Discipline	Course Number	Title
Biology	161	BIO 161 08/09/2021-General Biology I Ecology and Evolution
College	Division	Department
	Math, Science and Engineering Tech	Life Sciences
Faculty Preparer		David Wooten
Date of Last Filed Assessment Report		

I. Review previous assessment reports submitted for this course and provide the following information.

1. Was this course previously assessed and if so, when?

No

2. Briefly describe the results of previous assessment report(s).

3.

4. Briefly describe the Action Plan/Intended Changes from the previous report(s), when and how changes were implemented.

5.

II. Assessment Results per Student Learning Outcome

Outcome 1: Identify the processes and patterns in evolutionary biology.

- Assessment Plan

  o Assessment Tool: Departmental Exams

  o Assessment Date: Winter 2017

  o Course section(s)/other population: All sections

  o Number students to be assessed: All students

  o How the assessment will be scored: Item analysis of selected exam questions.

- o Standard of success to be used for this assessment: Seventy percent of students will score an overall average score of 70% or better on each assessment question.

- o Who will score and analyze the data: Appropriate life science faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2019	2018, 2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
164	141

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

Students who withdrew from the course or did not take the final exam/complete research paper were not included.

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

I am the only faculty member that teaches this course. I teach a double or triple section every semester. All students from all sections over the course of the assessment period were included.

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

A cumulative final exam was used to assess the outcome. Five questions that related to the outcome language were chosen and assessed across all included sections. Scores from all sections were aggregated into one data pool, then assessed for standard of success to avoid calculating percentages of percentages. See included Excel calculation sheet.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

141 students assessed for 5 questions that relate to outcome = 705 possible correct responses. 566 correct responses were recorded or 80.3% of the responses were correct. That meets and surpasses the standard of success for this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Half of this course is dedicated to the explanation and understanding of evolutionary processes. Given this is a majors level course and these concepts can be very difficult to understand, the students seem to be grasping and understanding the information at the appropriate level.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

This course is modeled after the Ecology and Evolutionary Biology course at Yale University. It was designed to be transferable to UM and EMU, as well as other universities as a one-to-one. Given its rigor and breadth/depth, and the assessment indicated that WCC students are meeting and exceeding those criteria, there are no plans to change the course at this time. As always, I will continue to explore different methodologies and examples to help foster student mastery of learning outcomes.

Outcome 2: Identify and recognize the biological characteristics of the six categories of living organisms.

- Assessment Plan
    - o Assessment Tool: Departmental Exams
    - o Assessment Date: Winter 2017
    - o Course section(s)/other population: All sections
    - o Number students to be assessed: All students
    - o How the assessment will be scored: Item analysis of selected exam questions.
    - o Standard of success to be used for this assessment: Seventy percent of students will score an overall average score of 70% or better on each assessment question.
    - o Who will score and analyze the data: Appropriate life science faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2019	2018, 2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
164	141

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

*See explanation under Outcome #1

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

*See explanation under Outcome #1

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

*See explanation under Outcome #1

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

141 students were assessed with 5 questions that relate to the outcome language = 705 possible correct responses. 624 correct responses were recorded, or 88.5%. This meets and exceeds the standard of success for this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

This outcome is somewhat complicated as it's required via our articulation with EMU, but not with UM. The WCC biology department is also in favor of this outcome being included. While the standard of success was met, I am always exploring different ways to include, for example, the biological characteristics of fungi without having an entire module/unit on fungi. Based on the assessment, while we continue to work on how to best include this information, the students are learning these concepts and achieving the desired assessment criteria.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

As stated above, while the standard of success was met and students do appear to be understanding the biological diversity of life, I am continuing to assess where and how to best incorporate this information into the course without detracting from our units on evolution and ecology. We have found that designating specific labs to examine specific organismal groups has worked well and we will continue to improve that aspect of the course.

Outcome 3: Identify and evaluate the organization, processes, study of, and organismal relationships in ecological systems.

- Assessment Plan

    o Assessment Tool: Departmental Exams

    o Assessment Date: Winter 2017

    o Course section(s)/other population: All sections

    o Number students to be assessed: All students

    o How the assessment will be scored: Item analysis of selected exam questions.

    o Standard of success to be used for this assessment: Seventy percent of students will score an overall average score of 70% or better on each assessment question.

    o Who will score and analyze the data: Appropriate life science faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2019	2018, 2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
164	141

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

*see explanation Outcome #1

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

*see explanation Outcome #1

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

*see explanation Outcome #1

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: Yes

141 student responses were recorded for 5 outcome questions = 705 possible correct responses. 595 correct responses were recorded or 84.4%. This meets and exceeds the standard of success for this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Ecology, and the understanding of the processes and relationships therein, is the other major topic of this course. It is extremely important and allows the students to transfer and apply what they have learned in regards to evolution and biodiversity to living systems. Being a majors course and designing it to be transferrable to other universities as a one-to-one, the concepts in this outcome are numerous and complex. Students are clearly understanding this information and able to apply it to various case studies, ecological models, living systems, etc. I am very pleased with this outcome assessment.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

*see response under Outcome #1.

Outcome 4: Perform laboratory exercises that reinforce and illustrate concepts in evolution, taxonomy, biodiversity, and ecology including designing, completing and interpreting a scientific experiment.

- Assessment Plan

- o Assessment Tool: Student Research Project and Paper

- o Assessment Date: Winter 2017

- o Course section(s)/other population: All sections

- o Number students to be assessed: All students

- o How the assessment will be scored: Departmentally-developed rubric.

- o Standard of success to be used for this assessment: Seventy percent of students will score an overall average score of 70% or better on the final project. Final project score will incorporate an evaluation of lab content and skills in the experiment, quality of writing in the scientific paper and a presentation.

- o Who will score and analyze the data: Appropriate life science faculty

1. Indicate the Semester(s) and year(s) assessment data were collected for this report.

Fall (indicate years below)	Winter (indicate years below)	SP/SU (indicate years below)
2019	2018, 2017	

2. Provide assessment sample size data in the table below.

# of students enrolled	# of students assessed
164	141

3. If the number of students assessed differs from the number of students enrolled, please explain why all enrolled students were not assessed, e.g. absence, withdrawal, or did not complete activity.

*see explanation Outcome #1

4. Describe how students from all populations (day students on campus, DL, MM, evening, extension center sites, etc.) were included in the assessment based on your selection criteria.

*see explanation Outcome #1

5. Describe the process used to assess this outcome. Include a brief description of this tool and how it was scored.

Students were introduced to lab skills and the scientific method in lab. They were asked to develop, execute, analyze, and report on a scientific experiment of their own design. The assignment included a formal scientific paper and a formal scientific presentation. These scores were added together (30 pts for presentation, 60 for paper) for a total of 90 pts. possible. All scores from all sections were

aggregated into a single data pool and assessed to avoid calculating percentages from percentages. See attached Excel file.

6. Briefly describe assessment results based on data collected for this outcome and tool during the course assessment. Discuss the extent to which students achieved this learning outcome and indicate whether the standard of success was met for this outcome and tool.

Met Standard of Success: <u>Yes</u>
70% (the standard of success for this outcome) of 90 pts. = 63 pts. Out of 141 students, 126 students scored a 63 or higher = 89.4%. This meets and exceeds the standard of success for this outcome.

7. Based on your interpretation of the assessment results, describe the areas of strength in student achievement of this learning outcome.

Assessing lab skills can sometimes be difficult and requires the inclusion of multiple labs or checklists. The paper/presentation assessment tool allows for a holistic overview of lab skills (data collection, data analysis, graphing, etc.) and an understanding of the topic researched. The students continue to impress with their excitement and commitment to their projects.

8. Based on your analysis of student performance, discuss the areas in which student achievement of this learning outcome could be improved. If student met standard of success, you may wish to identify your plans for continuous improvement.

Given the limitations of lab supplies for student research projects and the most recent restrictions with COVID, we are considering eliminating the research project aspect of this outcome and have the students only complete a formal scientific review paper on a subject. If that decision is made, then we will change the assessment tool for this outcome to be more inclusive of lab skills and not writing. We have a midterm and final lab practical which may serve as the new assessment tool.

III. Course Summary and Intended Changes Based on Assessment Results

1. Based on the previous report's Intended Change(s) identified in Section I above, please discuss how effective the changes were in improving student learning.

Part of the reason this course has never been assessed is due to the fact it has been in a state of continuous "evolution" since its inception. We created the course several years ago, then had to change it to meet EMU requirements, then had to change it several times over to meet the requirements for UM. While this continuous change has been frustrating at times, it has worked to improve the

course to a level we are proud of and are pleased to see the students' success in all outcomes.

2. Describe your overall impression of how this course is meeting the needs of students. Did the assessment process bring to light anything about student achievement of learning outcomes that surprised you?

I find this course is meeting the students' needs in two ways: 1) The students are learning the information and meeting outcome goals. In fact, they are exceeding them. 2) Students are transferring this course successfully to other schools and are communicating back (email, pers. comm.) on how applicable and effective it was for them moving through their degrees in biology, etc. I find this the best standard of success we can hope for.

3. Describe when and how this information, including the action plan, was or will be shared with Departmental Faculty.

The assessment report will be shared with the college, division, and at a departmental meeting.

4.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Assessment Tool	I am going to take a close look at Outcome #4 regarding lab skills and reconsider the assessment tool. In the future, we'll use the 13 weekly departmental lab reports.	The rationale is based on a change in the research project assignment. If we go to a scientific review paper, we will need to change the assessment tool so it reflects the actual use of lab skills per outcome language.	2021

5. Is there anything that you would like to mention that was not already captured?

Due to COVID and this course going "virtual" in W2020, the exams and lab exercises had to be completely revised to accommodate the online format. Those exams and labs are not commensurate with the working model of the course and were therefore not assessed. While the virtual-model data is saved and may be useful in the future, given this was the first time assessing the course since it was

remodeled several years ago, I wanted to get a snapshot of how the on-campus, known model of the course was working.

III. Attached Files

BIO161 Fall2021 Assessment

Faculty/Preparer: David Wooten **Date:** 08/09/2021
Department Chair: Anne Heise **Date:** 08/09/2021
Dean: Victor Vega **Date:** 08/10/2021
Assessment Committee Chair: Shawn Deron **Date:** 02/01/2022