 6 case studies.	Measure 1: The majority of students scored 80% or better on 6 case studies.	Measure 1: The majority of students successfully demonstrated theory underlying urinalysis and how it relates to renal disease.	Measure 1: No changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: A set of Urinalysis Case Studies from Unit 2.	Measure 1: Students will score 80% or better on 6 case studies.	Measure 1: The majority of students scored 80% or better on 6 case studies.	Measure 1: The majority of students successfully demonstrated theory underlying urinalysis and how it relates to renal disease.	Measure 1: No changes needed at this time
	Measure 2: 50 questions on Exam 3 dealing with renal disease.	Measure 2: Students will score 80% or better on the Unit 2 exam.	Measure 2: The majority of students were able to score 80% or better.	Measure 2: The majority of students correctly related laboratory findings to common renal diseases.	Measure 2: No changes needed at this time.

Evidence of Learning: Courses within the Major: MLS 1113

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus.	Measure 1: Students will attend laboratory section and be punctual.	Measure 1: The majority of students attended laboratory sessions unless previously excused.	Measure 1: The majority of students attended laboratory sessions and most were punctual.	Measure 1: No changes needed at this time.
	Measure 2: Adherence to laboratory dress code and safety procedures through viewing safety videos and discussions during the first lab session.	Measure 2: Students will comply with dress code and safety procedures.	Measure 2: All students complied with dress code and safety procedures.	Measure 2: Most students were in compliance with dress code and safety procedures. OSHA compliant dress was a problem at times.	Measure 2: For campus students, addition of a self-assessment tool for OSHA compliance, worth points OR require all students wear scrubs to lab.
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Class discussions and open-ended questions	Measure 1: Students will participate in class discussions when open ended questions are asked regarding the material.	Measure 1: Students are able to communicate their knowledge through class discussion	Measure 1: All students were able to communicate their knowledge through class discussions.	Measure 1: No changes needed at this time.
	Measure 2: Reflective questions as part of phlebotomy lab competency.	Measure 2: Students will be able to respond to 2 reflective questions and evaluate their own performance.	Measure 2: Students will evaluate themselves and offer suggestions on how they can improve their phlebotomy skills.	Measure 2: Students reflected on their skills and self-evaluated allowing them to find ways to improve.	Measure 2: No clinical changes needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 1113: Introduction to laboratory practices.

This course encompasses principles and applications to laboratory testing including safe practices for the laboratory practitioner, specimen quality assurance, phlebotomy, urinalysis, basic concepts in clinical immunology, and clinical approaches to immunological testing. Laboratory session addresses the principles and applications to laboratory testing including safe practices for the laboratory practitioner, specimen quality assurance, phlebotomy, urinalysis, basic concepts in clinical immunology, and clinical approaches to immunological testing. Data based on instruction from 2014-present by Janice Thomas.

Evidence of Learning: Courses within the Major: MLS 1114 Principles of Hematology and Hemostasis

Evidence of Learning: MLS 1114					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.	Measure 1: Six-unit exams and one comprehensive final where students are assessed through multiple choice questions and case study scenarios	Measure 1: The majority of students must score 80% or better on exams, proving competency. If they do not score above 80%, they are required to score well on a retake exam to prove competency.	Measure 1: The majority of students scored 80% or better on both exams.	Measure 1: Only the students who achieve competency are eligible to be admitted to the MLS program.	Measure 1: No changes needed at this time
	Measure 2: Eleven graded laboratory practice sessions and one	Measure 2 The majority students are required to score above an 80% in laboratory	Measure 2: The majority of students were able to correctly	Measure 2: Only the students who achieve competency are eligible to be	Measure 2: No changes needed at this time

Evidence of Learning: MLS 1114					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	comprehensive lab practical.	skills and competencies.	perform required laboratory skills	admitted to the MLS program.	
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Multiple-choice questions requiring mathematical calculations in exam 1, 2, 3, 5, and lab practical.	Measure 1: The majority students will score 80% or better on these questions.	Measure 1: The majority of students scored 80% or better on these questions regarding mathematical equations.	Measure 1: Most students successfully applied mathematical calculations to laboratory situations.	Measure 1: No changes needed at this time
	Measure 2: Laboratory sessions requiring applications of laboratory mathematical calculations	Measure 2: The majority of students will correctly perform mathematical calculations in laboratory situations.	Measure 2: The majority of students correctly performed mathematical calculations in laboratory situations.	Measure 2: Most students correctly performed mathematical calculations in laboratory situations.	Measure 2: No changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Several multiple-choice questions in exam 1, 2, 3 and 5 address specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: The majority students will score 80% or better on these questions.	Measure 1: The majority students scored 80% or better on these questions.	Measure 1: Most students successfully demonstrated knowledge of evaluating specimen acceptability and optimal analysis methods.	Measure 1: No changes needed at this time

Evidence of Learning: MLS 1114					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Demonstrate proper knowledge of specimen collection and processing, analysis, interpretation during laboratory sessions.	Measure 2: The majority of students will correctly determine proper sample suitability.	Measure 2: The majority of students were able to correctly determine proper sample suitability for hematology analysis.	Measure 2: Most students correctly determined proper sample suitability.	Measure 2: No changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Several multiple-choice questions each from exams 1,2, 3, 4, 5 and 6 that challenge a student to correlate theory with practical laboratory work.	Measure 1: The majority of students will score 80% or better on all questions.	Measure 1: The majority of students scored 80% or better on all questions	Measure 1: Most of students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No changes needed at this time
	Measure 2: Evaluate formed elements on peripheral blood smears with emphasis on normal blood smears and introduction to abnormal blood smears during the ten of the eleven	Measure 2: During the lab practical students will perform four manual differentials and match within specific range for each formed element on normal differential and score 80% or better on the	Measure 2: The majority of students accurately identified the formed elements on the normal differentials and scored 80% or better on the laboratory practical exam and participated in all	Measure 2: Most of students performed the required skills during the laboratory practical exam and required laboratory sessions.	Measure 2: No changes needed at this time

Evidence of Learning: MLS 1114					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	laboratory sessions. Formative feedback is given during laboratory sessions.	laboratory practical exam.	required laboratory sessions.		
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Several multiple-choice questions in exams one, two, three and six assess student's ability to evaluate a collection of tests to identify discrepancies.	Measure 1: The majority of students will score 80% or better on these questions.	Measure 1: The majority of students scored 80% or better on these questions.	Measure 1: Most students successfully demonstrated problem solving skills	Measure 1: No changes needed at this time
	Measure 2: Most laboratory activities require the students to troubleshoot specimen/result discrepancies.	Measure 2: The majority of students will correctly troubleshoot specimen/result discrepancies.	Measure 2: The majority of students correctly identified specimen/result discrepancies.	Measure 2: Most students were able to correctly troubleshoot specimen/result discrepancies.	Measure 2: No changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Several multiple-choice questions in exams one through six assess student's ability to correlate patient history and diagnoses to	Measure 1: The majority of students will score 80% or better on these questions.	Measure 1: The majority of students scored 80% or better these questions.	Measure 1: Most students successfully demonstrated problem solving skills	Measure 1: No changes needed at this time

Evidence of Learning: MLS 1114					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	laboratory findings.				
	Measure 2: Three of the laboratory sessions have students correlate patient history and laboratory findings to potential diagnosis. Formative feedback is given during laboratory sessions, and after submitting laboratory report forms.	Measure 2: Students will correlate patient history and laboratory findings to potential diagnosis.	Measure 2: The majority of students were able to correlate patient history and laboratory findings to potential diagnosis.	Measure 2: Most of students correctly correlated patient history and laboratory findings to potential diagnosis.	Measure 2: No changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus	Measure 1: Students will attend laboratory section and be punctual.	Measure 1: The majority of students attended laboratory sessions unless previously excused.	Measure 1: The majority of students attended laboratory sessions and most were punctual.	Measure 1: No changes needed at this time
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: Students will comply with dress code and safety procedures.	Measure 2: All students complied with dress code and safety procedures	Measure 2: All students followed dress code and safety procedures.	Measure 2: No changes needed at this time

Evidence of Learning: MLS 1114					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Laboratory etiquette and expectations are defined in the syllabus. Measured by punctuality and participation.	Measure 1: The majority of students will be punctual to laboratory sessions, and remain task-oriented throughout the session in order to receive full participation credit.	Measure 1: Most of students were punctual to laboratory sessions, and remained task-oriented throughout the session and received full participation credit.	Measure 1: Most of students demonstrated effective communication skills through punctuality and tasks during laboratory sessions.	Measure 1: No changes needed at this time

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 1114 is an introductory hematology course covering:

- The theory and principles of hematology and hemostasis relevant to routine laboratory testing
- Normal erythrocyte physiology and associated disorders
- Normal leukocyte physiology and associated non-malignant and malignant blood disorders
- Basic morphological analysis of body fluids
- Normal platelet and coagulation physiology and associated disorders.

MLS 1114 contains all eight of the program's identified learning goals in varying amounts. As noted in the curriculum map, learning goals 5 and 8 are areas of introduction, learning goals 1 and 3 are emphasized, and learning goals 2, 4, 6, and 7 are utilized.

Evidence of Learning: Courses within the Major: MLS 2210 Principles of Immunohematology

Evidence of Learning: Courses within the Major

Measurable Learning Goal Students will...	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: A set of multiple choice questions from Exam 2	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 24 graded laboratory practice sessions and 2 practical exams	Measure 2: 100% of students will correctly perform required laboratory skills as demonstrated by achieving at least 80% on laboratory sessions and practical exams.	Measure 2: 100% of students were able to correctly perform required laboratory skills as demonstrated by achieving at least 80% on laboratory sessions and practical exams.	Measure 2: All students correctly performed required laboratory skills	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: A set of multiple choice questions from Exams 3 and Final Exam	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully applied mathematical calculations to laboratory situations.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 2 graded laboratory applications of laboratory mathematical calculations	Measure 2: 100% of students will correctly perform mathematical calculations in laboratory situations.	Measure 2: 100% of students correctly performed mathematical calculations in laboratory situations.	Measure 2: All students correctly performed mathematical calculations in laboratory situations.	Measure 2: No clinical changes needed at this time

Evidence of Learning: Courses within the Major

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: A set of multiple choice questions from Exams 1, 2, 3, and Comprehensive Final Exam	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully demonstrated knowledge of evaluating specimen acceptability and optimal analysis methods.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Demonstrate proper knowledge of specimen criteria in a blood bank laboratory setting	Measure 2: 100% of students will correctly determine proper sample suitability.	Measure 2: 100% of students were able to correctly determine proper sample suitability for blood bank analysis	Measure 2: All students correctly determined proper sample suitability.	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: A set of multiple choice questions from Exams 2 and 3	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions	Measure 1: All students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Assess unknowns with accuracy during 2 laboratory practical exams.	Measure 2: 100% of students will score 80% or better on 2 laboratory practical exams.	Measure 2: 99% of students scored 80% or better on 2 laboratory practical exams.	Measure 2: Most students performed the required skills during the 2 laboratory practical exams.	Measure 2: No clinical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 5: Gather additional laboratory data and apply problem-solving skills to solve problems/discrepancies.	Measure 1: A set of multiple choice questions from Exams 2 and 3	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students resolve discrepancies in the laboratory sessions and must correlate patient history to laboratory findings	Measure 2: 100% of students will correctly resolve discrepancies in the laboratory sessions and correlate patient history to laboratory findings	Measure 2: 100% of students were able to correctly resolve discrepancies in the laboratory sessions and correlate patient history to laboratory findings	Measure 2: All students correctly resolved discrepancies in the laboratory sessions and correlated patient history to laboratory findings	Measure 2: No clinical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: A set of multiple choice questions from Exams 2, 3, and the Comprehensive Final Exam	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: In 2 laboratory sessions students relate laboratory findings to common diseases	Measure 2: 100% of students will perform the required skills in the laboratory	Measure 2: 100% of students were able to relate laboratory findings to common diseases.	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations	Measure 1: 100% of students will attend laboratory section and be punctual.	Measure 1: 100% attendance in laboratory section. 95% punctuality	Measure 1: All students attended laboratory section and most were punctual	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	defined in course syllabus				
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: 100% of students will comply with dress code and safety procedures.	Measure 2: 100% of students complied with dress code and safety procedures	Measure 2: All students were in compliance with dress code and safety procedures.	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Responses to essay questions in exams 1, 2, and 3	Measure 1: 100% of students will score 80% or better on essay questions.	Measure 1: 100% of students were able to communicate their knowledge on the essay questions	Measure 1: All students were able to communicate their knowledge on the essay questions	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Affective Domain Assessment in laboratory section regarding communication.	Measure 2: 100% of students will receive “satisfactory” marks in communication-related objectives in Affective Domain Assessment	Measure 2: 100% of students use professional and assertive communication with fellow students and instructor in the laboratory.	Measure 2: All students can communicate better as the course progresses	Measure 2: No changes needed at this time

* At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 2210 is an introductory immunohematology course covering the theory and principles of Immunohematology relevant to blood group serology, antibody detection and identification, compatibility testing, component preparation and therapy in blood transfusion service, quality control, donor screening and phlebotomy, transfusion reactions and hemolytic disease of the fetus and newborn. MLS 2210 contains all eight of the program’s identified learning goals, though in appropriately varying amounts. As noted in the curriculum map, learning goals 2,4,5,6 and 8 are areas

of introduction, learning goal 1 is emphasized, and learning goals 3 and 7 are utilized. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from two sections of the course taught in Spring 2021 by Justin Rhees. This course was previously listed at MLS 2215 and was taught by Bill Zundel and Janet Oja from 2008-2018.

Evidence of Learning: Courses within the Major: MLS 2211 Principles of Clinical Chemistry I

Evidence of Learning: MLS 2211					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Each exam covers testing specific to the covered units.	Measure 1: Each student must complete the exam with a score of at least 80%.	Measure 1: All students with passing grades achieved a score of at least 80% on each unit exam.	Measure 1: All students with passing grades showed an acceptable level of understanding of the theory behind the testing discussed.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Students will complete laboratory exercises, which require understanding of the testing methods.	Measure 2: The total points earned from the laboratory must equal at least 80% of the points possible.	Measure 2: All students with passing grades earned at least 80% of the total points possible.	Measure 2: All students with passing grades showed competency of the covered topics and laboratory exercises.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Students must complete a 40-question lab math exam before	Measure 1: Each student must pass the exam with a score of at least 80%.	Measure 1: All students with passing grades scored at least 80%.	Measure 1: All students with a passing grade can successfully complete	Measure 1: Instituted review questions in all subsequent examinations

Evidence of Learning: MLS 2211					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	beginning lab work. Questions are repeated throughout the year to help students remember			laboratory mathematics. Continual exposure to math throughout the year, assists with memory.	
	Measure 2: Graded laboratory exercises, which include calculations.	Measure 2: All students must correctly complete laboratory calculations.	Measure 2: All students with passing grades earned at least 80% of the total points possible.	Measure 2: All students with passing grades can successfully complete laboratory mathematics.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Students will complete a laboratory final with several exercises ranging in difficulty.	Measure 1: All students must complete the laboratory final with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can successfully complete laboratory testing procedures ranging in difficulty.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Demonstrate knowledge of accurate sample requirements and collection procedures.	Measure 2: Students will assess samples submitted for testing for acceptability.	Measure 2: All students with passing grades have accurately demonstrated knowledge of sample requirements.	Measure 2: All students can assess samples for testing as appropriate.	Measure 2: Instituted clinical correlation exercises which deal with patient pathologies and specimen issues in testing to better inform the students regarding sample

Evidence of Learning: MLS 2211					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				requirements and collection procedures
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students will correlate theory and terminology in all laboratory exercises.	Measure 1: Students will complete all laboratory correlation activities with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can correlate theory to practical laboratory situations.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Students must test unknown samples during laboratory exercises.	Measure 2: Students must complete the laboratory section with at least 80%.	Measure 2: All students with passing grades earned a score of at least 80%.	Measure 2: All students with passing grades can correlate theory to practical laboratory situations.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Students must gather all applicable data regarding the patient and use it for a tentative diagnosis	Measure 1: Students must obtain all pertinent information which is scored on their laboratory section, which must be at least 80%	Measure 1: All students with passing grades earned a score of at least 80%	Measure 1: All students with passing grades can gather laboratory data and use it to solve problems and discrepancies	Measure 1: Instituted QC labs prior to the introduction of a new test. Also instituted a Levy-Jennings problem-solving worksheet

Evidence of Learning: MLS 2211					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Not applicable.	Measure 2: Not applicable.	Measure 2: Not applicable.	Measure 2: Not applicable.	Measure 2: Not applicable.
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Each unit exam will test the student's ability to correlate laboratory findings to common diseases.	Measure 1: Each student must pass the exam with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can accurately correlate laboratory findings to common diseases.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Laboratory exercises require students to use disease correlation to laboratory findings as a QA tool.	Measure 2: Students must identify laboratory results that are not consistent with patient diagnoses.	Measure 2: All students with passing grades have accurately correlated laboratory findings on assigned laboratory activities.	Measure 2: All students with passing grades can correlate laboratory findings to disease states covered in the course.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Unit 1 test contains questions to include professional behavior.	Measure 1: Students must pass the test with a score of at least 80%.	Measure 1: All students with passing grades scored at least 80% on the test.	Measure 1: All students with passing scores have an introductory understanding of professional behavior.	Measure 1: Findings indicate no changes are needed at this time.

Evidence of Learning: MLS 2211					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Adherence to proper laboratory dress code and common regulatory requirements (i.e. HIPPA)	Measure 2: Students must comply with dress code requirements for safety and HIPPA requirements.	Measure 2: All students with passing grades properly gowned laboratory clothing (i.e. lab coat) and showed compliance to HIPPA regulations they were exposed to.	Measure 2: All students with passing grades are aware of proper laboratory attire and HIPPA regulations that are discussed.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Laboratory exercises require students to communicate critical values to the healthcare provider.	Measure 1: All students must accurately identify all critical values and properly report them to the provider.	Measure 1: All students with passing grades were able to identify critical values.	Measure 1: All students with passing grades know the importance of prompt and professional interaction.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Instructor/ Professor observation of interactions amongst peers.	Measure 2: All students must adhere to the no hazing policy outlined in the course syllabus.	Measure 2: All students with a passing grade have interacted appropriately with their colleagues.	Measure 2: All students with passing grades know the importance of prompt and professional interaction.	Measure 2: Findings indicate no changes are needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing.

Summary: MLS 2211 is an introductory clinical chemistry course covering the theory and principles of clinical chemistry, including laboratory math, basic instrumentation, carbohydrates, lipids, electrolytes, and acid-base balance. MLS 2211 contains all of the eight identified learning goals. The exposure level of each goal in this course is appropriate for the introductory students.

Evidence of Learning: Courses within the Major: MLS 2212 Principles of Clinical Microbiology I

Evidence of Learning: MLS 2212					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: 3 quizzes (100% of questions), 4 exams and comprehensive final (75% of questions)	Measure 1: 100% of students will score 80% or better on all test questions (quizzes are excluded)	Measure 1: Approx. 86% of students scored 80% or better on all exams (avg. 25 of 29 students)	Measure 1: 86% of students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 13 weeks of graded laboratory activities and 2 practical in-lab exams	Measure 2: 100% of students will score 80% or better by correctly performing required laboratory skills	Measure 2: 100% of students were able to correctly perform required laboratory skills	Measure 2: All students correctly performed required laboratory skills	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: 1-2 questions on quiz 2 and exam 2, fill-in-the blank and multiple choice	Measure 1: 100% of students will score 80% or better on math questions	Measure 1: 100% of students scored 80% or better on math questions	Measure 1: All students successfully applied mathematical calculations to laboratory situations	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 6 weekly laboratory activities with 1-2 unknown patient specimens per week which utilize correct reporting of	Measure 2: 100% of students will score 80% or better on mathematical calculations in laboratory situations	Measure 2: 100% of students correctly performed mathematical calculations 80% or better in laboratory situations	Measure 2: All students correctly performed mathematical calculations in lab situations 80% of the time or better	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 2212					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	urine cultures involving mathematical calculations				
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: 13 weeks of graded laboratory activities, each involving identification of bacterial unknown specimens and 2 practical in-lab exams	Measure 1: 100% of students will score 80% or better on laboratory activities and practical exams	Measure 1: 100% of students scored 80% or better overall on final course laboratory grade	Measure 1: All students successfully demonstrated knowledge of evaluating specimen acceptability and optimal analysis methods.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Demonstrate proper knowledge of quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students will correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students were able to correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: All students correctly determined quality assurance procedures in clinical microbiology laboratory	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: All course exams and 3 quizzes have 50% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better	Measure 1: 86% of students scored 80% or better	Measure 1: 86% of students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 2212

Measurable Learning Goal Students will...	Method of Measurement Direct and Indirect Measures*	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
	Measure 2: Assess 4-5 weekly laboratory unknowns in each of the 13 laboratory activities and 1 comprehensive lab final	Measure 2: 100% of students will score 80% or better overall on course laboratory activities and comprehensive lab final	Measure 2: 100% of students scored 80% or better overall on course laboratory activities and comprehensive lab final	Measure 2: All students performed the required skills during 13 lab activities and comprehensive lab final	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Four case study homework assignments in Unit 2 and Unit 3.	Measure 1: 100% of students must complete assignments	Measure 1: 100% of students completed the four assignments.	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Exams 2,3,4 and the final exam contain approximately 10% diagnostic questions	Measure 1: 100% of students will score 80% or better on the diagnostic questions	Measure 1: 100% of students scored 80% or better on the diagnostic questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: In 11 of the weekly laboratory activities specimen source of unknowns is related to diseases	Measure 2: 100% of students will perform 80% or better relating specimen unknowns to related diseases	Measure 2: 100% of students were able to relate laboratory findings to common diseases 80% of the time	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 2212					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus	Measure 1: 100% of students will attend laboratory section and be punctual.	Measure 1: 100% attendance in laboratory section. 95% punctuality	Measure 1: All students attended laboratory section and most were punctual	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: 100% of students will comply with dress code and safety procedures.	Measure 2: 100% of students complied with dress code and safety procedures	Measure 2: All students were in compliance with dress code and safety procedures.	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Correct reporting (communication) of laboratory results in 13 weekly activities.	Measure 1: 100% of students will correctly report results 80% or better on laboratory reports.	Measure 1: 100% of students were able to correctly report results 80% or better on laboratory reports.	Measure 1: All students were able to correctly report laboratory reports.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students work in teams for 6 of 13 weekly laboratory activities	Measure 2: 100 % of students will demonstrate effective team work during the 6 weeks of laboratory activities	Measure 2: 100% of students demonstrated effective team work.	Measure 2: All students demonstrated effective team work.	Measure 2: No curricular or pedagogical changes needed at this time

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 2212 – Principles in Clinical Microbiology I is an introductory clinical microbiology course provides an in-depth coverage of clinically significant bacteria including epidemiology, pathogenicity, and procedures for traditional laboratory identification. Major organisms include Gram positive cocci, enteric Gram negative rods, non-fermentative Gram negative rods, and miscellaneous Gram negative rods. This course

contains all eight of the program's identified learning goals. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from two years and three sections of the course taught from Fall 2019-2021 by Kendal Beazer, with student results derived from the most recent cohort.

Evidence of Learning: Courses within the Major: MLS 2213 Principles of Clinical Chemistry II

Evidence of Learning: MLS 2213

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Each exam covers testing specific to the covered units.	Measure 1: Each student must complete the exam with a score of at least 80%.	Measure 1: All students with passing grades achieved a score of at least 80% on each unit exam.	Measure 1: All students with passing grades showed an acceptable level of understanding of the theory behind the testing discussed.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Students will complete laboratory exercises, which require understanding of the testing methods.	Measure 2: The total points earned from the laboratory must equal at least 80% of the points possible.	Measure 2: All students with passing grades earned at least 80% of the total points possible.	Measure 2: All students with passing grades showed competency of the covered topics and laboratory exercises.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Students must complete a 40-question lab math	Measure 1: Each student must pass the exam with a	Measure 1: All students with passing grades	Measure 1: All students with a passing grade can successfully	Measure 1: Instituted review questions in all

Evidence of Learning: MLS 2213

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	exam before beginning lab work. Questions are repeated throughout the year to help students remember	score of at least 80%.	scored at least 80%.	complete laboratory mathematics. Continual exposure to math throughout the year, assists with memory.	subsequent examinations
	Measure 2: Graded laboratory exercises, which include calculations.	Measure 2: All students must correctly complete laboratory calculations.	Measure 2: All students with passing grades earned at least 80% of the total points possible.	Measure 2: All students with passing grades can successfully complete laboratory mathematics.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Students will complete a laboratory final with several exercises ranging in difficulty.	Measure 1: All students must complete the laboratory final with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can successfully complete laboratory testing procedures ranging in difficulty.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Demonstrate knowledge of accurate sample requirements and collection procedures.	Measure 2: Students will assess samples submitted for testing for acceptability.	Measure 2: All students with passing grades have accurately demonstrated knowledge of sample requirements.	Measure 2: All students can assess samples for testing as appropriate.	Measure 2: Instituted clinical correlation exercises which deal with patient pathologies and specimen issues in testing to better inform the students regarding sample

Evidence of Learning: MLS 2213

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
					requirements and collection procedures
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students will correlate theory and terminology in all laboratory exercises.	Measure 1: Students will complete all laboratory correlation activities with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can correlate theory to practical laboratory situations.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Students must test unknown samples during laboratory exercises.	Measure 2: Students must complete the laboratory section with at least 80%.	Measure 2: All students with passing grades earned a score of at least 80%.	Measure 2: All students with passing grades can correlate theory to laboratory situations.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Students must gather all applicable data regarding the patient and use it for a tentative diagnosis	Measure 1: Students must obtain all pertinent information which is scored on their laboratory section, which must be at least 80%	Measure 1: All students with passing grades earned a score of at least 80%	Measure 1: All students with passing grades can gather laboratory data and use it to solve problems and discrepancies	Measure 1: Instituted QC labs prior to the introduction of a new test. Also instituted a Levy-Jennings problem-solving worksheet
	Measure 2: Most laboratory activities require the students to troubleshoot	Measure 2: All Students must correct discrepancies in order to report out	Measure 2: All students with passing grades earned a score of at least 80%.	Measure 2: All students with passing grades are able to identify and correct	Measure 2: Findings indicate no changes are needed at this time.

Evidence of Learning: MLS 2213

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	specimen/result discrepancies.	correct results with at least 80% accuracy.		discrepancies in order to provide accurate results.	
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Each unit exam will test the student's ability to correlate laboratory findings to common diseases.	Measure 1: Each student must pass the exam with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can accurately correlate laboratory findings to common diseases.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Laboratory exercises require students to use disease correlation to laboratory findings as a QA tool.	Measure 2: Students must identify laboratory results that are not consistent with patient diagnoses.	Measure 2: All students with passing grades have accurately correlated laboratory findings on assigned laboratory activities.	Measure 2: All students with passing grades can correlate laboratory findings to disease states covered in the course.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: The final exam contains questions that cover professional behavior.	Measure 1: Students must pass the test with a score of at least 80%.	Measure 1: All students with passing grades scored at least 80% on the test.	Measure 1: All students with passing scores have an introductory understanding of professional behavior.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Adherence to proper laboratory dress code and	Measure 2: Students must comply with dress code requirements	Measure 2: All students with passing grades properly gowned	Measure 2: All students with passing grades are aware of proper	Measure 2: Findings indicate no changes are needed at this time.

Evidence of Learning: MLS 2213

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	common regulatory requirements (i.e. HIPAA)	for safety and HIPAA requirements.	laboratory clothing (i.e. lab coat) and showed compliance to HIPAA regulations they were exposed to.	laboratory attire and HIPAA regulations that are discussed.	
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Laboratory exercises require students to communicate critical values to the healthcare provider.	Measure 1: All students must accurately identify all critical values and properly report them to the provider.	Measure 1: All students with passing grades were able to identify critical values.	Measure 1: All students with passing grades know the importance of prompt and professional interaction.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Instructor/ Professor observation of interactions amongst peers.	Measure 2: All students must adhere to the no hazing policy outlined in the course syllabus.	Measure 2: All students with a passing grade have interacted appropriately with their colleagues.	Measure 2: All students with passing grades know the importance of prompt and professional interaction.	Measure 2: Findings indicate no changes are needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing.

Summary: MLS 2213 is the second semester of the introductory clinical chemistry course covering the theory and principles of clinical chemistry, including proteins and non-protein nitrogens, enzymology, endocrinology, therapeutic drug monitoring, toxicology, analytical principles,

heme derivatives, and body fluids. MLS 2213 contains all of the eight identified learning goals. The exposure level of each goal in this course is appropriate for the introductory students.

Evidence of Learning: Courses within the Major: MLS 2214 Principles of Clinical Microbiology II

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: 3 quizzes (100% of questions), 3 exams and a comprehensive final (75% of questions)	Measure 1: 100% of students will score 80% or better on all test questions (quizzes are excluded)	Measure 1: Approx. 91% of students scored 80% or better all exams (avg. 29 of 32 students)	Measure 1: 91% of students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 11 weeks of graded laboratory activities and 1 practical in-lab exam	Measure 2: 100% of students will score 80% or better by correctly performing required laboratory skills	Measure 2: 100% of students were able to correctly perform required laboratory skills	Measure 2: All students correctly performed required laboratory skills	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: 1-2 questions on exam 1, multiple choice	Measure 1: 100% of students will score 80% or better on math questions	Measure 1: 100% of students scored 80% or better on math questions	Measure 1: All students successfully applied mathematical calculations to laboratory situations	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 3 weekly laboratory activities with 1-2 unknown patient specimens and 1 week of hospital urine culture plates, which utilize	Measure 2: 100% of students will score 80% or better on mathematical calculations in laboratory situations	Measure 2: 100% of students correctly performed mathematical calculations 80% or better in laboratory situations	Measure 2: All students correctly performed mathematical calculations in lab situations 80% of the time or better	Measure 2: No clinical changes needed at this time

Evidence of Learning: Courses within the Major

Measurable Learning Goal Students will...	Method of Measurement Direct and Indirect Measures*	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
	correct reporting of urine cultures involving mathematical calculations.				
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: 11 weeks of graded laboratory activities involving identification of bacteria, parasites, and fungi	Measure 1: 100% of students will score 80% or better on laboratory activities and practical exams	Measure 1: 100% of students scored 80% or better overall on final course laboratory grade	Measure 1: All students successfully demonstrated knowledge of evaluating specimen acceptability and optimal analysis methods.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Demonstrate proper knowledge of quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students will correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students were able to correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: All students correctly determined quality assurance procedures in clinical microbiology laboratory	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: All course exams and 2 quizzes have 50% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better on questions.	Measure 1: 91% of students scored 80% or better on questions	Measure 1: 91% of students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Assess 4-5 weekly laboratory unknowns in each of the 11 laboratory activities	Measure 2: 100% of students will score 80% or better overall on course laboratory activities	Measure 2: 100% of students scored 80% or better overall on course laboratory activities	Measure 2: All students performed the required skills during 11 lab activities	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Four case study homework assignments in Unit 4, 6, 8, and 11.	Measure 1: 100% of students must complete assignments	Measure 1: 100% of students completed the four assignments.	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: All exams contain approximately 20% diagnostic questions	Measure 1: 100% of students will score 80% or better on the diagnostic questions	Measure 1: 95% of students scored 80% or better on the diagnostic questions	Measure 1: 95% of students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: In 11 of the weekly laboratory activities, specimen source of unknowns is related to diseases	Measure 2: 100% of students will perform 80% or better relating specimen unknowns to related diseases	Measure 2: 100% of students were able to relate laboratory findings to common diseases 80% of the time	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations	Measure 1: 100% of students will attend laboratory	Measure 1: 100% attendance in laboratory section. 95% punctuality	Measure 1: All students attended laboratory section	Measure 1: No curricular or pedagogical

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	defined in course syllabus	section and be punctual.		and most were punctual	changes needed at this time
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: 100% of students will comply with dress code and safety procedures.	Measure 2: 100% of students complied with dress code and safety procedures	Measure 2: All students were in compliance with dress code and safety procedures.	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Correct reporting (communication) of laboratory results in 11 weekly activities.	Measure 1: 100% of students will correctly report results 80% or better on laboratory reports.	Measure 1: 100% of students were able to correctly report results 80% or better on laboratory reports.	Measure 1: All students were able to correctly report laboratory reports.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students work in teams for 3 of 11 weekly laboratory activities	Measure 2: 100 % of students will demonstrate effective team work during the 3 weeks of laboratory activities	Measure 2: 100% of students demonstrated effective team work.	Measure 2: All students demonstrated effective team work.	Measure 2: No curricular or pedagogical changes needed at this time

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C+. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 2214 – Principles in Clinical Microbiology II is an introductory course and is a continuation of MLS 2212, including antimicrobials, Gram positive rods, mycobacteria, anaerobes, mycology, and parasitology. This course contains all eight of the program’s identified learning goals. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from two years and three sections of the course taught from Spring 2020-2022 by Kendal Beazer, with student results derived from the most recent cohort.

Evidence of Learning: Courses within the Major: MLS 3302 Biostatistics, Research Methods, and Laboratory Practices

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.	Measure 1: Exam three focused on pre-use validation of clinical instrumentation	Measure 1: 100% of students will score at least 80% on this exam	Measure 1: 84% of students scored an 80% or better (range: 58 – 100)	Measure 1: four students did not achieve 80% but upon retake they earned the required 80% grade	Measure 1: No changes are needed to this unit exam
	Measure 2: Problem based practical exam containing a five-part pre-use validation of a new clinical test.	Measure 2: 100% of students will score at least 80% on the practical exam	Measure 2: 100% of students scored an 80% or better (range: 85-100)	Measure 2: All students performed adequately on applying their knowledge in a problem-based assignment	Measure 2: No changes are needed to this unit practical (changes were made to make it easier for students to perform calculations not directly taken from CLSI standard manual)
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: A series of homework assignments (n= 14) covering; t-Test, F-Test, ANOVA, Chi-Squared Test, Correlation, Reference Ranges, Standard Error of the Mean, Sensitivity, Specificity, Positive Predictive Value,	Measure 1: 100% of students will compute and interpret the findings.	Measure 1: 100% of students completed all homework assignments and either interpreted their findings correctly or understood where they made an error	Measure 1: All students were able to apply common laboratory mathematical calculations and understand their results	Measure 1: No changes are needed to these series of homework assignments

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Negative Predictive Value, Accuracy, Precision, Minimum Detection Limit				
	Measure 2: Two problem based practical exams	Measure 2: 100% of students will score at least 80% on the practical exam	Measure 2: 100% of students scored an 80% or better (range: 83-100)	Measure 2: All students were able to apply mathematical calculations to real laboratory situations	Measure 2: No changes are needed to the two practical exams
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	This course focuses on advanced application of laboratory mathematical theory, research methods, and financial lab management. As such, there are no 'wet' lab procedures taught or conducted. The students do participate in a computer lab.	NA	NA	NA	NA
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Three (total= 4) unit examinations focus on theory and application of	Measure 1: 100% of students will score at least 80% on this exam	Measure 1: 84% of students scored an 80% or better (range 58-100) These data were compiled across	Measure 1: 8 students individually did not achieve 80% across on of the three unit exams but upon	Measure 1: No changes are needed for these examinations

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	advanced laboratory practices		three examinations regarding the LO4.	retake they earned the required 80% grade	
	Measure 2: A series of homework assignment (n=18)	Measure 2: 100% of students will complete the assignment and interpret their findings	Measure 1: 100% of students completed all homework assignments and either interpreted their findings correctly or understood where they made an error	Measure 2: All students were able to apply common laboratory mathematical calculations and understand their results	Measure 2: No changes are needed to these assignments
	Measure 3: Two problem based practical examinations	Measure 3: 100% of students will score at least 80% on the practical exam	Measure 3: 100% of students scored an 80% or better (range: 83-100)	Measure 3: All students were able to apply advanced laboratory theory to practical situations	Measure 3: No changes are needed to these practical exams
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: One unit problem based practical examination (specifically values on the low end of linear range appeared to be suitable until the examination of bias plots)	Measure 1: 100% of students will score at least 80% on the practical exam	Measure 1: 100% of students scored an 80% or better	Measure 1: All students were able to apply advanced laboratory theory to practical situations	Measure 1: No changes are needed to these practical exams

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Research article critique assignment (students select a primary research article to present to the class, often contain clinically relevant laboratory data and disease characterizations)	Measure 1: 100% of students must demonstrate adequate presentation and written skills to convey critical findings, conclusions, and critiques	Measure 1: 100% of students demonstrated an ability to communicate a critical examination of a primary research article.	Measure 1: All students were able to interpret and explain the crucial methods, results, and conclusions of their selected research article and understand how their laboratory results did or did not lead to the conclusions the authors made.	Measure 1: No changes are needed to this assignment
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	This is a theory and application-based course that does not focus or measure professionalism or ethical behavior	NA	NA	NA	NA
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Research article critique	Measure 1: 100% of students must demonstrate adequate presentation and written skills to convey critical findings, conclusions, and critiques	Measure 1: 100% of students demonstrated an ability to communicate a critical examination of a primary research article.	Measure 1: All students were able to interpret and explain the crucial methods, results, and conclusions of their selected research article and understand how their laboratory results did or did not lead to the	Measure 1: No changes are needed to this assignment

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
				conclusions the authors made.	
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	<p>Measure 1: Inventory Forecasting assignment</p> <p>Measure 2: LMIP workload recording assignment</p>	<p>Measure 1: 100% of students must demonstrate and apply various inventory forecasting techniques used in the clinical lab.</p> <p>Measure 2: 100% of students must understand and implement the CAP LMIP system for workload recording, efficiency, and budgetary operations while</p>	<p>Measure 1: 100% were able to accurately predict the appropriate level of inventory to order in various trend environments.</p> <p>Measure 2: 100% completed a mock LMIP submission and made appropriate conclusions about their and peer laboratory operations while identifying areas of</p>	<p>Measure 1: the students were able to apply the various statistical techniques covered in lecture and lab demonstrations to order the appropriate level of supplies to respond to various simulated conditions.</p> <p>Measure 2: the students completed and submitted mock LMIP data analysis worksheets and conclusions based on assessment of two labs and their metrics.</p>	<p>Measure 1: No changes are needed to this assignment</p> <p>Measure 2: No changes are needed to this assignment</p>

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
		comparing their findings to peer review.	strength and weakness.		
Learning Outcome 10: Demonstrate proficiency in basic research skills and statistical analysis.	<p>Measure 1: Research article critique</p> <p>Measure 2: Unit 2 Exam: Research Methods</p>	<p>Measure 1: 100% of students must demonstrate adequate presentation and written skills to convey critical findings, conclusions, and critiques</p> <p>Measure 2: 80% of students will pass the unit 2 exam which covers how to develop a research plan, epidemiological study design, research article components, fallacy and biases,</p>	<p>Measure 1: 100% of students demonstrated an ability to communicate a critical examination of a primary research article.</p> <p>Measure 2: 100% of students achieved the 80% competency on the unit 2 examination covering research methods.</p>	<p>Measure 1: All students were able to interpret and explain the crucial methods, results, and conclusions of their selected research article and understand how their laboratory results did or did not lead to the conclusions the authors made.</p> <p>Measure 2: the students achieved the expected level of competency on all the sections of the unit 2 exam</p>	<p>Measure 1: No changes are needed to this assignment</p> <p>Measure 2: No changes are needed to this assignment</p>

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
		and interpretation of data tables and figures.			
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	This is a theory and application-based course that does not focus or measure interprofessional interactions or education in the clinical environment.	NA	NA	NA	NA

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS3302: Biostatistics, Research Methods, and Laboratory Practices is a course that covers advanced theory and application of mathematics, research concepts, and financial management practices in the clinical laboratory. This course contains four units that cover; basic statistics, experimental/research study design, critiquing and interpreting of research articles, laboratory instrumentation testing and pre-use validation, and laboratory financial management (healthcare reimbursement, financial cost analysis, laboratory budgets, workload recording, and inventory forecasting). MLS3302 is a focused advanced level course that deals with very specific areas of clinical laboratory operation and theory. As such, it does not contain all eight of the MLS department program goals. The goals that are covered; 1-6 & 8, are covered to a high degree (to the utilization level or higher). These data are collected from a single on campus section in the Fall semester from 2018. This population consisted of a total of 21 students and is typical of the campus cohorts I have taught over the last seven years. I have made learning outcome improvements to the course over the seven years I have taught it; the changes I have mostly relate to improved language used in examinations, improving walkthrough laboratory assignments to better teach students to learn statistical software such as R, and adding periodic quizzes to prepare students for the type of questions I will be asking in each unit. I believe in testing with a variety of multiple choice and written questions, with the written essay questions

often giving our students the most difficulty. The ‘labs’ in this course are computer-based laboratories lead by the instructor and guided by online walkthroughs that I have created that teach students to: upload a data set, perform basic graphical and statistical procedures, and interpret the results of those procedures with a particular interest in the resolving of issues.

Evidence of Learning: Courses within the Major: MLS 3310 Advanced Immunohematology

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: A set of 10 multiple choice questions from Exam 1 and Quiz 1	Measure 1: 100% of students will score 80% or better on 10 questions	Measure 1: 100% of students scored 80% or better on 10 questions	Measure 1: All students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 11 graded laboratory practice sessions and 2 practical exams	Measure 2: 100% of students will correctly perform required laboratory skills	Measure 2: 100% of students were able to correctly perform required laboratory skills	Measure 2: All students correctly performed required laboratory skills	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: A set of multiple choice questions from Exams 2, 3, and Comprehensive Final Exam	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully applied mathematical calculations to laboratory situations.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 2 graded laboratory applications of laboratory mathematical calculations	Measure 2: 100% of students will correctly perform mathematical calculations in laboratory situations.	Measure 2: 100% of students correctly performed mathematical calculations in laboratory situations.	Measure 2: All students correctly performed mathematical calculations in laboratory situations.	Measure 2: No clinical changes needed at this time

Evidence of Learning: Courses within the Major

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: A set of multiple choice questions from Exams 1 and 2 related to performance of laboratory procedures, specimen collection and processing, analysis, and QA.	Measure 1: 100% of students will score 80% or better on the multiple choice questions	Measure 1: 96% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully demonstrated knowledge of evaluating specimen acceptability and optimal analysis methods.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Demonstrate proper knowledge of specimen criteria in a blood bank laboratory setting.	Measure 2: 100% of students will correctly determine proper sample suitability. Students to perform QC on all blood bank reagents	Measure 2: 100% of students were able to correctly determine proper sample suitability for blood bank analysis. QC results accurate.	Measure 2: All students correctly determined proper sample suitability.	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: A set of multiple choice questions from Exams 1 and 2.	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions	Measure 1: All students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Assess unknowns with accuracy during 2 laboratory practical exams	Measure 2: 100% of students will score 80% or better on 2 laboratory practical exams	Measure 2: 100% of students scored 80% or better on 2 laboratory practical exams.	Measure 2: Most students performed the required skills during the 2	Measure 2: No clinical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*			laboratory practical exams.	
Learning Outcome 5: Gather additional laboratory data and apply problem-solving skills to solve problems/discrepancies.	Measure 1: A set of multiple choice questions from Exams 2 and 3.	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions.	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students resolve discrepancies in the laboratory sessions and must correlate patient history to laboratory findings	Measure 2: 100% of students will correctly resolve discrepancies in the laboratory sessions and correlate patient history to laboratory findings	Measure 2: 100% of students were able to correctly resolve discrepancies in the laboratory sessions and correlate patient history to laboratory findings	Measure 2: All students correctly resolved discrepancies in the laboratory sessions and correlated patient history to laboratory findings	Measure 2: No clinical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: A set of questions from Exams 2, 3, and the Comprehensive Final Exam	Measure 1: 100% of students will score 80% or better on the multiple choice questions.	Measure 1: 100% of students scored 80% or better on the multiple choice questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: In 2 laboratory sessions students relate laboratory findings to common diseases	Measure 2: 100% of students will perform the required skills in the laboratory	Measure 2: 100% of students were able to relate laboratory findings to common diseases.	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time
Learning Outcome 7:	Measure 1: Attendance and punctuality	Measure 1: 100% of students will attend laboratory	Measure 1: 100% attendance in	Measure 1: All students attended laboratory section	Measure 1: No curricular or pedagogical

Evidence of Learning: Courses within the Major

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Demonstrate professional conduct and ethical behavior	expectations defined in course syllabus	section and be punctual.	laboratory section. 90% punctuality	and most were punctual	changes needed at this time
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: 100% of students will comply with dress code and safety procedures.	Measure 2: 100% of students complied with dress code and safety procedures	Measure 2: All students were in compliance with dress code and safety procedures.	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: 3 Essay questions on exams 1, 2, and 3.	Measure 1: 100% of students will score 80% or better on essay questions.	Measure 1: 100% of students were able to communicate their knowledge on the essay questions	Measure 1: All students were able to communicate their knowledge on the essay questions	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Affective Domain Assessment in laboratory measuring communication skills.	Measure 2: 100% of students will receive "satisfactory" marks on Affective Domain Assessment measuring communication skills.	Measure 2: 100% of students communicate effectively in the group setting	Measure 2: All students can communicate better as the course progresses	Measure 2: No clinical changes needed at this time
Learning Outcome 9: Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No changes needed at this time.

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 10: Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.	Measure 1: Students must perform a focused literature search and engage in scholarly writing for a presentation on a topic related to advanced immunohematology.	Measure 1: Students must submit a completed PowerPoint presentation and three questions based upon the content.	Measure 1: All students achieved a minimum score of 90% on their presentation assignment.	Measure 1: All students achieved a minimum score of 90% on their presentation assignment.	Measure 1: No changes needed at this time.
Learning Outcome 11: Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1: Students must label and dispense trauma blood products for a massive blood transfusion and role-play from the perspective of a nurse picking up the blood and also from the perspective of the immunohematologist dispensing the blood.	Measure 1: Students must pass this skill with a minimum score of 80%.	Measure 1: All students passed this skill with a minimum score of 80%.	Measure 1: All students passed this skill with a minimum score of 80%.	Measure 1: No changes needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 3310 is an advanced immunohematology course covering advanced blood banking theory and specialized procedures of immunohematology relevant to blood group serology, antibody detection and identification, compatibility testing, component preparation and therapy in blood transfusion service, quality control, donor screening and phlebotomy, transfusion reactions and hemolytic disease of the fetus and newborn.

MLS 3310 contains all eight of the program's identified learning goals, though in appropriately varying amounts. As noted in the curriculum map, learning goals 1, 2, 4, 5, and 8 are areas of utilization, learning goal 6 is emphasized, and learning goals 3 and 7 are assessed comprehensively. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from two sections of the course taught in fall 2021 by Justin Rhees. This course was previously listed as MLS 3311 and was taught by Bill Zundel and Janet Oja from 2008-2018.

Evidence of Learning: Courses within the Major: MLS 3313 Advanced Hematology and Hemostasis

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem-solving skills.	Measure 1: Six-unit exams and one comprehensive final where students are assessed through multiple choice questions and case study scenarios	Measure 1: The majority of students must score 80% or better on exams, proving competency. If they do not score above 80%, they are required to score well on a retake exam to prove competency.	Measure 1: The majority of students scored 80% or better on both exams.	Measure 1: All students successfully demonstrated theory underlying laboratory testing	Measure 1: No changes needed at this time
	Measure 2: Eleven in person, one virtual graded laboratory practice sessions, one comprehensive lab practical and one virtual practical on abnormal differentials.	Measure 2 The majority students are required to score above an 80% in laboratory skills and competencies.	Measure 2: The majority of students were able to correctly perform required laboratory skills	Measure 2: All students correctly performed required laboratory skills	Measure 2: No changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Multiple-choice questions requiring mathematical calculations on exam 1, 2, 3, 5, and lab practical.	Measure 1: The majority students will score 80% or better on these questions.	Measure 1: The majority of students scored 80% or better on these questions regarding mathematical equations.	Measure 1: All students successfully applied mathematical calculations to laboratory situations.	Measure 1: No changes needed at this time
	Measure 2: Laboratory sessions requiring applications of laboratory mathematical calculations	Measure 2: The majority of students will correctly perform mathematical calculations in laboratory situations.	Measure 2: The majority of students correctly performed mathematical calculations in laboratory situations.	Measure 2: All students correctly performed mathematical calculations in laboratory situations.	Measure 2: No changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Several multiple-choice questions in exam 1, 2, 3 and 5 address specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: The majority students will score 80% or better on these questions.	Measure 1: The majority students scored 80% or better on these questions.	Measure 1: All students successfully demonstrated knowledge of evaluating specimen acceptability and optimal analysis methods.	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Demonstrate proper knowledge of specimen collection and processing, analysis, interpretation during laboratory sessions.	Measure 2: The majority of students will correctly determine proper sample suitability.	Measure 2: The majority of students were able to correctly determine proper sample suitability for hematology analysis.	Measure 2: All students correctly determined proper sample suitability.	Measure 2: No changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Several multiple-choice questions each from exams 1,2, 3, 4, 5 and 6 that challenge a student to correlate theory with practical laboratory work.	Measure 1: The majority of students will score 80% or better on all questions.	Measure 1: The majority of students scored 80% or better on all questions	Measure 1: All students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No changes needed at this time
	Measure 2: Evaluate formed elements on peripheral blood smears with a review of normal blood smears and emphasis on abnormal blood smears during ten of the laboratory sessions. Formative	Measure 2: During the in-person lab practical students will perform four manual differentials and match within specific range for each formed element on normal differential and score 80% or better on the laboratory practical exam.	Measure 2: The majority of students accurately identified the formed elements on the normal differentials and scored 80% or better on the in-person laboratory practical exam and the virtual	Measure 2: All students performed the required skills during the laboratory practical exam and required laboratory sessions.	Measure 2: No changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	feedback is given during laboratory sessions.	The virtual abnormal practical students must achieve 80% accuracy on 12 abnormal differentials	abnormal practical. Most students participated in all required laboratory sessions.		
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Several multiple-choice questions in exams one through six assess student's ability to correlate patient history and diagnoses to laboratory findings.	Measure 1: The majority of students will score 80% or better on these questions.	Measure 1: The majority of students scored 80% or better on these questions.	Measure 1: Most students successfully demonstrated problem solving skills	Measure 1: No changes needed at this time
	Measure 2: Students work in groups to gather applicable data regarding various problem sets to correlate the results for a tentative hematologic diagnosis	Measure 2: Students will correctly identify additional laboratory data required to correctly solve the problem sets.	Measure 2: Students solved the problem sets with 100% accuracy.	Measure 2: All students successfully identified additional laboratory data required and demonstrated problem solving skills necessary to resolve the problem sets.	Measure 2: No changes needed at this time
Learning Outcome 6:	Measure 1: Several multiple-choice questions in exams	Measure 1: The majority of students will score 80% or	Measure 1: The majority of students scored	Measure 1: All of the students successfully	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major

Measurable Learning Goal Students will...	Method of Measurement Direct and Indirect Measures*	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Relate laboratory findings to common disease.	one through six assess student's ability to correlate patient history and diagnoses to laboratory findings.	better on these questions.	80% or better these questions.	correlated patient history and diagnoses to laboratory findings.	
	Measure 2: In five of the laboratory sessions students correlate patient history and laboratory findings to potential diagnosis. Formative feedback is given during laboratory sessions, and after submitting laboratory report forms.	Measure 2: Students will correlate patient history and laboratory findings to potential diagnosis.	Measure 2: The majority of students were able to correlate patient history and laboratory findings to potential diagnosis.	Measure 2: All of students correctly correlated patient history and laboratory findings to potential diagnosis.	Measure 2: No changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus	Measure 1: Students will attend laboratory section and be punctual.	Measure 1: The majority of students attended laboratory sessions unless previously excused.	Measure 1: The majority of students attended laboratory sessions and most were punctual.	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: Students will comply with dress code and safety procedures.	Measure 2: All students complied with dress code and safety procedures	Measure 2: All students followed dress code and safety procedures.	Measure 2: No changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Laboratory etiquette and expectations are defined in the syllabus. Measured by punctuality and participation.	Measure 1: The majority of students will be punctual to laboratory sessions, and remain task-oriented throughout the session in order to receive full participation credit.	Measure 1: Most of students were punctual to laboratory sessions, and remained task-oriented throughout the session and received full participation credit.	Measure 1: Most of students demonstrated effective communication skills through punctuality and tasks during laboratory sessions.	Measure 1: No changes needed at this time
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1N/A	Measure 1: No changes needed at this time
Learning Outcome 10: Demonstrate proficiency in basic research skills and statistical analysis.	Measure 1: During to lab sessions students work in groups to gather applicable data for method comparison study of two coagulation platforms.	Measure 1: All students required to attend and participate in lab sessions.	Measure 1: All students participate in lab sessions.	Measure 1: Most students participated in lab sessions.	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1N/A	Measure 1: No changes needed at this time

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 3313 is an Advanced Hematology course covering:

- Hematology and hemostasis relevant to routine laboratory testing
- Normal erythrocyte physiology and abnormal erythrocyte associated disorders
- Normal leukocyte physiology and abnormal leukocyte associated non-malignant and malignant blood disorders
- Basic morphological analysis of body fluids
- Normal platelet and coagulation physiology and associated disorders.

MLS 3313 contains ten of the program's identified learning goals in varying amounts. As noted in the curriculum map, learning goals 5 and 8 are areas of introduction, learning goals 1 and 3 are emphasized, and learning goals 2, 4, 6, 7, 9 and 10 are utilized.

Evidence of Learning: Courses within the Major: MLS 3314

Evidence of Learning: Courses within the Major

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Each exam covers testing specific to the covered units.	Measure 1: Each student must complete the exam with a score of at least 80%.	Measure 1: All students with passing grades achieved a score of at least 80% on each unit exam.	Measure 1: All students with passing grades showed an acceptable level of understanding of the theory behind the testing discussed.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Students will complete laboratory exercises, which require understanding of the testing methods.	Measure 2: The total points earned from the laboratory must equal at least 80% of the points possible.	Measure 2: All students with passing grades earned at least 80% of the total points possible.	Measure 2: All students with passing grades showed competency of the covered topics and laboratory exercises.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Multiple exams include questions covering reactions specific to that unit.	Measure 1: Each student must pass the exam with a score of at least 80%.	Measure 1: All students with passing grades scored at least 80%.	Measure 1: All students with a passing grade can successfully complete laboratory mathematics.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Graded laboratory exercises, which include calculations.	Measure 2: All students must correctly complete laboratory calculations.	Measure 2: All students with passing grades earned at least 80% of the total points possible.	Measure 2: All students with passing grades can successfully complete laboratory mathematics.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 3: Perform laboratory procedures from simple	Measure 1: Students will complete a	Measure 1: All students must complete the	Measure 1: All students with passing grades	Measure 1: All students with passing grades can	Measure 1: Findings indicate

Evidence of Learning: Courses within the Major

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
to complex, including specimen collection and processing, analysis, (CONT) interpretation, and use of quality assurance procedures.	laboratory project that includes several exercises ranging in difficulty.	laboratory with a score of at least 80%.	earned a score of at least 80%.	successfully complete laboratory testing procedures ranging in difficulty.	no changes are needed at this time.
	Measure 2: Demonstrate knowledge of accurate sample requirements and collection procedures.	Measure 2: Students will assess samples submitted for testing for acceptability.	Measure 2: All students with passing grades have accurately demonstrated knowledge of sample requirements.	Measure 2: All students can assess samples for testing as appropriate.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students will correlate theory and terminology in all laboratory exercises.	Measure 1: Students will complete all laboratory correlation activities with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can correlate theory to practical laboratory situations.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Students must complete the verification exercise that requires knowledge of theory.	Measure 2: Students must complete the verification with at least 80%.	Measure 2: All students with passing grades earned a score of at least 80%.	Measure 2: All students with passing grades can correlate theory to laboratory situations.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 5: Gather additional laboratory data and apply problem solving	Measure 1: Students will evaluate a collection of tests to	Measure 1: All students must pass the panel exam with at least 80%.	Measure 1: All students with passing grades	Measure 1: All students with passing grades are able to correlate	Measure 1: Findings indicate no changes are needed at this time.

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
skills to solve problems/discrepancies.	identify discrepancies.		earned a score of at least 80%.	multiple results for the identification of erroneous entries.	
	Measure 2: The laboratory verification exercise will require the students to troubleshoot multiple situations.	Measure 2: All Students must correct discrepancies in order to report out verification results with at least 80% accuracy.	Measure 2: All students with passing grades earned a score of at least 80%.	Measure 2: All students with passing grades are able to identify and correct discrepancies in order to provide accurate results.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 6: Relate laboratory findings to common disease. (CONT)	Measure 1: Each unit exam will test the student's ability to correlate laboratory findings to common diseases.	Measure 1: Each student must pass the exam with a score of at least 80%.	Measure 1: All students with passing grades earned a score of at least 80%.	Measure 1: All students with passing grades can accurately correlate laboratory findings to common diseases.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Class assignments will require the students to understand disease states in order to determine if the results are acceptable.	Measure 2: Students must identify laboratory results that are not consistent with patient diagnoses.	Measure 2: All students with passing grades have accurately correlated laboratory findings on assigned activities.	Measure 2: All students with passing grades can correlate laboratory findings to disease states covered in the course.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: The final exam contains 30 questions that cover professional behavior.	Measure 1: Students must pass the test with a score of at least 80%.	Measure 1: All students with passing grades scored at least 80% on the test.	Measure 1: All students with passing scores have an introductory understanding of	Measure 1: Findings indicate no changes are needed at this time.

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*			professional behavior.	
	Measure 2: Adherence to proper laboratory dress code and common regulatory requirements (i.e. HIPAA)	Measure 2: Students must comply with dress code requirements for OSHA and HIPAA requirements.	Measure 2: All students with passing grades properly gowned laboratory clothing (i.e. lab coat) and showed compliance to HIPAA regulations they were exposed to.	Measure 2: All students with passing grades are aware of proper laboratory attire and HIPAA regulations that are discussed.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: The verification exercise requires the students to submit a validation plan and an executive summary.	Measure 1: All verification and validation activities but earn a grade of at least 80%.	Measure 1: All students with passing grades earned at least 80% on the verification and validation exercises.	Measure 1: All students with passing grades have shown appropriate written communication skills.	Measure 1: Findings indicate no changes are needed at this time.
	Measure 2: Instructor/ Professor observation of interactions amongst peers.	Measure 2: All students must adhere to the no hazing policy outlined in the course syllabus.	Measure 2: All students with a passing grade have interacted appropriately with their colleagues.	Measure 2: All students with passing grades know the importance of prompt and professional interaction.	Measure 2: Findings indicate no changes are needed at this time.
Learning Outcome 9: Supervisory Skill: Demonstrate ability to oversee day-to-day	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
operations including hiring and technical supervision.					

Learning Outcome 10: Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A

Learning Outcome 11: Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A

Measure 2:
Instructor/
Professor
observation of
interactions
amongst peers.

Measure 2: All
students must
adhere to the no
hazing policy
outlined in the
course syllabus.

Measure 2: All
students with a
passing grade have
interacted
appropriately with
their colleagues.

Measure 2: All
students with
passing grades
know the
importance of
prompt and
professional
interaction.

Measure 2:
Findings indicate
no changes are
needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 3314 is an advanced clinical chemistry course covering the theory and principles of clinical chemistry, including protein catabolism, carbohydrate metabolism, safety, regulatory agencies, non-protein nitrogen compounds, instrumentation validation, electrolyte balance, Lipids, enzymology, therapeutic drug monitoring, toxicology, analytical principles, and endocrinology. MLS 3314 contains all of the eight identified learning goals. The exposure level of each goal in this course is appropriate for the advanced students.

Evidence of Learning: Courses within the Major: MLS 3316 Advanced Microbiology and

Evidence of Learning: MLS 3316					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: 2 quizzes (75% of questions), 5 exams (75% of questions)	Measure 1: 100% of students will score 80% or better on all test questions (quizzes are excluded)	Measure 1: Approx. 89% of students scored 80% or better on all exams (avg. 31 of 35 students)	Measure 1: 89% of students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 11 weeks of graded laboratory activities and 1 practical in-lab exam	Measure 2: 100% of students will score 80% or better by correctly performing	Measure 2: 100% of students were able to correctly perform required laboratory skills	Measure 2: All students correctly performed required laboratory skills	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 3316					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
		required laboratory skills			
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: 1-2 questions on exams 1 and 2, multiple choice	Measure 1: 100% of students will score 80% or better on exam 2 and correctly answer math questions	Measure 1: 100% of students scored 80% or better on math questions	Measure 1: All students successfully applied mathematical calculations to laboratory situations	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 5 weekly laboratory activities with 1-2 unknown patient specimens per week which utilize correct reporting of urine cultures involving mathematical calculations	Measure 2: 100% of students will score 80% or better on mathematical calculations in laboratory situations	Measure 2: 100% of students correctly performed mathematical calculations 80% or better in laboratory situations	Measure 2: All students correctly performed mathematical calculations in lab situations 80% of the time or better	Measure 2: No clinical changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation,	Measure 1: 11 weeks of graded laboratory activities covering molecular techniques, bacteriology, mycology, and mycobacteriology	Measure 1: 100% of students will score 80% or better on laboratory activities and practical exams	Measure 1: 100% of students scored 80% or better overall on final course laboratory grade	Measure 1: All students successfully demonstrated knowledge of specimen acceptability and analysis methods.	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 3316					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will... and use of quality assurance procedures.	Direct and Indirect Measures*				
	Measure 2: Demonstrate proper knowledge of quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students will correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students were able to correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: All students correctly determined quality assurance procedures in clinical microbiology laboratory	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: All course exams and quizzes have 60% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better	Measure 1: 89% of students scored 80% or better	Measure 1: 89% of students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Assess unknowns in 8 of the 11 laboratory activities	Measure 2: 100% of students will score 80% or better overall on course laboratory activities	Measure 2: 100% of students scored 80% or better overall on course laboratory activities	Measure 2: All students performed the required skills during 8 lab activities	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Students are required to present case studies in group presentations for the entire class	Measure 1: 100% of students must complete present and complete assignments	Measure 1: 100% of students completed the case studies	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 3316					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Discrepancies and problems are routinely included in the 8 laboratories where students are expected to identify unknowns	Measure 2: 100% of students will score 80% or better overall on course laboratory activities	Measure 2: 100% of students scored 80% or better overall on course laboratory activities	Measure 2: All students were able to trouble shoot laboratory discrepancies in unknown samples	Measure 2: No clinical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Exams 2,3,4, and the final exam contain approximately 20% diagnostic questions	Measure 1: 100% of students will score 80% or better on the diagnostic questions	Measure 1: 100% of students scored 80% or better on the diagnostic questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: In 8 of the weekly laboratory activities specimen source of unknowns is related to diseases	Measure 2: 100% of students will perform 80% or better relating specimen unknowns to related diseases	Measure 2: 100% of students were able to relate laboratory findings to common diseases 80% of the time	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus	Measure 1: 100% of students will attend laboratory section and be punctual.	Measure 1: 100% attendance in laboratory section. 94% punctuality	Measure 1: All students attended laboratory section and most were punctual	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Adherence to laboratory dress code and safety procedures	Measure 2: 100% of students will comply with dress code and safety procedures.	Measure 2: 100% of students complied with dress code and safety procedures	Measure 2: All students were in compliance with dress code and safety procedures.	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 3316					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Correct reporting (communication) of laboratory results in 11 weekly laboratory activities.	Measure 1: 100% of students will correctly report results 80% or better on laboratory reports.	Measure 1: 100% of students were able to correctly report results 80% or better on laboratory reports.	Measure 1: All students were able to correctly report laboratory reports.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students work in teams for 7 of 11 weekly laboratory activities	Measure 2: 100 % of students will demonstrate effective team work during the 5 weeks of laboratory activities	Measure 2: 100% of students demonstrated effective team work.	Measure 2: All students demonstrated effective team work.	Measure 2: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 10: Demonstrate proficiency in basic research skills and statistical analysis.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate	N/A	N/A	N/A	N/A	N/A

Evidence of Learning: MLS 3316					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
as part of the healthcare team.					

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 3316 – Advanced Clinical Microbiology and Molecular Diagnostics is senior level clinical microbiology course providing in-depth coverage of clinically significant bacteria, viruses, mycobacteria, and fungi. Epidemiology, pathogenicity, and procedures for traditional laboratory identification are included in each section covering the individual microorganisms. Major organisms include Gram positive cocci, enteric Gram negative rods, non-fermentative Gram negative rods, anaerobes, Gram positive rods, mycobacteria, and fungi. In addition to traditional laboratory identification, molecular diagnostic methods are also identified and utilized in the didactic and laboratory portions of the course. This course contains eight of the program’s 11 identified learning goals. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from three years and three sections of the course taught from Spring 2019-2022 by Kendal Beazer, with student results derived from the most recent cohort.

Evidence of Learning: Courses within the Major: MLS 4409

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical,	Measure 1: Student participation in physician guided correlation	Measure 1: All students required to attend and participate in discussion	Measure 1: All students participate in discussion	Measure 1: Student participation increases as semester progresses	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
interpretive, and problem solving skills.	Measure 2: None	Measure 2: None	Measure 2: None	Measure 2: None	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1N/A	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students must view pre-recorded lectures and take a quiz each week***	Measure 1: The threshold for evidence of student learning is 80% for the overall quiz grade***	Measure 1: This course serves as a capstone to link the previously-learned learning objectives from multiple courses***	Measure 1: Students increase their knowledge and empathy toward patients and disease***	Measure 1: Because of these results, and student preference, more student-directed cases have been presented with a pathologist's guidance

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Students must appropriately present a case that provides a teaching point and include findings from 2 areas of the lab***	Measure 2: The presentation should demonstrate a pathophysiologic mechanisms and testing interferences learned in the program***	Measure 2: This course helps students to link previously learned outcomes and testing interferences with actual pathologies***	Measure 2: Students gain a greater understanding of the application of the didactic knowledge and deeper understanding ***	Measure 2: Emphasis has been placed to ensure that the students teach a practical application of testing during their case
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: ***	Measure 1: ***	Measure 1: ***	Measure 1: ***	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: ***	Measure 2: ***	Measure 2: ***	Measure 2: ***	Measure 2: No clinical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Students must take a quiz on the weekly lecture video***	Measure 1: The threshold for evidence of student learning is 80% for the overall quiz grade***	Measure 1: This course serves as a capstone to link the previously-learned learning objectives from multiple courses ***	Measure 1: Students can easily correlate their laboratory findings with disease states***	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: ***	Measure 2: ***	Measure 2: ***	Measure 2: ***	Measure 2: No clinical changes needed at this time
Learning Outcome 7:	Measure 1: Attendance and punctuality	Measure 1: 100% of students will	Measure 1: 95% punctuality	Measure 1: Most students were punctual	Measure 1: No curricular or pedagogical

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Demonstrate professional conduct and ethical behavior	expectations defined in course syllabus	attend and be punctual.			changes needed at this time
	Measure 2: Observation of an educational case presentation***	Measure 2: Presenting an educational case to the class***	Measure 2: A requirement in the presentation assignment is to include 2 different areas of the lab that give practical application***	Measure 2: Students gained confidence in their presentation skills and clinicopathologic correlation***	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Observation of conveyance of appropriate knowledge***	Measure 1: Effectively shared appropriate knowledge with the class***	Measure 1: Inclusion of 2 previously learned learning outcomes from 2 sections of the lab is required***	Measure 1: Students gain appropriate knowledge when presenting cases***	Measure 1: Began having students present cases for their learning
	Measure 2: ***	Measure 2: ***	Measure 2: ***	Measure 2: ***	Measure 2: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 10: Demonstrate proficiency in basic	N/A	N/A	N/A	N/A	N/A

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
research skills and statistical analysis.					
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	N/A	N/A	N/A	N/A	N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

*** This course is a 1 credit hour course. Case studies are presented and discussed with the students and correlations between laboratory data and patient diagnosis are evaluated. Dr. Moore will route the discussions to achieve the course objectives.

Summary: MLS 4409 - Clinical Correlation. This course is a 1 credit hour course which discusses correlations between laboratory data, patient diagnoses, and how it affects their lives. Dr. Scott Moore, a pathologist and Assistant Professor at Weber State University, presents cases and has physicians from the community visit occasionally to give their perspectives on patient care. During class time, the students begin by presenting an introductory case study, and work up to presenting full case studies of their choosing as a final project. The students are also assigned each week to watch one recorded lecture at home and take a quiz. This has been taught by Dr. Scott Moore since fall of 2017.

Evidence of Learning: Courses within the Major: MLS 4410 Interdisciplinary Healthcare Teams

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Student will correctly correlate laboratory data with the patient's clinical condition in case study presentation.	Measure 1: 100% of students will correctly correlate laboratory data with the patient's clinical condition.	Measure 1: 100% of students were able to correctly correlate the laboratory data with the patient's clinical condition.	Measure 1: All students correctly correlated the laboratory data with the patient's clinical condition.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Student will correctly correlate the laboratory data with the patient's clinical condition in the interprofessional simulation activity.	Measure 2: 100% of students will correctly correlate laboratory data with the patient's clinical condition.	Measure 2: 100% of students were able to correctly correlate the laboratory data with the patient's clinical condition.	Measure 2: All students correctly correlated the laboratory data with the patient's clinical condition.	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Student will correctly correlate perform mathematical calculations in case study presentation and in interprofessional simulation.	Measure 1: 100% of students will correctly perform mathematical calculations in case study presentation and in interprofessional simulation.	Measure 1: 100% of students correctly performed mathematical calculations in case study presentation and in interprofessional simulation.	Measure 1: All students successfully applied mathematical calculations in case study presentation and in interprofessional simulation.	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Not Applicable (This course does not have a laboratory component.)	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students will accurately correlate laboratory theory and utilize the terminology to solve multidisciplinary case studies.	Measure 1: Students will solve the multidisciplinary case studies by applying knowledge of laboratory theory and terminology with 100% accuracy.	Measure 1: Students solved the multidisciplinary case studies with 100% accuracy.	Measure 1: All students successfully correlated laboratory theory and terminology to the practical laboratory work presented in the multidisciplinary case study.	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem-solving skills to solve problems/discrepancies.	Measure 1: Students will work in groups to brainstorm additional laboratory data required to correctly solve the multidisciplinary case studies.	Measure 1: Students will correctly identify additional laboratory data required to correctly solve the multidisciplinary case studies.	Measure 1: Students solved the multidisciplinary case studies with 100% accuracy.	Measure 1: All students successfully identified additional laboratory data required and demonstrated problem solving skills necessary to resolve the	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*			multidisciplinary case studies.	
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Students relate laboratory findings to common diseases in the multidisciplinary case study and simulated interprofessional education (IPE) activity.	Measure 1: Students will relate laboratory findings to the disease states presented in the case study and IPE activity with 100% accuracy.	Measure 1: 100% of students were able to relate laboratory findings to common diseases.	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance, punctuality, and professional/ethical expectations defined in course syllabus	Measure 1: Students will attend regular course offerings, be punctual, and demonstrate professional/ethical behavior while interacting with fellow students.	Measure 1: Students attended regular course offerings with >90% attendance and punctuality. No issues related to unprofessional behavior/ lack of ethics were noted during lectures, group work, and/or IPE activities.	Measure 1: All students attended the sessions with >90% attendance and most were punctual	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills	Measure 1: Students demonstrate	Measure 1: All students will demonstrate	Measure 1: 100% of students were	Measure 1: All students were able to	Measure 1: No curricular

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
and behaviors with colleagues in the program and in the laboratory	effective communication skills and behaviors while they interview a member from a different allied healthcare program.	effective communication skills while conducting the interview.	able to communicate effectively and professionally during the interview.	demonstrate effective communication skills and behaviors with their colleagues within the program.	or pedagogical changes needed at this time
	Measure 2: Students demonstrate effective communication skills and behaviors while they work in teams to solve case studies and participate in a simulated IPE activity.	Measure 2: All students will demonstrate effective communication skills while working on the case studies and within their role in the simulated IPE activity.	Measure 2: 100% of students demonstrated effective communication skills while working in groups on the case studies and within their role in the simulated IPE activity.	Measure 2: All students were able to demonstrate effective communication skills and behaviors with their colleagues within the program.	Measure 2: No changes needed at this time
Learning Outcome 9: Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No changes needed at this time.
Learning Outcome 10: Research Skill: Demonstrate	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No changes

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
proficiency in basic research skills and statistical analysis.					needed at this time.
Learning Outcome 11: Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1: Students must interview a member from a different healthcare profession and submit a write-up of their findings.	Measure 1: Students must submit a complete write-up of their interview, including their reflections.	Measure 1: All students submitted a complete write-up of their interview.	Measure 1: All students achieved a minimum score of 90% on the interview assignment.	Measure 1: No changes are needed at this time.
	Measure 2: Students must participate in an interprofessional education (IPE) activity, requiring them to teach laboratory skills to students from another healthcare profession.	Measure 2: Students must perform interdisciplinary teaching of laboratory skills.	Measure 2: All students participated in the IPE activity and received evaluations of their teaching.	Measure 2: All students achieved a minimum score of 90% on the IPE teaching activity.	Measure 2: No changes are needed at this time.

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 4410 is a course covering the theory and principles of interdisciplinary teamwork within the healthcare setting. This course provides an interdisciplinary experience with the team concept as a priority. Students learn the roles and responsibilities of various healthcare professionals. The course teaches students to practice an interdisciplinary approach as they research, interact, and learn in the interdisciplinary environment of a healthcare setting. MLS 4410 contains seven of the program's identified learning goals, though in appropriately varying amounts. As noted in the curriculum map, learning 1, 2, and 4 are utilized, 5 and 6 are emphasized, and 7 and 8 are comprehensively assessed. Learning goal 3

is not applicable to this course. In all cases, the measures show that 100% of the students are reaching all 7 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from two sections of the course taught in spring semester 2021, by Justin Rhees. Prior to spring, 2019, MLS 4410 was taught by Janet Oja.

Evidence of Learning: Courses within the Major: MLS 4411 Simulated Laboratory I

Evidence of Learning: MLS 4411					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Participation in Simulated Lab Sessions	Measure 1: 100% of students will participate in simulated lab sessions and apply knowledge learned in the MLT program	Measure 1: Students will problem-solve and troubleshoot issues that will allow them to use their interpretive and problem solving skills	Measure 1: All students successfully participated in SIM lab.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Recognition of critical values	Measure 2: Students recognize critical values in SIM lab	Measure 2: Students use use interpretive skills	Measure 2: the majority of students recognized critical values	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Students will calculate CBC values from an EDTA clumper patient.	Measure 1: Students rotating through Hematology will calculate CBC values from an EDTA clumper patient.	Measure 1: 100% of Students rotating through Hematology will calculate CBC values from an EDTA clumper patient.	Measure 1: All students rotating through Hematology will calculate CBC values from an EDTA clumper patient.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students will perform a sample dilution	Measure 2: Students will perform a sample dilution when value is above assay range	Measure 2: The majority of the students rotating through chemistry will perform a sample dilution on a glucose assay	Measure 2: The majority of the students rotating through chemistry performed a sample dilution on a glucose assay	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 4411					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Rotation through all departments of SIM lab	Measure 1: Students will rotate through each department: Processing, UA, serology, heme, Coag, Chem, blood bank and micro at least one week during the semester.	Measure 1: 100% of students will rotate through each department: Processing, UA, serology, heme, Coag, Chem, blood bank and micro at least one week during the semester.	Measure 1: 100% of students rotated through each department: Processing, UA, serology, heme, Coag, Chem, blood bank and micro at least one week during the semester.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Weekly sample collection	Measure 2: Students will draw blood each week for a total of 12 blood draws.	Measure 2: 100% of students will draw blood each week for a total of 12 blood draws.	Measure 2: 90% drew blood each week.	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students participate in mock CAP inspection	Measure 1: All students will review current CAP standards and prepare a laboratory for inspection	Measure 1: 100% of students participated in mock CAP inspection and submitted a deficiency report to lab manager	Measure 1: All students successfully participated in mock CAP inspection	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students will calibrate laboratory equipment	Measure 2: All students will calibrate laboratory equipment currently in use	Measure 2: 100% of students calibrated laboratory equipment to lab manager standards	Measure 2: All students successfully participated in calibration studies	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 4411					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Recognition of sample drawn above IV line	Measure 1: Students will recognize when a sample is drawn above. The IV line	Measure 1: Students applied problem solving skills to solve problems/discrepancies with a sample.	Measure 1: The majority of the students recognized discrepant results resulting from a sample drawn above the IV line.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: NA
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Participation in blood bank SBAR exercise.	Measure 1: Students will participate in a blood bank exercise using the SBAR technique for which they will relate laboratory findings to disease	Measure 1: 100% of Students will participate in a blood bank exercise using the SBAR technique for which they will relate laboratory findings to disease	Measure 1: 100% of participated in a blood bank exercise using the SBAR technique for which they will relate laboratory findings to disease	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Affective domain rubric assessment of timeliness and professionalism	Measure 1: All students will be assessed using the affective domain rubric and receive	Measure 1: 100% of students will be assessed using the affective domain rubric	Measure 1: All students assessed using the affective domain rubric and	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 4411					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
		the higher acceptable mark.	and receive the higher acceptable mark.	received the higher acceptable mark.	
	Measure 2: Assessment of Telephone skills	Measure 2: All students will be assessed in proper telephone skills.	Measure 2: 100% of students will demonstrate proper telephone skills.	Measure 2: 100% of students demonstrated proper telephone skills.	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Student functioning as a member of a team	Measure 1: All students will participate in team projects, each taking turns being the project manager	Measure 1: 100% of students participated in team projects, with each taking a turn as project manager	Measure 1: All students participated in and managed the team for all projects	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Evaluation and participation in simulated lab sessions through completion of a manager's checklist in SIM lab.	Measure 2: All student managers will report on team members skills and participation in simulated lab sessions.	Measure 2: 100% of student managers will report on team members skills and participation in simulated lab sessions.	Measure 2: All students completed evaluations on team members skills and participation in simulated lab sessions	Measure 2: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	Measure 1: Simulated lab session, student functions as manager of a group	All managers will demonstrate leadership skills and ability to manage a group of students during SIM lab sessions	Student will demonstrate proper ability to direct students and fill in departments based on workload and speed of work from peers	80% of higher in management rotation	No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 4411					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 10: Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.	Measure 1-NA Measure 2-NA	Measure 1-NA Measure 2-NA	Measure 1-NA Measure 2-NA	Measure 1-NA Measure 2-NA	
Learning Outcome 11: Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1-NA Measure 2-NA	Measure 1-NA Measure 2-NA	Measure 1-NA Measure 2-NA	Measure 1-NA Measure 2-NA	

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 4411 – MLS Simulated Laboratory I. This course teaches is a hands-on simulated working laboratory in which students refine technical skills, problem identification and solving, work-load management, and decision-making skills, development of strategies for managing and implementing the rules and regulations that govern medical laboratory testing. Data in this table are derived from five semesters taught fall 2018-2022 by Janice Thomas and Justin Rhees.

Evidence of Learning: MLS 4412 Simulated Laboratory II					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: All projects within the course: Method. Comparison, reference Interval, Mock CAP inspection.	Measure 1: A score of 80% or above in projects	Measure 1: Projects in MLS 4412 assess knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills	Measure 1: The majority of the students completed course projects with 80% competency or above.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Reference Interval Project	Measure 1: Students score 80% or higher in a project where they have to calculate a number of reference intervals	Measure 1: Students successfully completed the reference interval project	Measure 1: Students were able to apply mathematical calculations to different reference interval assays.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1N/A	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 4412 Simulated Laboratory II					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will... and processing, analysis, interpretation, and use of quality assurance procedures.	Direct and Indirect Measures*				
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students participate in mock CAP inspection	Measure 1: All students will review current CAP standards and prepare a laboratory for inspection	Measure 1: 100% of students participated in mock CAP inspection and submitted a deficiency report to lab manager	Measure 1: All students successfully participated in mock CAP inspection	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students will calibrate laboratory equipment	Measure 2: All students will calibrate laboratory equipment currently in use	Measure 2: 100% of students calibrated laboratory equipment to lab manager standards	Measure 2: All students successfully participated in calibration studies	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 4412 Simulated Laboratory II					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will... skills to solve problems/discrepancies.	Direct and Indirect Measures*				
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Student participation in capital equipment committee project	Measure 1: All students will participate and develop written responses in capital equipment committee project	Measure 1: 100% of students participated in in capital equipment committee project	Measure 1: All students participated and demonstrated professional and ethical conduct through team work in then capital equipment committee project	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: N/A	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills	Measure 1: Student functioning as a member of a team	Measure 1: All students will participate in team	Measure 1: 100% of students participated in team	Measure 1: All students participated in and	Measure 1: No curricular or pedagogical

Evidence of Learning: MLS 4412 Simulated Laboratory II					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
and behaviors with colleagues in the program and in the laboratory		projects, each taking turns being the project manager	projects, with each taking a turn as project manager	managed the team for all projects	changes needed at this time
	Measure 2: Evaluation of each team member for effective communication skills and participation in projects	Measure 2: All students will complete evaluations on team members for effective communication skills and participation in group projects	Measure 2: 100% of students completed evaluations on team members for effective communication skills and participation in group projects	Measure 2: All students completed evaluations on team members for effective communication skills and participation in group projects	Measure 2: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	Measure 1: Students participate in SOP and Standard Works writing used on a day-to-day basis in the clinical laboratory	Measure 1: Students work as teams updating existing SOPs and writing new SOPs for laboratory procedures done in SIM lab	Measure 1: All students successfully completed the assigned work individually and in teams	Measure 1: All students demonstrated competence in a skill related to technical supervision	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 10: Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.	Measure 1: Student complete a method comparison assignment	Measure 1: Students receive 80% or above in the method comparison assignment	Measure 1: All students successfully completed the assigned work individually	Measure 1: Students were able to apply statistical skills necessary in technical supervision.	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 4412 Simulated Laboratory II					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 11: Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1: N/A	Measure 1: N/A	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 4412 – MLS Simulated Laboratory II. This course teaches fundamental principles for establishing a simulated working laboratory in which students refine technical skills, problem identification and solving, work-load management, and decision-making skills, development of strategies for managing and implementing the rules and regulations that govern medical laboratory testing. Data in this table are derived from five semesters taught fall 2018-2022 by Janice Thomas.

Evidence of Learning: Courses within the Major: MLS 4415 Laboratory Teaching and Supervision

Evidence of Learning: Courses within the Major: MLS 4415					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Multiple choice questions in Management Theory Quiz	Measure 1: Students are expected to score 80% or better to prove knowledge and competency	Measure 1: The majority of students were able to achieve 80% or higher competency	Measure 1: Students have proven to have knowledge of management theories	Measure 1: No changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Students are assigned to TA a laboratory where they can apply previously learned procedures in education and training and quality assurance.	Measure 1: All students will achieve 90% or better attendance to their assigned labs. Lab instructors evaluate their performance using a rubric.	Measure 1: All students participated as TAs and achieved 90% or better attendance.	Measure 1: All students successfully demonstrated their proficiency in education and training by assisting in laboratory teaching.	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 4415					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Students participate in online discussions analyzing management case studies scenarios and applying the management concepts previously learned.	Measure 1: The majority of students will participate and score 80% or better on all discussions.	Measure 1: The majority of students participated and scored 80% or better on all online discussions.	Measure 1: Students were able to correlate management theory to real life case study situations and management scenarios.	Measure 1: No changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 6: Relate laboratory findings to common disease.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations	Measure 1: Students will attend class section and be punctual.	Measure 1: The majority of students attended class sessions	Measure 1: Students attended class sessions and most were punctual. They	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 4415

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	defined in course syllabus.		unless previously excused	demonstrated professional conduct and ethical behavior.	
	Measure 2: Students will listen to a guest speaker on resume writing and critique each other's resumes.	Measure 2: Students will attend and participate in a resume critique exercise where they will review 3 of their classmates' resumes.	Measure 2: The majority of students attended and participated in a resume critique exercise where they reviewed 3 of their classmates' resumes.	Measure 2: Students attended and participated in a resume critique exercise. They demonstrated professional conduct and ethical behavior.	Measure 2: No changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Students will listen to a guest speaker on interviewing skills and participate in mock interviews.	Measure 1: Students will participate as interviewer and interviewee in mock interview exercise and score 80% or higher in peer evaluations.	Measure 1: The majority of participated in the mock interviews and scored 80% or higher in their peer evaluations	Measure 1: Students were able to apply interviewing skills previously learned in class through class lectures and guest speakers	Measure 1: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 4415

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Students participate in online discussions analyzing management case studies scenarios and applying the management concepts previously learned.	Measure 2: The majority of students will participate and score 80% or better on all discussions.	Measure 2: The majority of students participated and scored 80% or better on all online discussions.	Measure 2: Students were able to correlate management theory to real life case study situations and management scenarios.	Measure 2: No changes needed at this time

Evidence of Learning: Courses within the Major: MLS 4415

Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 9: Supervisory Skill: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	Measure 1: Students will take the Human Resources Quiz	Measure 1: A score of 80% or higher in the Human Resources Quiz	Measure 1: Knowledge of skills related to technical supervision.	Measure 1: The majority of the students demonstrate knowledge of skills related to technical supervision.	Measure 1: No changes needed at this time
	Measure 2: Students will participate in mock interviews	Measure 2: Completion of 2 mock interviews, one as the interviewer and one as the interviewee.	Measure 2: Experience with the interview process used in hiring employees.	Measure 2: All students participated and demonstrated competence with the interview process used in hiring employees.	No changes needed at this time
Learning Outcome 10: Research Skill: Demonstrate proficiency in basic research skills and statistical analysis.	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A

Evidence of Learning: Courses within the Major: MLS 4415					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 11: Interprofessional Relations: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A	Measure 1:N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

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MLS 4415: Students will apply sound instructional and pedagogical theory. Approaches to management, leadership of groups, human resource management, and technical supervision will also be covered and reinforced through online discussions and case study analysis. Each student will also participate as a laboratory teaching assistant (TA) in a MLS laboratory section assisting the faculty in the administration of the laboratory instruction. Each student will be assigned to a MLS course laboratory section in which expected behavior includes: active participation in laboratory teaching, demonstration of procedures, preparation of laboratory teaching materials and assisting laboratory faculty and students where ever needed. Data based on 2018-2022 taught by Janice Thomas. Course will be taught by Chere Clawson starting January 2023.

Evidence of Learning: Courses within the Major: MLS 4803 Research Projects in MLS

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Student research groups develop a research question / hypothesis related to MLS and write a grant detailing the experimentation needed to test their hypothesis.	Measure 1: 100% of student groups will develop a research question relating to MLS and also develop methods to address the research question	Measure 1: 100% of student groups developed a research question relating to MLS and also developed methods to address the research question	Measure 1: All students were able to define a clear hypothesis and outline a research proposal for the next year detailing their experimental approaches and expected results.	Measure 1: No curricular or pedagogical changes needed at this time; however we are always critiquing the grants produced by the students to improve the likelihood of obtaining funding.
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Student groups identify appropriate statistical calculations to be used in analyzing data to be collected.	Measure 1: 100% of student groups will identify appropriate statistical calculations to be used in analyzing data to be collected.	Measure 1: 100% of student groups identified appropriate statistical calculations to be used in analyzing data to be collected.	Measure 1: The students have achieved the learning outcome by defining the statistical calculations they intend to use.	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Goal not applicable to research class this semester because it is focuses on generating a hypothesis, writing a research grant, and obtaining funding for experimentation in	NA	NA	NA	NA

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	the following semester.				
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: During the process of developing the research methods, students will correlate laboratory theory and terminology to determine what testing is required to test their hypothesis	Measure 1: 100% of students will correlate laboratory theory and terminology to determine the appropriate tests/methodologies required to experimentally test their hypothesis.	Measure 1: 100% of students correlated laboratory theory and terminology to determine the appropriate experimental methodologies to use in their research plan.	Measure 1: The students were able draw on their knowledge of the clinical laboratory and describe detailed methods to test their hypothesis.	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Goal not applicable to this research-based course	NA	NA	NA	NA
Learning Outcome 6: Relate laboratory findings to common disease.	Goal not applicable to this research-based course	NA	NA	NA	NA
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations	Measure 1: 100% of students will attend class and be punctual.	Measure 1: 95% attendance in class	Measure 1: Most students attended class each week, a	Measure 1: No curricular or pedagogical

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	defined in course syllabus			few had excuses absences	changes needed at this time
	Measure 2: Obtain CITI certification in Institutional Review Board (IRB) training	Measure 2: 100% of students will achieve at least an 80% on the seven CITI training modules for IRB certification	Measure 2: 100% of students achieved CITI IRB certification	Measure 2: All students were able to pass the seven training modules and earn the CITI certification	Measure 2: No clinical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: 7 course group assignments demonstrating writing proficiency (e.g. abstract, grant proposal, methods, budget sheet)	Measure 1: 100% of student groups will demonstrate writing proficiency with scores above 80% or better by following directions and format (e.g. abstract and grant guidelines)	Measure 1: 100% of students scored better than 80% on written group assignments	Measure 1: All student groups were able to demonstrate writing proficiency and that they could adequately communicate their hypothesis, methodological approach, and budget justifications	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: demonstrates effective communication and collaboration within research group and with research mentor	Measure 2: 100 % of students will demonstrate effective communication and collaboration within research group and	Measure 2: 93% of students demonstrated effective communication and collaboration within research group and	Measure 2: Most students were able to effectively communicate in a collaborative fashion within their research group and with mentor; one	Measure 2: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
		with research mentor	with research mentor	student did have an unresolvable conflict with their group and needed to be removed from the project.	

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

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Summary: MLS 4803 – Research Projects in MLS is the first in a series of two courses that span over a single academic year. These data presented are from the most recent campus semester taught, Fall 2018. Students in this course will be guided by the instructor/research mentor through developing a hypothesis, obtaining grant support, experimentation, analysis, and dissemination of their research over an entire year. The first course focuses on developing an independent research question, hypothesis/es that can potentially answer this question, and specific aims to test their hypothesis/es. Over the course of the first semester, students write an abstract, a 7-8 page research proposal outlining their research plan for the coming year, obtain CITI certified IRB training, and apply for project and travel funding for the Spring semester.

Evidence of Learning: Courses within the Major: MLS 4804 Research Projects in MLS II

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Student groups will perform experimentation outlined in the Fall proposals to test their main hypothesis/es	Measure 1: 100% of student groups will conduct experimental objectives to successfully test their main hypothesis/es by the March presentation & dissemination deadline	Measure 1: 100% of student groups were able to complete their experimental goals by the March presentation & dissemination deadline	Measure 1: All the student groups were able to optimize and perform the myriad of experimental methods outlined in their research proposals	Measure 1: No changes are required, but even with success every group meets challenges or obstacles to performing their experiments that must be problem-solved in the time allotted
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Student groups will perform various laboratory mathematical calculations to setup and carry out their experiments (e.g. buffers, reagents, standard curves, etc.)	Measure 1: 100% of student groups will successfully perform the calculations required to achieve their research objectives	Measure 1: 100% of student groups were able to perform the various calculations required to perform their experiments (e.g. make buffers, reagents, standard curves, etc.)	Measure 1: All groups were able to perform the appropriate set of calculations to setup, perform, and analyze their experiments	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Statistical analysis will be applied to data collected for	Measure 2: 100% of student groups will be able to apply the	Measure 2: 100% of student groups were able to apply formal statistical	Measure 2: Each student group was able to apply a unique set of	Measure 2: No curricular or pedagogical

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	hypothesis testing (e.g. t-tests, ANOVA, linear regression, etc.)	appropriate statistical test to formally assess their data and test their hypothesis/es	tests to assess and analyze their experimental data	statistical tests appropriate for their project data and hypothesis/es	changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Perform laboratory testing of identified research methods to address research question, if appropriate for research project	Measure 1: 100% of laboratory testing will be completed for the identified research methods to address the identified research methods to test hypothesis/es	Measure 1: 100% of laboratory testing was completed for the identified research methods to address the identified research methods to test hypothesis/es	Measure 1: 100% of student groups were able to complete laboratory testing for the identified research methods to test hypothesis/es	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	This outcome is not applicable to this research-based course.	NA	NA	NA	NA
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Students will evaluate each set of experimental results and modify methods/procedures to ensure successful experimentation	Measure 1: 100% of students will evaluate each set of experimental results and modify methods/procedures to ensure successful experimentation	Measure 1: 100% of students were able to evaluate each set of experimental results and modify methods/procedures to ensure successful experimentation	Measure 1: Every research group encountered obstacles or errors that required troubleshooting or optimizing their protocols	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: If appropriate to research question or hypothesis, students will relate research findings to common disease	Measure 1: 100% of students will relate research findings to common disease, if appropriate for research project	Measure 1: 100% of students related research findings to common disease, if appropriate for research project	Measure 1: When applicable, the students were able to relate the data they collected to specific disease states	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus and research contract between students	Measure 1: 100% of students will attend class and lab sections to complete their experiments on time	Measure 1: 100% of the student groups attended the designated class and lab sections, as well as complete their experimentation on time	Measure 1: Perform, analyzing, and disseminating their research in one semester is a challenge, having the students stick to a schedule helps ensure completion.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Present their research to professionals at various local and national conferences	Measure 2: 100% of the student groups will submit abstracts and be accepted for a poster presentation	Measure 2: 100% of the student groups were able to submit abstracts and be accepted for a poster presentation	Measure 2: All of the research groups presented their posters at a University research symposium and a local medical society meeting, along with select groups presenting at one of two national	Measure 2: No curricular or pedagogical changes needed at this time

Evidence of Learning: Courses within the Major					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
				professional meetings	
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: 3 course group assignments demonstrating writing proficiency	Measure 1: 100% of student groups will demonstrate writing proficiency on 3 assignments with scores above 80% or better	Measure 1: 100% of students scored better than 80% on written group assignments	Measure 1: All student groups were able to demonstrate writing proficiency on groups assignments	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Demonstration of effective communication and collaboration within research group and with research mentor	Measure 2: 100 % of students will demonstrate effective communication and collaboration within research group and with research mentor	Measure 2: 93% of students demonstrated effective communication and collaboration within research group and with research mentor	Measure 2: Most students were able to effectively communicate in a collaborative fashion within their research group and with mentor	Measure 2: No curricular or pedagogical changes needed at this time

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 4804 – Research Projects in MLS II. This course is a continuation of MLS 4803. Students will continue working on their original research project that was outlined in the Fall semester. After completing the project, students will present their research findings in poster and oral formats, along with preparing a formal manuscript for publication in the university undergraduate research journal ERGO and possibly in other appropriate scientific journals. The data presented are from the most recent completed semester Spring 2019.

Evidence of Learning: Certificate Courses: MLS 5201 Technologist in Microbiology: Clinical Microbiology I

Evidence of Learning: MLS 5201					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Weekly quizzes (75% of questions), 4 exams and comprehensive final (75% of questions)	Measure 1: 100% of students will score 80% or better on all test questions (quizzes are excluded)	Measure 1: Approx. 85% of students scored 80% or better on exams (avg. 13 of 15 students)	Measure 1: 85% of students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Two case studies covering laboratory identification of pathogens and clinical correlation	Measure 2: 100% of students will score 80% or better by identifying proper procedures and identification of pathogens	Measure 2: 100% of students were able to correctly identify proper procedures and identification of pathogens	Measure 2: All students correctly identified proper procedures and identification of pathogens	Measure 2: No curricular changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Two questions on quiz 2 and exam 2, multiple choice	Measure 1: 100% of students will score 80% or better on math questions	Measure 1: 100% of students scored 80% or better on math questions	Measure 1: All students successfully applied mathematical calculations to laboratory situations	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: One case study using correct reporting of urine cultures involving	Measure 2: 100% of students will score 80% or better on case study	Measure 2: 100% of students correctly performed mathematical	Measure 2: All students correctly performed mathematical calculations on	Measure 2: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 5201					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	mathematical calculations	mathematical calculations in laboratory situations	calculations 80% or better on case study	case study 80% of the time or better	
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Laboratory procedures are demonstrated in MLS 5204 of the certificate program, not applicable for MLS 5201	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: All course exams and quizzes have 50% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better	Measure 1: 85% of students scored 80% or better	Measure 1: 85% of students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Two case studies correlating	Measure 2: 100% of students will score 80% or	Measure 2: 100% of students scored 80% or better	Measure 2: All students showed correlation of	Measure 2: No curricular or pedagogical

Evidence of Learning: MLS 5201					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	laboratory theory with clinical practice	better overall on case study activities	overall on case study activities	theory with lab testing	changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Two case study homework assignments in Unit 2 and Unit 3.	Measure 1: 100% of students will score 80% or better overall on case study activities	Measure 1: 100% of students scored 80% or better overall on case study activities	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Exams 2,3,4,5, and the final exam contain approximately 20% diagnostic questions	Measure 1: 100% of students will score 80% or better on the diagnostic questions	Measure 1: 100% of students scored 80% or better on the diagnostic questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Weekly activities and case studies connect disease to laboratory findings	Measure 2: 100% of students will complete activities relating laboratory tests to disease states	Measure 2: 100% of students were able to complete assignments connecting laboratory findings to common diseases 80% of the time	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 5201					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Punctuality expectations defined in course syllabus	Measure 1: 100% of students will turn in assignments on time	Measure 1: 90% of students turned in assignments by the due date	Measure 1: Most students demonstrated punctuality in assignment submission	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Professional correspondence expectations defined in course syllabus	Measure 1: 100% of students will demonstrate professional correspondence in all communication with instructors and peers	Measure 1: 100% of students interacted with professor and peers in a respectful, professional manner	Measure 1: All students complied with professional correspondence expectations	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 10: Demonstrate proficiency in basic	N/A	N/A	N/A	N/A	N/A

Evidence of Learning: MLS 5201					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
research skills and statistical analysis.					
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	N/A	N/A	N/A	N/A	N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C+. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 5201 – Technologist in Microbiology: Clinical Microbiology I is an introductory clinical microbiology course provides an in-depth coverage of clinically significant bacteria including epidemiology, pathogenicity, antimicrobials, and procedures for traditional laboratory identification. Major organisms include Gram positive cocci, enteric Gram negative rods, non-fermentative Gram negative rods, Gram negative diplococci, Gram positive rods, and spirochetes. This course contains eight of the program’s eleven identified learning goals. In all cases, the measures show that the majority of students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from one year and two sections of the course taught from Fall 2021-2022 by Kendal Beazer, with student results derived from the most recent cohort.

Evidence of Learning: Courses within the Certificate: MLS 5202 Technologist in Microbiology: Clinical Microbiology II

Evidence of Learning: MLS 5202					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Weekly quizzes (75% of questions), 4 exams and comprehensive final (75% of questions)	Measure 1: 100% of students will score 80% or better on all test questions (quizzes are excluded)	Measure 1: Approx. 90% of students scored 80% or better on exams (avg. 9 of 10 students)	Measure 1: 90% of students successfully demonstrated theory underlying laboratory testing	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Four case studies covering laboratory identification of pathogens and clinical correlation	Measure 2: 100% of students will score 80% or better by identifying proper procedures and identification of pathogens	Measure 2: 100% of students were able to correctly identify proper procedures and identification of pathogens	Measure 2: All students correctly identified proper procedures and identification of pathogens	Measure 2: No curricular changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: Two questions on exam 5	Measure 1: 100% of students will score 80% or better on math questions	Measure 1: 100% of students scored 80% or better on math questions	Measure 1: All students successfully applied mathematical calculations to laboratory situations	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Case study of errors in polymerase chain reaction testing due	Measure 2: 100% of students will score 80% or better on case study	Measure 2: 100% of students correctly performed mathematical	Measure 2: All students correctly performed mathematical calculations on	Measure 2: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 5202					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	to incorrect math performed	mathematical calculations in laboratory situations	calculations 80% or better on case study	case study 80% of the time or better	
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation, and use of quality assurance procedures.	Measure 1: Laboratory procedures are demonstrated in MLS 5204 of the certificate program, not applicable for MLS 5202	Measure 1: N/A	Measure 1: N/A	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: All course exams and quizzes have 50% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better	Measure 1: 90% of students scored 80% or better	Measure 1: 90% of students successfully correlated laboratory theory and terminology to practical laboratory work.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Four case studies correlating	Measure 2: 100% of students will score 80% or	Measure 2: 100% of students scored 80% or better	Measure 2: All students showed correlation of	Measure 2: No curricular or pedagogical

Evidence of Learning: MLS 5202					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	laboratory theory with clinical practice	better overall on case study activities	overall on case study activities	theory with lab testing	changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Four case study homework assignments.	Measure 1: 100% of students must complete assignments	Measure 1: 100% of students completed the four assignments.	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Exams 2,3,4, and 5 contain approximately 20% diagnostic questions	Measure 1: 100% of students will score 80% or better on the diagnostic questions	Measure 1: 100% of students scored 80% or better on the diagnostic questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Weekly activities and case studies connect disease to laboratory findings	Measure 2: 100% of students will complete activities relating laboratory tests to disease states	Measure 2: 100% of students were able to complete assignments connecting laboratory findings to common diseases 80% of the time	Measure 2: All students correctly related laboratory findings to common diseases.	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 5202					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Punctuality expectations defined in course syllabus	Measure 1: 100% of students will turn in assignments on time	Measure 1: 80% of students turned in assignments by the due date	Measure 1: Most students demonstrated punctuality in assignment submission	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Professional correspondence expectations defined in course syllabus	Measure 1: 100% of students will demonstrate professional correspondence in all communication with instructors and peers	Measure 1: 100% of students interacted with professor and peers in a respectful, professional manner	Measure 1: All students complied with professional correspondence expectations	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 10: Demonstrate proficiency in basic	N/A	N/A	N/A	N/A	N/A

Evidence of Learning: MLS 5202					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
research skills and statistical analysis.					
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	N/A	N/A	N/A	N/A	N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C+. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 5202 Technologist in Microbiology: Clinical Microbiology II is an introductory course and is a continuation of MLS 5201, including mycobacteria, anaerobes, mycology, parasitology, and molecular diagnostics. This course contains eight of the program's eleven identified learning goals. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from less than a year and two sections of the course taught from spring 2022 - fall 2022 by Kendal Beazer, with student results derived from the most recent cohort.

Evidence of Learning: Courses within the Major: MLS 5203 Applied Laboratory Mathematics and Operations

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Unit 2 exam and assignments focusing discipline specific calculations	Measure 1: 100% of students will score 80% or better on unit exam	Measure 1: 100% of students have passed the Unit 2 exam with over an 80%	Measure 1: students are demonstrating the desired competency on this outcome	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Unit 3 exam and assignments focusing on quality control, assessment, and validation studies.	100% of students will score 80% or better on unit exam	Measure 2: 100% of students have passed the Unit 3 exam with over an 80%	Measure 2: students are demonstrating the desired competency on this outcome	Measure 2: No curricular or pedagogical changes needed at this time
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: the entire course is focused on application of laboratory mathematics in every core discipline and QC/QA applications	Measure 1: 100% of students will achieve an 80% or higher final grade in the course and all unit assessments (3 exams and 1 project)	Measure 1: 100% of students have earned an 80% or higher in the unit assessments, final project, and overall course grades	Measure 1: this newly revamped course is meeting the requirements and competency expectation of the program	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection	NA: this is a theory and applied mathematical course with no	NA: this is a theory and applied mathematical course with no	NA: this is a theory and applied mathematical course with no	NA: this is a theory and applied mathematical course with no	NA: this is a theory and applied mathematical course with no physical

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
and processing, analysis, interpretation, and use of quality assurance procedures.	physical laboratory component	physical laboratory component	physical laboratory component	physical laboratory component	laboratory component
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Unit 2 exam and assignments focusing discipline specific calculations	Measure 1: 100% of students will score 80% or better on unit exam	Measure 1: 100% of students have passed the Unit 2 exam with over an 80%	Measure 1: students are demonstrating the desired competency on this outcome	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: unit 3 practical exam – instrument verification	Measure 2: 100% of students will score 80% or better on the verification	Measure 2: 100% of students scored 80% or better overall	Measure 2: students are demonstrating the desired competency on this outcome	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: unit 3 practical exam – instrument verification	Measure 1: 100% of students will score 80% or better on the verification	Measure 1: 100% of students scored 80% or better overall	Measure 1: students are demonstrating the desired competency on this outcome	Measure 1: No clinical changes needed at this time

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 6: Relate laboratory findings to common disease.	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component	NA: this is a theory and applied mathematical course with no physical laboratory component
Learning Outcome 8: Demonstrate effective communication skills and behaviors with	Measure 1: unit 3 practical exam – instrument	Measure 1: 100% of students will score 80% or	Measure 1: 100% of students scored 80% or better overall	Measure 1: students are demonstrating the desired	Measure 1: No clinical changes needed at this time

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
colleagues in the program and in the laboratory	verification and they are responsible	better on the verification		competency on this outcome	
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 10: Demonstrate proficiency in basic research skills and statistical analysis.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	N/A	N/A	N/A	N/A	N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 5203 Technologist in Microbiology: Applied Laboratory Mathematics and Operations is a post-BS level course that provides basic statistical and mathematical calculations used in clinical chemistry, clinical microbiology, immunohematology, and hematology. Additionally, this course applies this fundamental mathematics in performing and monitoring quality control/quality assessment plans and instrument verification, which covers calibration verification, linear range, accuracy and precision, minimum detection limit, method comparison and predictive values. This is a part of the post-BS certificate program in the department and provides students from outside the clinical laboratory the fundamental knowledge of how to perform and interpret laboratory mathematics. The course is divided into three units that covers content defined in by the BOC and what is assessed in the technologist in microbiology certification exam; briefly unit 1 covers basic mathematic and statistical concepts, unit 2 applies these concepts specifically to the core disciplines in medical laboratory sciences, and the final units focuses specifically on quality control, quality assessment, laboratory verifications, and other clinical laboratory features that may be new to non-clinically trained students. This course has been taught for two semesters with about 40 students enrolled and currently Fall 2022, all students have achieved the departmental competency standard of 80% on all unit examinations, practical exams, and a final overall grade. The data in this table are derived from two semesters Summer and Fall 2022 that were taught by Matthew Nicholaou exclusively.

Evidence of Learning: Courses within the Major: MLS 5204 Technologist in Microbiology: Supervised Clinical Experience

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 1: Demonstrate knowledge of theory underlying laboratory testing using analytical, interpretive, and problem solving skills.	Measure 1: Comprehensive exam (95% of questions)	Measure 1: 100% of students will score 80% or better on all test questions	Measure 1: Fall 2022 first semester using this measure. No results recorded yet.	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 160 hours of clinical rotation hours required with suggested lab activities and	Measure 2: 100% of students will score 80% or better by correctly performing	Measure 2: 100% of students were able to correctly perform required laboratory skills	Measure 2: All students correctly performed required laboratory skills	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	competency checklist	required laboratory skills			
Learning Outcome 2: Apply mathematical calculations to laboratory situations.	Measure 1: 3-4 questions on comprehensive final exam that cover microbiology math	Measure 1: 100% of students will score 80% or better on comprehensive exam and correctly answer math questions	Measure 1: Fall 2022 first semester using this measure. No results recorded yet.	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
	Suggested laboratory activities cover laboratory mathematics covered within the clinical rotation	Measure 2: 100% of students will demonstrate competency on mathematical calculations in laboratory rotation	Measure 2: 100% of students demonstrated competency on mathematical calculations in laboratory rotation	Measure 2: All students correctly performed mathematical calculations from suggested lab activities	Measure 2: No clinical changes needed at this time
Learning Outcome 3: Perform laboratory procedures from simple to complex, including specimen collection and processing, analysis, interpretation,	Measure 1: 160 hours of clinical rotation hours required with suggested lab activities and competency checklist	Measure 1: 100% of students will score 80% or better by correctly performing required laboratory skills	Measure 1: 100% of students were able to correctly perform required laboratory skills	Measure 1: All students correctly performed required laboratory skills	Measure 1: No clinical changes needed at this time

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
and use of quality assurance procedures.	Measure 2: Demonstrate proper knowledge of quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students will correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: 100% of students were able to correctly determine proper quality assurance procedures in clinical microbiology laboratory	Measure 2: All students correctly determined quality assurance procedures in clinical microbiology laboratory	Measure 2: No clinical changes needed at this time
Learning Outcome 4: Correlate laboratory theory and terminology to practical laboratory work	Measure 1: Comprehensive exam with 95% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better	Measure 1: Fall 2022 first semester using this measure. No results recorded yet.	Measure 1: N/A	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 160 hours of clinical rotation hours correlating theory to lab work	Measure 2: 100% of students will score 80% or better overall on lab competency	Measure 2: 100% of students scored 80% or better overall on lab competency	Measure 2: All students performed the required skills during their clinical rotation	Measure 2: No clinical changes needed at this time
Learning Outcome 5: Gather additional laboratory data and apply problem solving skills to solve problems/discrepancies.	Measure 1: Students are required to present case studies in group presentations	Measure 1: 100% of students must complete and present the assignments	Measure 1: 100% of students completed the case studies	Measure 1: All students successfully demonstrated problem solving skills	Measure 1: No curricular or pedagogical changes needed at this time

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	Measure 2: Discrepancies and problems are routinely included in the laboratory when completing the lab checklist	Measure 2: 100% of students will score 80% or better overall on lab competency	Measure 2: 100% of students scored 80% or better overall on lab competency	Measure 2: All students were able to complete laboratory checklist by identifying discrepancies	Measure 2: No clinical changes needed at this time
Learning Outcome 6: Relate laboratory findings to common disease.	Measure 1: Comprehensive exam with 95% of questions that correlate theory/terminology to laboratory testing	Measure 1: 100% of students will score 80% or better on the diagnostic questions	Measure 1: 100% of students scored 80% or better on the diagnostic questions	Measure 1: All students correctly related laboratory findings to common diseases.	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: 160 hours of clinical rotation hours correlating theory to lab work	Measure 2: 100% of students will score 80% or better overall on lab competency	Measure 2: 100% of students scored 80% or better overall on lab competency	Measure 2: All students correlated disease to laboratory testing during their clinical rotation	Measure 2: No clinical changes needed at this time
Learning Outcome 7: Demonstrate professional conduct and ethical behavior	Measure 1: Attendance and punctuality expectations defined in course syllabus	Measure 1: 100% of students will attend laboratory section and be punctual.	Measure 1: 100% attendance in laboratory section. 100% punctuality	Measure 1: All students attended laboratory section and were punctual	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Adherence to laboratory dress	Measure 2: 100% of students will comply with dress	Measure 2: 100% of students complied with	Measure 2: All students were in compliance with	Measure 2: No clinical changes needed at this time

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
	code and safety procedures	code and safety procedures.	dress code and safety procedures	dress code and safety procedures.	
Learning Outcome 8: Demonstrate effective communication skills and behaviors with colleagues in the program and in the laboratory	Measure 1: Professional communication of laboratory activities in weekly lab logs	Measure 1: 100% of students will share their laboratory experiences in a professional manner	Measure 1: 100% of students completed the lab log activities showing professional communication	Measure 1: All students were able to communicate their lab activities in a professional manner	Measure 1: No curricular or pedagogical changes needed at this time
	Measure 2: Students are required to present case studies in group presentations	Measure 1: 100% of students must complete and present the assignments	Measure 1: 100% of students completed the case studies	Measure 1: All students successfully demonstrated ability to work as a team to achieve a common goal	Measure 1: No curricular or pedagogical changes needed at this time
Learning Outcome 9: Demonstrate ability to oversee day-to-day operations including hiring and technical supervision.	N/A	N/A	N/A	N/A	N/A
Learning Outcome 10: Demonstrate proficiency in basic research skills and statistical analysis.	N/A	N/A	N/A	N/A	N/A

Evidence of Learning: MLS 5204					
Measurable Learning Goal	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results**
Students will...	Direct and Indirect Measures*				
Learning Outcome 11: Understand the role of other healthcare disciplines in patient diagnosis and successfully participate as part of the healthcare team.	N/A	N/A	N/A	N/A	N/A

*At least one measure per objective must be a direct measure. Indirect measures may be used to supplement evidence provided via the direct measures.

** MLS department policy states that not achieving a minimum competency of 80% overall will result in a letter grade of C. A grade below B- is not considered passing for students wishing to complete the MLS (MT) program.

Summary: MLS 5204 Technologist in Microbiology: Supervised Clinical Experience is a senior level clinical rotation course providing practical application of clinically significant bacteria, viruses, mycobacteria, parasites, and fungi using traditional and molecular techniques in the clinical laboratory. This course is intended as a capstone to the didactic course materials covered in MLS 5201, 5202, and 5203 of the Technologist in Microbiology certificate program. In addition to the laboratory exercises, students are expected to do a group presentation on case studies they encounter during their laboratory rotation. This course contains eight of the program's 11 identified learning goals. In all cases, the measures show that 100% of the students are reaching all 8 goals at levels of 80% or above, so no curricular or clinical changes are seen as needed at this time. Data in this table are derived from one year and two sections of the course taught from summer 2022- fall 2022 by Kendal Beazer, with student results derived from the most recent complete cohort.

G.C Evidence of Learning: General Education Courses

NA – the MLS Department teaches no general education courses

Appendix A

Most departments or programs receive a number of recommendations from their Five/Seven-Year Program Review processes. This page provides a means of updating progress towards the recommendations the department/program is enacting.

Date of Program Review: 7/09/2020	Recommendation	Progress Description
5-yr Interim NAACLS Review	The five-year interim report was found to be satisfactory with no recommendations made.	Achievement unlocked!

Additional narrative: Even though our five-year interim review passed with no deficits or recommendations our ten-year review in 2015 yielded a recommendation to improve documentation for clinical affiliates and site mentors. There were five sites that incomplete paperwork out of over 800 active clinical affiliations. The department has since moved to complete digital record keeping and has recently purchased Salesforce software to replace the current in-house data base tool for monitor these documents.

Appendix B

Please provide the following information about the full-time *and adjunct faculty* contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five-Year Program Review document that is shared with the State Board of Regents.

Faculty Headcount	2018-19	2019-20	2020-21	2021-22
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)				
Full-time Tenured	1	1	2	2
Full-time Non-Tenured (includes tenure-track)	1	1	1	1
Part-time and adjunct	0	0	0	0
With Master's Degrees				
Full-time Tenured	2	2	1	1
Full-time Non-Tenured	2	2	1	1
Part-time and adjunct	1	1	1	1
With Bachelor's Degrees				
Full-time Tenured	0	0	0	0
Full-time Non-tenured	0	0	0	1
Part-time and adjunct	4	4	3	4
Other				
Full-time Tenured	0	0	0	0
Full-time Non-tenured	0	0	0	0
Part-time	0	0	0	0
Total Headcount Faculty				
Full-time Tenured	2	2	3	3
Full-time Non-tenured	4	4	3	3
Part-time	0	0	0	0

Please respond to the following questions.

- 1) Looking back at your previous biennial report where you identified strategies for improvement, what progress has been made in implementing improvements?

I don't have any record of a response from our last biennial review. As stated above our five-year NAACLS review yielded no deficits or recommendations. That said, we have continued to try and optimize our competency-based assessment tools. Over the past year we have been developing tools within the new Canvas based testing environment to use for competency. The Outcomes/Learning Mastery within Canvas has afforded us the opportunity to use this system to assess competency (defined as an 80% mastery on each outcome) at the unit objective level within every course. These unit objectives align directly with Body of Knowledge and BOC exam content that our students are expected to learn before entering the professional laboratory. While implementation has been rocky, the faculty and students see the value of this learning mastery system for not only achieving true competency in their course but in review and study for assessments since they can identify instantly and to a high degree of granularity which material they are weak in without faculty intervention or the need to review specific exam questions.

- 2) Please take a few minutes to review the new DFWI dashboard in the Report Gallery. This dashboard allows you to see the percentage of students in each course who earn a D+, D, D-, E, W, UW, or NC grade. The data can be filtered by several parameters. Reflect on the DFWI rates overall and of your underserved minority students versus your Caucasian students:
 - a. What are you seeing?
I see values that don't exactly replicate our findings since we use this measure (grades) as triggers for students to be placed on academic probation and dismissal. Our program numbers don't exactly agree but that is not uncommon for most of the data dashboards provided by WSU. It is good to track and we do that, but sometimes there are good reasons students chose to W/UW and we try to account for that in our tracking, most of our students will withdrawal from a course and take the financial hit rather than end up with a lower letter grade.
 - b. What concerns you?
Not much regarding this dashboard again because we track this internal per semester.
 - c. What additional data could be beneficial?
I think this is a good metric for programs to have and assess, but we do things a tad differently so I don't know what specifically could be provided to us that would be beneficial.

- 3) We have invited you to re-think your program assessment. What strategies are you considering? What support or help would you like?

As mentioned above we are trying to adjust our overall competency policy in the department across our degree programs. It has been slow and cumbersome to implement but all stack-holders appear to be interested in its' use. The Canvas Outcomes/Learning Mastery provides us

with a number of opportunities to exam and assess specific student competencies down to a small number of objectives or topics per course. This final layer of detail will allow for us to easily generate reports from Canvas and specifically assess topics/content across the programs. Additionally, this system will not only be useful to our faculty but also to our students where they now get real-time feedback on their performance in the course. Ultimately, we would like to move away from the retake portion of our competency policy and use the Learning Mastery to trigger additional content and assessments within a course to better tailor the learning experience to each student while simultaneously stressing their achievement and competency on a set of objectives rather than just an overall score. Gail her team have been invaluable in assisting us in the design and implementation of this system over the last year and I would just like to thank and applaud their effort.

Glossary

Student Learning Outcomes/Measurable Learning Outcomes

The terms ‘learning outcome’, ‘learning objective’, ‘learning competency’, and ‘learning goal’ are often used interchangeably. Broadly, these terms reference what we want students to be able to do AFTER they pass a course or graduate from a program. For this document, we will use the word ‘outcomes’. Good learning outcomes are specific (but not too specific), are observable, and are clear. Good learning outcomes focus on skills: knowledge and understanding; transferrable skills; habits of mind; career skills; attitudes and values.

- Should be developed using action words (if you can see it, you can assess it).
- Use compound statements judiciously.
- Use complex statements judiciously.

Curriculum Grid

A chart identifying the key learning outcomes addressed in each of the curriculum’s key elements or learning experiences (Suskie, 2019). A good curriculum:

- Gives students ample, diverse opportunities to achieve core learning outcomes.
- Has appropriate, progressive rigor.
- Concludes with an integrative, synthesizing capstone experience.
- Is focused and simple.
- Uses research-informed strategies to help students learn and succeed.
- Is consistent across venues and modalities.
- Is greater than the sum of its parts.

Target Performance (previously referred to as ‘Threshold’)

The level of performance at which students are doing well enough to succeed in later studies (e.g., next course in sequence or next level of course) or career.

Actual Performance

How students performed on the specific assessment. An average score is less meaningful than a distribution of scores (for example, 72% of students met or exceeded the target performance, 5% of students failed the assessment).

Closing the Loop

The process of following up on changes made to curriculum, pedagogy, materials, etc., to determine if the changes had the desired impact.

Continuous Improvement

An idea with roots in manufacturing, that promotes the ongoing effort to improve. Continuous improvement uses data and evidence to improve student learning and drive student success.

Direct evidence

Evidence based upon actual student work; performance on a test, a presentation, or a research paper, for example. Direct evidence is tangible, visible, and measurable.

Indirect evidence

Evidence that serves as a proxy for student learning. May include student opinion/perception of learning, course grades, measures of satisfaction, participation. Works well as a complement to direct evidence.

HIEE – High Impact Educational Experiences

Promote student learning through curricular and co-curricular activities that are intentionally designed to foster active and integrative student engagement by utilizing multiple impact strategies. Please see <https://weber.edu/weberthrives/HIEE.html>