

4. Progress on Outcomes Assessment (Annual Question)

Updating this Question is Required on the Annual Plan!

Refer to the [SLO Cloud](#) to evaluate the results from your course level Student Learning Outcomes (SLOs) and to develop actions reflected in your program review action plan (i.e. Question 10).

- a. Please summarize **course SLO assessment results**. Include a discussion of whether or not the program met its target for each course SLO.
- b. Please describe any course and/or instructional improvements you plan to make as a result of the course SLO assessment(s).
- c. What objective(s) or action step(s) will you add to Question 10 as a result of the SLO assessment(s)? If none, please explain.

a. Please summarize the progress your unit has made on SLO/SAO measures you have applied since your last program review.

This discipline consists of Anatomy & Physiology (ANAT), Biology (BIOL), and Microbiology (MICRO). Each program has individual defined SLOs and assessments are completed within.

ANAT Defined SLOs

ANAT-101: Upon completion of this course, student will be able to demonstrate:

1. The ability to identify gross anatomy of the various systems in the human body.
2. The ability to describe the various structures and functions of components of the cells and tissues on the histology slides.
3. The ability to Explain physiological processes of the various systems in the human body.
4. The ability to demonstrate the proper uses the light microscope.
5. The ability to comprehend the overall performance of the human body.

ANAT 150: Upon completion of this course, student will be able to demonstrate:

1. The ability to identify gross anatomy of the various systems in the human body.
2. The ability to describe the various structures and functions of components of the cells and tissues on the histology slides.
3. The ability to Explain physiological processes of the various systems in the human body.
4. The ability to demonstrate the proper uses the light microscope.
5. The ability to comprehend the overall performance of the human body.

ANAT 151: Upon completion of this course, student will be able to demonstrate:

1. The ability to identify gross anatomy of the various systems in the human body.
2. The ability to describe the various structures and functions of components of the cells and tissues on the histology slides.
3. The ability to Explain physiological processes of the various systems in the human body.
4. The ability to demonstrate the proper dissection of wet specimens in the laboratory portion.
5. The ability to comprehend the overall performance of the human body.

ANAT-159 and ANAT-259: Upon completion of this course, student will be able to demonstrate:

1. The ability to isolate and identify gross anatomy of the various systems in the human body.
2. The ability to perform prosection by presenting anatomical structures and functions to various Human Anatomy & Physiology courses.
3. The ability to use various techniques to properly dissection the human cadaver.

The SLO results and discussions for ANAT 101/150/151 ([Table 4a.1](#)) and ANAT 159/259 ([Table 4a.2](#)) for Fall 2018. The SLO results and discussions for ANAT 101/150/151 ([Table 4a.3](#)) and ANAT 159/259 ([Table 4a.4](#)) for Spring 2019 uploaded to the SLO Cloud.

- **UPDATES FOR ANAT (FALL 2019):** *Of the SLO results, only ANAT 101 fall short of the defined satisfactory mark of less than 70% during the Fall 2018 results. Multiple steps had been implemented since. Such as working with the tutoring center/STEM Center and identifying tutors to specifically assist in this area. Having tutors come out into the classrooms to advertise their services and workshops. The ANAT discipline hold meetings of all faculty/staff on the Adjunct orientation day to update academic and campus related matters. An ongoing shadowing program allowed Adjunct faculty to attend an experienced faculty to learn from. The ANAT lead faculty and Lab tech continues to offer support to all ANAT Adjunct faculty. A discipline-specific syllabi, books, notes, and lab practicals are used to ensure uniformity throughout. SLO#3 for ANAT 101 will is scheduledd to be re-assessed for Fall 2020. The updated 2-year SLO Plans for 2020-2022 (Table 4c.1.1) can be found in section 4c below.*

BIOL Defined SLOs:

BIOL 100

1. Students will be able to critically evaluate biological information published in popular science sources.
2. Students will be able to apply scientific method in a research context and interpret data.
3. Students will be able to compare and contrast the key physical and physiological traits of each kingdom of life (bacteria, protista, fungi, plants, animals).
4. Students will be able to collect scientific data using simple tools of measurement and a microscope.

BIOL 130

1. Compare and contrast cell structure and relate attributes to functional differences.
2. Identify major anabolic and catabolic chemical pathways in cells and relate these to cell function.
3. Apply simple and complex patterns of genetic inheritance to predict the results of matings.
4. Compare and contrast the patterns and purposes of mitosis versus meiosis.

5. Predict consequences of DNA mutation and other metabolic pathway disruption to protein synthesis and gene regulation.
6. Use online scientific databases to evaluate gene and protein sequence and structure.
7. Observe biological phenomena and generate scientific hypotheses to explain observations.
8. Design and execute tests of hypotheses.
9. Apply basic statistical analysis to data and use analytical data to evaluate hypotheses.
10. Read and understand formal scientific journal articles

As of Fall 2019, Biology has been working to catch up on SLO assessments that were made by not recorded in the SLO Cloud. Adjunct faculty are being directed to do SLO assessment in a more proactive manner, and mentoring is being offered. Discussion of outcomes is happening, with the one full-time faculty member acting as the conduit for discussion. SLO 3 for BIOL 100 has not reached a satisfactory level, but each semester instructional improvements and resources have been identified to advance success. Those implemented ideas have improved the course overall, increasing student engagement, satisfaction, attendance, and retention. However, although the BIOL 100 SLO assessment has shown improvements since 2017, we are still working at reaching a satisfactory level.

Feedback from our 2019 team of BIOL instructors suggests that the SLOs need to be reviewed, with the goal of improving clarity and ensuring that all important aspects of the course are subject to assessment.

SLO assessment outcomes for BIOL 130-131, along with feedback from the CHC Office of Institutional Research, counseling staff, and instructors teaching the major's biology sequence, all concur that BIOL 131 curriculum should be revised to make BIOL 130 a prerequisite. Students who take BIOL 130 and then BIOL 131 have higher retention and success than students who do the reverse. Ten years ago, the number of students was so small in BIOL 130 and BIOL 131 that it was felt necessary to keep all options open. With a quadrupled enrollment in BIOL 130 and BIOL 131 each semester, we anticipate making this curriculum change will have only a small impact on enrollment for a semester or two.

MICRO Defined SLOs

MICRO 102

1. Students will collect information and create a flow chart.
2. Students will learn to collect information, create a flow chart and to successfully navigate through that flow chart.
3. Students will successfully navigate through the flow chart.
4. The students collect and analyze information from a reference source. Using this information they devise a flow chart to solve the problem of identifying an unknown bacterium. They use the laboratory skills developed over the semester to work through the flow chart and to identify their unknown. Success in this project is dependent upon the students grasp of the concepts learned in the laboratory including but not limited to: the ability to research (using Bergey's Manual of Determinative Bacteriology) the

biochemical characteristics of bacteria on their list of possible unknowns, correctly interpret this information to prepare a logical and economical plan to solve the problem, a knowledge of how to correctly inoculate a variety of microbiological media and to accurately interpret the results is also required.

MICRO 150

1. Collect information, create a flow chart and successfully navigate through that flow chart and determine the identity of an unknown microorganism.
2. Students will collect information and create a flow chart.
3. Students will learn to collect information, create a flow chart and to successfully navigate through that flow chart.
4. Students will learn to retrieve, evaluate and use contemporary microbiologic information.
5. Students will successfully navigate through the flow chart.
6. The students collect and analyze information from a reference source. Using this information they devise a flow chart to solve the problem of identifying an unknown bacterium. They use the laboratory skills developed over the semester to work through the flow chart and to identify their unknown. Success in this project is dependent upon the students grasp of the concepts learned in the laboratory including but not limited to: the ability to research (using Bergeys Manual of Determinative Bacteriology) the biochemical characteristics of bacteria on their list of possible unknowns, correctly interpret this information to prepare a logical and economical plan to solve the problem, a knowledge of how to correctly inoculate a variety of microbiological media and to accurately interpret the results is also required.

MICRO 247 A-D

1. Demonstrate the ability to correctly wash laboratory glassware
2. Demonstrate the ability to operate an autoclave
3. Demonstrate the ability to prepare microbiological media
4. Interpret the information contained in SDS (safety data sheets - formally called MSDS)
5. Micro 247 (Special Problems) students work 6 hours a week. During this time they learn and perfect a wide variety of skills including: how to operate an autoclave, how to properly wash laboratory glassware (and to operate a lab glassware cleaner), how to interpret the information contained in SDS (safety data sheets - formally called MSDS), how to prepare microbiological media, how to determine and adjust the pH of a solution and how to use an automatic pipettor and a micropipettor. (247 students are responsible for the first four of the skills. 248 students learn all six of the listed objectives). These skills are used in many laboratories and can be included in a resume when the student seeks employment in the future.
6. Students will communicate (via oral presentation or research paper) their learned skills and material learned at the end of each participating term. (UPDATED/ADDED)

MICRO 248 A-D

1. Demonstrate the ability to correctly use an automatic pipettor and a micropipettor

2. Demonstrate the ability to correctly wash laboratory glassware
3. Demonstrate the ability to determine and adjust the pH of solutions
4. Demonstrate the ability to operate an autoclave
5. Demonstrate the ability to prepare microbiological media
6. Interpret the information contained in SDS (safety data sheets - formally called MSDS)
7. Micro 248 students work in the microbiology laboratory 9 hours a week. During this time they learn and perfect a wide variety of skills including: how to operate an autoclave, how to properly wash laboratory glassware (and to operate a lab glassware cleaner), how to interpret the information contained in SDS (safety data sheets - formally called MSDS), how to prepare microbiological media, how to determine and adjust the pH of a solution and how to use an automatic pipettor and a micropipettor. (247 students are responsible for the first four of the skills. 248 students learn all six of the listed objectives). These skills are used in many laboratories and can be included in a resume when the student seeks employment in the future.
8. Students will communicate (via oral presentation or research paper) their learned skills and material learned at the end of each participating term. (UPDATED/ADDED)

In **Microbiology** for the past several years, microbiology collected and analyzed data for micro 102, micro 150 and special problems in microbiology (247 & 248). The SLO data has been collected, and clearly demonstrates that the “Flowchart” outcomes designed by Professor Shimeld are clearly being met in their respective courses. Creation, Navigation, and Implementation of the flowcharts are clearly being met as objectives of Microbiology.

Regarding the Special Problems courses, an incredible 100% success is being met through the application of Microbiology techniques, to the extent that students can help the Micro 150 and 102 students improve on their skills.

Of note is Micro 100 (Microbes and Society) a course designed to be a general introduction to Microbiology. Unfortunately, this course has not been taken off the ground, and no sections have been offered. A goal here will be to have the course be offered during all semesters and collect SLO data to being the first assessment of the course.

UPDATES FOR MICRO (FALL 2019):

The SLO results originating from the SLO Cloud Reports for MICRO 102/150/247/248 can be summarized as consistently averaging 90% or higher for the Fall 2018 – Spring 2019 range, as well as for the past 3 years.

Discussion

There are several facets that should be noted for MICRO (the responses are discussed in 4.b.) despite meeting and exceeding the targets for each objective. It is important to note that for both the content-based MICRO courses, the SLOs solely focus on the last portion of the laboratory as a “Catch-all” project and does not really assess anything of the course beyond that. Secondly, the SLOs themselves, overlap in material that is being assessed as well as being vague in terms of how to measure such items.

Similarly, for MICRO 247/248, a “Special Problems” course, the difference in unit weight should not be reflected based on the course number, rather the complexity of the projects designed respectively, based on each other’s hours vs. units assigned. Additionally, these SLOs are also vague and should be revised.

b. Please describe any program/course and/or instructional improvements made by your unit as a result of the outcomes assessment process.

Faculty members of this department are followed up on each assessment and results discussed. Discussions in this department using the results from the various SLOs to better serve the student body.

In **Anatomy & Physiology**, the results of the assessment of the SLOs provide the various instructors from the different sections with valuable information that gave the instructor an idea which process to improvement and which process to continue with success. As a result, the following improvements have been made and will continue to update to this department: Made the lecture Powerpoint presentation from the publisher available to all faculty members, distribution of lecture PowerPoint to all students through QR codes available in the course syllabi for faculty members, continuous revision of the lab practical database and customized lab manual, update to the QR codes used in selected anatomical models, and universal laboratory introduction using an iPad made available to all faculty.

In **Biology**, we will continue to collect and analyze SLO data in the biology program and adjust the course material and delivery as necessary.

In **Microbiology**, we will continue to collect and analyze SLO data in the microbiology program and adjust the course material and delivery as necessary. With the current 2-4 years of very promising data, post-assessment, Microbiology should now focus on crafting novel outcomes to assess other plausible challenges in the course. A major improvement in the course is the impact of applied microbiology in students that take the previous techniques learned throughout the course and virtually design their own mini-capstone project.

UPDATE FALL 2019 (MICRO)

Based on the aforementioned assessments, as stated in the previous SLO reflections, it is important to revise and condense these SLOs based on the following recommendations per course:

All of the target values are met, however retention in MICRO 102 is low. Two factors are considered, 1, lack of any prerequisites (anecdotal testimony reports that most students are coming in without any preparation, yet it is a course that is applicable to some of our programs – respiratory tech, etc.); and 2, the COR states virtually identical objectives as the 150 course (thus, similar rigor in the lecture and labs are displayed). We recommend introducing Introductory Chemistry or Biology as a prerequisite to the course. Similarly, updating the SLOs to reflect course content.

For MICRO 150, as the SLOs solely reflect the lab, we wish to re-assess at least 3 SLOs over the next 2 years. It is encouraging to know that students are performing well in the laboratory, especially through an all-encompassing final project, however, the lecture content should be assessed as well.

Special Problems courses 247/248, due to their nature of being creative research-based courses, assessment is critical, yet highly positive based on the training and reporting of all student participants. Nonetheless, we would like increase the student participation in these sections, as well as to add a SLO on the writing/presentation component already part of the course to be included as a major step being assessed.

Overall, MICRO seeks to improve its overall retention and performance by increasing efforts focused on student preparation. Our department meets twice per semester to discuss preparation and implementation of material and laboratory techniques to better serve our population. We already have a great relationship with the STEM center, and our tutors are students that completed our courses successfully (unfortunately, these students have graduated and are entering their career programs), we would like to work with the STEM center to introduce new tutors, however, MICRO being typically a final course in a path, students often graduate at the same time they are completing the course. Our adjunct faculty receive all the support from the lead faculty (literature, all course materials, etc.) and receive regular emails containing updates and recommendations for each lecture and lab, as well as our laboratory technician continues to offer outstanding support to the entire department (though it is crucial that we receive additional support for the night sections).

c. What is your plan for continuously completing the assessment cycle?

Anatomy & Physiology plans to continue with the assessment, analysis, and use of result of the SLOs for all ANAT courses. The results are input into the SLOCloud. The 2-year plan of SLO assessment cycle for Anatomy & Physiology are provided in [Table 4c.1](#).

- **UPDATE FOR ANAT (FALL 2019):** *The updated 2-year plan (Academic year 2020-2022) can be found in [Table 4c.1.1](#).*

In **Microbiology**, the intent is to craft 2-4 novel SLOs focused on core medical knowledge and techniques that are medically/clinically relevant and implement their first round of assessments starting this summer.

- **UPDATE FOR MICRO (FALL 2019):**

Consistent with Question 10 previous plans/requests:

Objective 1.3 will continue to be of importance to support MICRO (and the entire Biological Sciences department) as the Microscope is the quintessential tool for our field, and routine maintenance of \$2000-3000 per year saves significant funding as each microscope itself costs about the same to replace.

Objective 1.4 should receive a higher priority, especially in light of recent power outage events which have cost several thousand dollars in losses of samples due to the lack of emergency generators (loss of microbiological samples plays a financial role, but a health and safety concern due to bacterial samples thawing out). We will propose a modification for a purchase of dedicated emergency generators to ameliorate this challenge.

Objectives 1.5-1.6 remain priorities for upkeep of lab materials. Similar focus remains on 1.7-1.8 in terms improvements of budget to meet the needs of our students and their success.

Objective 3. Similar to all colleague requests, additional laboratory technician support and staffing continues to be important for student success for MICRO due to material control and faculty support.

d. If your program has SAOs, please discuss here.

Not applicable.