

**Course Assessment Report  
Washtenaw Community College**

Discipline	Course Number	Title
Biology	237	BIO 237 01/25/2021- Microbiology
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Life Sciences	Anne Heise
Date of Last Filed Assessment Report		06/16/2015

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

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

Yes

It looks like the last assessment was in 2015.

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

For most outcomes the standard of success was met. I was piloting the use of a comprehensive final exam to assess the lecture outcomes, and only one other instructor besides myself chose to participate.

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

I decided not to continue with a common comprehensive final. One problem with embedded questions is that if I write them for all the microbiology instructors, they may not work well for the students in other sections, unless they are very low on the Bloom's taxonomy schema.

**II. Assessment Results per Student Learning Outcome**

Outcome 1: Recognize major subcellular and molecular structures in bacteria and viruses.

- Assessment Plan
  - Assessment Tool: Multiple-choice, matching, etc. test questions
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All

- Number students to be assessed: All
- How the assessment will be scored: Item analysis
- Standard of success to be used for this assessment: 100% of the students will score 75% or higher on the outcome questions
- Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	165

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.

All students in all sections were assessed but sometimes students were absent, or did not do an assignment.

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.

All students in Fall 2020 were assessed. This included daytime and evening sections. All sections were Virtual Classroom (synchronous remote lecture, synchronous remote lab) in Fall 2020.

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

Embedded multiple-choice and true/false questions on unit exams.

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  
 While, the standard of success states that 100% of the students will score 75% or higher, I used the average percent correct for each set of questions. I don't believe

strongly enough in the validity of each individual question to think that 75% of students need to answer correctly on each question.

Five questions were used to assess this outcome. For each question, over 75% of students answered the question correctly. Furthermore, for this set of questions over 75% were answered correctly.

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

Students have a solid understanding of the major subcellular components of cells, and the molecular structures of bacteria and viruses.

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.

The only area of weakness concerns acid fast bacteria, where 78% of students answered a question correctly about these bacteria. Nevertheless, students are doing well overall. We will continue to keep the content fresh as new microbes enter the scene.

Outcome 2: Recognize fundamental principles of molecular genetics.

- Assessment Plan
  - Assessment Tool: Multiple-choice, matching, etc. test questions
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All
  - Number students to be assessed: All
  - How the assessment will be scored: Item analysis
  - Standard of success to be used for this assessment: 100% of the students will score 75% or higher on the outcome questions
  - Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	118

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.

A student may have been absent or didn't do the assessment. Additionally, one of the instructors forgot to put the questions for this outcome on any of the exams. That accounts for up to 48 missing students.

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.

All students in all sections were assessed. This includes daytime and evening. In Fall 2020, all sections were VC: synchronous remote lecture and synchronous remote lab.

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

Embedded questions on unit exams were scored with an answer key.

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

While, the standard of success states that 100% of the students will score 75% or higher, I used the average percent correct for this set of questions. I don't believe strongly enough in the validity of each individual question to think that 75% of students need to answer correctly on each question.

Five questions were used to assess the outcome. By chance the exact same number of students responded to each question, making it easy to simply average the percent correct over all five questions. The range across the five questions was from 72% correct to 96% correct. The average is 82%.

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

I was surprised by how well students did on this outcome. This material is difficult especially because some of the information is brand new, and other information

overlaps with terms used in common conversation which may have different meanings in biology, for example, the genetic code.

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.

Ideally more time could be spent in the class on transcription and translation now that mRNA vaccines are a reality.

Outcome 3: Recognize epidemiological terminology used to describe pathogen transmission and the occurrence of disease in a population.

- Assessment Plan
  - Assessment Tool: Multiple-choice, matching, etc. test questions
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All
  - Number students to be assessed: All
  - How the assessment will be scored: Answer key. Item analysis will take place.
  - Standard of success to be used for this assessment: 100% of the students will score 75% or higher on the outcome questions
  - Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	165

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.

A student may have been absent or chose not to answer some of the questions used for this outcome.

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.

All students were assessed including day and evening. In Fall 2020, all sections were 100% remote.

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

Five true/false and multiple-choice questions were embedded in unit exams. Answers were scored automatically by Blackboard.

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

While the standard of success states that 100% of the students will score 75% or higher, I used the average percent correct for this set of question. I don't believe strongly enough in the validity of each individual question to think that 75% of students need to answer correctly on each question.

The overall percentage of questions answered correctly for this outcome was 86%. Individually, the standard of success was met on 4 of the 5 questions. On the fifth question, only 69% of students answered it correctly.

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

Students did well overall on this outcome, and generally poorly on one of the embedded questions used for this outcome. That question is a True/False which has a NOT in it rendering the entire question FALSE -- it is unnecessarily logically complex and should be re-written.

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.

Performance was good overall. We will continue teaching this material and providing up-to-date examples for students.

Outcome 4: Identify major mechanisms of pathogenesis within the human body and the body's major defenses against infectious disease.

- Assessment Plan
  - Assessment Tool: Multiple-choice, matching, etc. test questions
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All
  - Number students to be assessed: All
  - How the assessment will be scored: Item analysis
  - Standard of success to be used for this assessment: 100% of the students will score 75% or higher on the outcome questions
  - Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	165

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.

A student may have chosen not to answer one or more of the questions used to assess this outcome.

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.

All students were included. There are some daytime sections and some evening sections. In Fall 2020, all sections were 100% remote.

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

Ten multiple-choice and true/false questions were embedded in unit exams. Answers were scored automatically by Blackboard.

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

While the standard of success states that 100% of the students will score 75% or higher, I used the average percent correct for each set of question. I don't believe strongly enough in the validity of each individual question to think that 75% of students need to answer correctly on each question.

Over the ten questions used to assess this outcome, 80% of the answers were correct. However, for four of the ten questions the standard of success was not met, with the percent correct ranging from 64% to 70%.

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

This outcome includes the adaptive immune system, a complex system within the body that is very hard to teach and learn. Some of it is brand-new and other concepts are used commonly in conversation but not necessarily in an accurate way, so there are mis-conceptions to overcome as well. Another reason some students may not have done well on particular embedded questions is that an individual instructor may not have stressed the exact information a question asked about. I think this is the case for the question about meningitis.

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.

Allocating sufficient time for this subject can help. There is so much new material that you can't rush through it and hope students will figure it out on their own. Finding that time is hard; I will probably reduce time spent on discussion of individual diseases, even though students generally appreciate that material a lot.

Outcome 5: Demonstrate proficient use of the microscope and preparation of high-quality slides of bacteria.

- Assessment Plan
  - Assessment Tool: Skills checklist
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All

- Number students to be assessed: All
- How the assessment will be scored: Departmentally-developed rubric
- Standard of success to be used for this assessment: 75% of students will score 4 or higher on a 5-point scale
- Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	158

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.

Quite a few students in one instructor's lab did not do this assignment.

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.

All students were included in this assessment. Sections were daytime and evening; all sections were 100% remote.

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

This outcome has been assessed in the past using a skills checklist and rubric in the lab. That was not possible this semester because of the pandemic. Instead, the outcome was assessed by tallying the number of students who got an 8 or better on a 10-point lab worksheet that had students use a virtual microscope and also look at images of prepared slides as they would appear in a microscope. The worksheet was scored holistically by each instructor on a 10-point scale; students would lose points based on the number/severity of incorrect answers or if they didn't answer a question.

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>
145 out of 158 students, or 92%, scored 8 or better on the worksheet.

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

Students were able to use the virtual microscope and get some sort of feeling for how to use a microscope and what it can do.
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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.

In the remote environment, we are going to do the lab on staining before the microscope lab. This will give students more experience looking at images of microscopic organisms. Once we are face-to-face again, there is no substitution for having students spend time looking at a lot of slides and building their expertise with a microscope.
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Outcome 6: Use basic aseptic techniques in the microbiology lab.

- Assessment Plan
  - Assessment Tool: Skills checklist
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All
  - Number students to be assessed: All
  - How the assessment will be scored: Departmentally-developed rubric
  - Standard of success to be used for this assessment: 75% of students will score 4 or higher on a 5-point scale
  - Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	162

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.

Some students may not have done the assignment.

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.

All students were assessed. The sections are day and evening, 100% remote in Fall 2020.

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

This outcome has been assessed in the past using a rubric in the lab to assess how well students perform an aseptic isolation streak on an agar plate. That being impossible in Fall 2020 thanks to the pandemic, we assessed the outcome using a drag-drop exercise demonstrating aseptic inoculation from a broth culture onto an agar plate. It was scored by a global judgment of the instructor based on whether the student included all the steps with aseptic transfer and whether the student was able to trouble-shoot bad results.

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

On a 10-point scale, 93% scored 7 (70%) or better on this assessment. The stated standard of success was that 75% would score 4 or better on a 5 point scale; thus it would have made sense that on a 10 point scale the standard of success would be 8 out of 10. However, data based on 7/10 (70%) as the standard of success was requested by mistake. Overall performance was very good.

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

Students adapted very well to the virtual aseptic technique assignment.

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.

Steady as she goes in the remote setting. In the face-to-face lab, we always stress aseptic technique because it helps build a mind-set that we hope students will take with them when they are working in healthcare.

Outcome 7: Design, execute, and present an original microbiological experiment.

- Assessment Plan
  - Assessment Tool: Student presentation
  - Assessment Date: Winter 2019
  - Course section(s)/other population: All
  - Number students to be assessed: All
  - How the assessment will be scored: Departmentally-developed rubric
  - Standard of success to be used for this assessment: 70% of students will score 25 or higher on a 30-point rubric
  - Who will score and analyze the data: Department 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)
2020		

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

# of students enrolled	# of students assessed
167	160

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.

Some students may have not done the assignment.

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.

All students from all sections were assessed. The sections include daytime and evening sections. In Fall 2020, all sections were remote thanks to the pandemic.

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

This outcome has been assessed in the past using a rubric to judge students' presentations of a two-week independent project done individually or in small groups in lab. Because of the pandemic, no actual wet-lab projects were possible. Instead, students had to design an experiment that could answer a given question, such as "Which removes microbes from a cutting board more effectively, Dawn dish soap or 409 cleaner?". They described how they would do such an experiment and what the outcomes might look like if their hypothesis was either disproved or confirmed. The assignment was graded holistically by each instructor on a 10-point scale.

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

99% of students scored 7 or better on this assignment.

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

Students did very well on this assignment.

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.

The project itself could be expanded to include analysis of actual experiments. In the existing project, students are using their imagination to make up experimental outcomes. In the face-to-face lab the project is almost always a good experience for students. Their major stumbling block is procrastination.

### 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.

Unfortunately, there is really no way to tell if Intended Changes made any difference. The two assessment tools are entirely different: comprehensive final in F2F classes vs embedded questions on Blackboard-based exams in VC classes.

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?

Generally, students are doing well meeting the outcomes of the course. There will be long-term questions about how well a VC class can help students meet lab-based outcomes. Those outcomes were skills-based in the past but in Fall 2020 they were assessed indirectly using virtual "labs" which did not allow students to develop actual lab skills.

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

I will share results with department faculty and most especially with instructors who teach microbiology once this report has been approved.

- 4.

Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Outcome Language	Modify the standard of success so that it can be achieved.	It was not possible to achieve a score of 75% on most of the learning outcomes. This will be modified in the master syllabus update.	2021
Assessment Tool	Many of the embedded questions should be rewritten. Multiple-choice questions should be scrutinized, and for each one only three choices should be offered.	True-false questions should be replaced by multiple-choice. Students often overthink T/F questions, and as I mentioned earlier at least one of the questions (a T/F about meningitis) used in this assessment is unnecessarily logically complex. A student could answer it incorrectly if they	2021

		lost track of the double-negatives.  Research shows that three choices on a multiple-choice question works as well as four or more choices.	
Assessment Tool	Update questions.	Replace TF with multiple choice; consider rewriting all questions if testing going forward is always going to be in Blackboard. If so, make the questions harder to cheat on, assuming students will either be permitted to use additional resources, or will figure out ways to Google answers.	2021

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

Here's the elephant in the room. This assessment was based on data collected in Fall 2020. All exams were taken online via Blackboard. In my sections I made the exams "open resource"; I don't know what the other instructors did. Just eyeballing the performance of my students compared to others, there is no glaring difference, but the use of online exams is a departure at least for me and probably one other instructor. I think one of the instructors has used Bb exams for a long time.

Overall, my sections had more As and Bs in Fall 2020 than in earlier Fall semesters, and some of that could be because of how the students took their exams. (I also changed the point distributions to down-play the importance of the exams.) I don't think this change affected this assessment much; however, but there is no way to know. I can say that the results of this assessment are similar to the results from the last time the course was assessed, in an era when all sections were face-to-face and most exams were given on paper in the testing center.

Finally, this project could not have been completed without contributions from Sreelatha Ponnaluri, Diane Anderson, Tamara Wrone, and Nirit Mor-Vaknin.

### III. Attached Files

[Questions embedded on unit exams](#)

[Microscope Lab Assignment](#)

[Aseptic Technique Lab Assignment](#)

[Lab Project - Design an Experiment](#)

[Assessment Data - Bio 237 Fall 2020](#)

**Faculty/Preparer:** Anne Heise **Date:** 01/29/2021

**Department Chair:** Anne Heise **Date:** 01/29/2021

**Dean:** Victor Vega **Date:** 02/15/2021

**Assessment Committee Chair:** Shawn Deron **Date:** 03/24/2021

**Course Assessment Report**  
**Washtenaw Community College**

Discipline	Course Number	Title
Biology	237	BIO 237 04/29/2015- Microbiology
Division	Department	Faculty Preparer
Math, Science and Engineering Tech	Life Sciences	Anne Heise
Date of Last Filed Assessment Report		

**I. Assessment Results per Student Learning Outcome**

Outcome 1: Use correct terminology when referring to the major subcellular and molecular structures in bacteria and viruses.

- Assessment Plan
  - Assessment Tool: Short-answer and/or constructed response questions on unit exam and/or final
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All
  - Number students to be assessed: 100%
  - How the assessment will be scored: item analysis
  - Standard of success to be used for this assessment: The average score on the outcome questions will be 75% or higher.
  - Who will score and analyze the data: department 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)
	2015	

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

# of students enrolled	# of students assessed
166	85

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.

I was piloting the use of an end-of-semester comprehensive makeup exam as a platform for asking the questions used in assessment. Since this was a pilot, I asked the Bio 237 instructors to participate on a voluntary basis. Only one instructor agreed. So the assessment is based on the student in her two sections, plus the students in my two sections.

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.

All students were in daytime sections on main campus. There are no MM or DL sections of this class.

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

The tool was a comprehensive makeup exam. Five questions - two true/false and three multiple choice - were used to assess this outcome. The exams were graded by scantron and the questions were analyzed using the scantron item analysis feature.

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: No

Overall 72% of the answers were correct.

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

If you look question by question for this outcome, it appears that overall students did well... until you get to questions 11 and 12. My sections did fine on those questions but others did not. In the case of question 11, it is worded in a way my students are used to but the other instructor's were not. In the case of question 12, the other instructor tells me she did not stress that particular fact with her students.

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.

Instructors may wish to highlight the nature of the cell wall in acid fast bacteria.

Outcome 2: Recognize and/or describe fundamental principles of molecular genetics.

- Assessment Plan
  - Assessment Tool: Short-answer and/or constructed response questions on unit exam and/or final
  - Assessment Date: Winter 2018
  - Course section(s)/other population: All
  - Number students to be assessed: 100%
  - How the assessment will be scored: item analysis
  - Standard of success to be used for this assessment: The average score on the outcome questions will be 75% or higher.
  - Who will score and analyze the data: department 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)
	2015	

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

# of students enrolled	# of students assessed
166	85

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.

I was piloting the use of an end-of-semester comprehensive makeup exam as a platform for asking the questions used in assessment. Since this was a pilot, I asked the Bio 237 instructors to participate on a voluntary basis. Only one instructor agreed. So the assessment is based on the student in her two sections, plus the students in my two sections.

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.

All students were in daytime sections on main campus. There are no MM or DL sections of this class.

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

The tool was a comprehensive makeup exam. Five questions - two true/false and three multiple choice - were used to assess this outcome. The exams were graded by scantron and the questions were analyzed using the scantron item analysis feature.

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: No

Overall 62% of the answers were correct.

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

Students did fine on the very straightforward True/False assessment questions and on question 14, which again is a very straightforward multiple choice question. The other two multiple choice questions used for this outcome were subtle; the other instructor called one of them "tricky". It is possible the students overall actually know more about the genetic code than the assessment can demonstrate because students may have struggled with the logical structure of the questions.

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.

Personal observation makes me believe many students overall have a fairly shaky understanding of basic molecular genetics. We may decide to spend more time on the topic, and we can also either rewrite the assessment questions or offer more advance practice in how to tackle "tricky" questions.

Outcome 3: Describe patterns of infectious disease prevalence and transmission in a population of hosts.

- Assessment Plan
  - Assessment Tool: Short-answer and/or constructed response questions on unit exam and/or final

- Assessment Date: Winter 2018
- Course section(s)/other population: All
- Number students to be assessed: 100%
- How the assessment will be scored: The assessment will be scored using an answer key. Item analysis will take place.
- Standard of success to be used for this assessment: The average score on the outcome questions will be 75% or higher.
- Who will score and analyze the data: department 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)
	2015	

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

# of students enrolled	# of students assessed
166	85

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.

I was piloting the use of an end-of-semester comprehensive makeup exam as a platform for asking the questions used in assessment. Since this was a pilot, I asked the Bio 237 instructors to participate on a voluntary basis. Only one instructor agreed. So the assessment is based on the student in her two sections, plus the students in my two sections.

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.

All students were in daytime sections on main campus. There are no MM or DL sections of this class.

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

The tool was a comprehensive makeup exam. Five questions - two true/false and three multiple choice - were used to assess this outcome. The exams were graded by scantron and the questions were analyzed using the scantron item analysis feature.

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>
Overall, 90% of the answers were correct.

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

This outcome requires knowledge of vocabulary. The questions were straightforward and the students did great.
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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.

When I look at the questions I used for this outcome, I see one that I would like to rewrite; I can see how students might pick one of the distractors if they constructed a particular chain of events in their minds.
---

Outcome 4: Describe major mechanisms of pathogenesis within the human body and the body's major defenses against infectious disease.

- Assessment Plan
    - Assessment Tool: Short-answer and/or constructed response questions on unit exam and/or final
    - Assessment Date: Winter 2018
    - Course section(s)/other population: All
    - Number students to be assessed: 100%
    - How the assessment will be scored: item analysis
    - Standard of success to be used for this assessment: The average score on the outcome questions will be 75% or higher.
    - Who will score and analyze the data: department 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)
	2015	

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

# of students enrolled	# of students assessed
166	85

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.

I was piloting the use of an end-of-semester comprehensive makeup exam as a platform for asking the questions used in assessment. Since this was a pilot, I asked the Bio 237 instructors to participate on a voluntary basis. Only one instructor agreed. So the assessment is based on the student in her two sections, plus the students in my two sections.

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.

All students were in daytime sections on main campus. There are no MM or DL sections of this class.

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

The tool was a comprehensive makeup exam. Ten questions - four true/false and six multiple choice -- were used to assess this outcome. The exams were graded by scantron and the questions were analyzed using the scantron item analysis feature.

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  
Overall, 82% of the answers were correct.

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

This outcome is absolutely huge and once this assessment has worked its way through the system I plan to separate this outcome into two outcomes. Overall students were successful on this outcome. They did very well on the questions related to pathogenesis and not as well on questions related to immunity.

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.

The question with the worst performance was #22. I don't have a way of checking this hypothesis, but I would not be surprised if a lot of students chose the answer that includes "kill the toxin" instead of "neutralize the toxin". I stress that toxins aren't alive and thus can't be killed, but I know that students think casually about the immune system killing toxins.

Outcome 5: Demonstrate proficient use of the microscope and preparation of high-quality slides of bacteria.

- Assessment Plan
    - Assessment Tool: Skills checklist
    - Assessment Date: Winter 2018
    - Course section(s)/other population: all
    - Number students to be assessed: all
    - How the assessment will be scored: departmentally-developed rubric
    - Standard of success to be used for this assessment: 75% will score 4 or better on a 5 pt scale.
    - Who will score and analyze the data: department 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)
	2015	

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

# of students enrolled	# of students assessed
166	92

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.

There were 7 sections of Bio 237 offered in Winter 2015. I asked for instructors to volunteer to participate in assessment, because the method I planned to use was a pilot. 4 of 7 sections participated.

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.

Participation was voluntary (see above). The 4 sections that participated were all day students on campus.

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

Skills checklist using a rubric (attached). Scoring done by lab instructor. Maximum possible score was 10, minimum was 0.

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

83 out of 92, or 86% of assessed students, scored an 8 or higher. The standard of success was met.

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

Students are able to prepare good quality microscope slides.

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.

Performance could be improved if we had better microscopes.

Outcome 6: Use basic aseptic techniques in the microbiology lab.

- Assessment Plan
  - Assessment Tool: Skills checklist
  - Assessment Date: Winter 2018
  - Course section(s)/other population: all
  - Number students to be assessed: all
  - How the assessment will be scored: departmentally-developed rubric

- Standard of success to be used for this assessment: 75% will score 4 or better on a 5 pt scale.
- Who will score and analyze the data: department 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)
	2015	

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

# of students enrolled	# of students assessed
166	0

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.

This outcome was not assessed.

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.

N/A

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

N/A

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: No  
N/A

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

This outcome was not assessed.

- 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 outcome was not assessed.

## II. Course Summary and Action Plans Based on Assessment Results

- 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?

The results are not surprising to me.

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

I will share the results with department faculty in Fall 2015.

- Intended Change(s)

Intended Change	Description of the change	Rationale	Implementation Date
Outcome Language	I plan to split Outcome 4 into two Outcomes. I plan to combine Outcomes 5 and 6 into one lab-based outcome.	Outcome 4 is about both the production of infection/disease, and the body's innate and adaptive immune responses to infection. That is way too much.  We may also decide to write a set of common questions that all instructors in all sections are required to embed in their exams. I would do this in consultation with the part-time faculty who teach this class. Using an end-	2016

		of-term exam is only convenient for instructors who want to offer a makeup exam to their students. I like having such an exam but not all instructors do.	
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4. Is there anything that you would like to mention that was not already captured?

Jennifer Pruette volunteered to have her sections participate in this assessment. Tamara Tucker collected information for one of Jennifer's labs, and Jennifer collected the information for the other lab. Karen Paelicke collected the information for both of Anne Heise's lab sections. Anne wrote the questions used on this assessment.

**III. Attached Files**

[Questions and Rubric Analysis by question](#)

**Faculty/Preparer:** Anne Heise **Date:** 05/07/2015  
**Department Chair:** Anne Heise **Date:** 05/07/2015  
**Dean:** Kristin Good **Date:** 05/11/2015  
**Assessment Committee Chair:** Michelle Garey **Date:** 06/15/2015

**COURSE ASSESSMENT REPORT**

**I. Background Information**

1. Course assessed:  
 Course Discipline Code and Number: Bio 237  
 Course Title: Microbiology  
 Division/Department Codes: MNSB
  
2. Semester assessment was conducted (check one):  
 Fall 2009  
 Winter 20\_\_  
 Spring/Summer 20\_\_
  
3. Assessment tool(s) used: check all that apply.  
 Portfolio  
 Standardized test  
 Other external certification/licensure exam (specify):  
 Survey  
 Prompt  
 Departmental exam  
 Capstone experience (specify):  
 Other (specify):
  
4. Have these tools been used before?  
 Yes  
 No

If yes, have the tools been altered since its last administration? If so, briefly describe changes made.

Unit exams were used on the last assessment but many of the questions are new.

5. Indicate the number of students assessed/total number of students enrolled in the course.  
 Two double sections of Bio 237 were assessed, for a total of about 90 students (92 on Exam 1 down to 86 on Exam 5).
  
6. Describe how students were selected for the assessment.  
 All students in Anne Heise's lecture sections were assessed.

**II. Results**

1. Briefly describe the changes that were implemented in the course as a result of the previous assessment.

The previous assessment showed that the course was working reasonably well. At least 77% of students had satisfactory performance on each objective. I continue to modify test questions that significant percentages of students find confusing or misleading; I continue to try new homework or in-class exercises to drill on challenging concepts, molecular genetics in particular. Lab skills were at a satisfactorily high level, so I have not changed much in the lab.

List each outcome that was assessed for this report exactly as it is stated on the course master syllabus.

**Outcome 1:** Use correct terminology when referring to the major subcellular and molecular structures in bacteria and viruses.

**Outcome 2:** recognize and/or describe fundamental principles of molecular genetics.

**Outcome 3:** Describe patterns of infectious disease prevalence and transmission in a population of hosts.

**Outcome 4:** Within the human body, describe major mechanisms of pathogenesis, and the body's major defenses against infectious disease:

**COURSE ASSESSMENT REPORT**

2. Briefly describe assessment results based on data collected during the course assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. *Please attach a summary of the data collected.*

I gave 5 unit exams during the Fall 2009 semester. For each exam, I identified questions that could be used to assess the four outcomes above. I used at least 5 questions to assess each outcome. I used the item analysis feature with the Scantron reader to find out what percent of students got each assessment question right. Then I averaged the percent correct for all assessment questions related to each outcome. See attachment for data summary.

Outcome	# questions used for assessment	average % of students answering correctly, over all questions	Success?
Outcome 1	9	86%	Yes
Outcome 2	5	64	No
Outcome 3	7	86	Yes
Outcome 4	15	80	Yes

3. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. *Please attach the rubric/scoring guide used for the assessment.*

The standard of success for all 4 outcomes was 70% correct answers, averaged over all questions and all students. This standard was set in the master syllabus.

4. Describe the areas of strength and weakness in students' achievement of the learning outcomes shown in assessment results.

**Strengths:**

Student achievement was strong in all areas except molecular genetics. I believe the scores are a bit artificially low for outcome 2, based on anecdotal feedback that one of the questions I used for assessment was "confusing".

**Weaknesses:** The major weakness is molecular genetics.

**III. Changes influenced by assessment results**

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

Exam questions can be revised. More varieties of instruction can be tried such as videos, in-class group work, extensive homeworks. I would also like to try to get the classes that are pre-requisites to Bio 237 to spend more time on genetics. I may try doing a pre-test kind of survey when starting this material to get a better sense of what students do and do not understand, so I can adjust how much time I spend on each topic.

2. Identify intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

As mentioned above, I will probably modify exam questions, course assignments, teaching methods and instructional activities. These are not drastic changes that require a lengthy rationale.

- a.  Outcomes/Assessments on the Master Syllabus  
Change/rationale:

COURSE ASSESSMENT REPORT

- b.  Objectives/Evaluation on the Master Syllabus  
Change/rationale:
- c.  Course pre-requisites on the Master Syllabus  
Change/rationale:
- d.  1<sup>st</sup> Day Handouts  
Change/rationale:
- e.  Course assignments  
Change/rationale:
- f.  Course materials (check all that apply)
  - Textbook
  - Handouts
  - Other:
- g.  Instructional methods  
Change/rationale:
- h.  Individual lessons & activities  
Change/rationale:

3. What is the timeline for implementing these actions? Begin in Winter 2010.

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this course.

Tool was adequate.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

3. Which outcomes from the master syllabus have been addressed in this report?

All \_\_\_\_\_ Selected   X  

If "All", provide the report date for the next full review:   3   years from acceptance \_\_\_\_\_

If "Selected", provide the report date for remaining outcomes:   June 2010  

Submitted by:

Print:   Anne Heise    
Faculty/Preparer

Signature   Anne Heise   Date:   1-14-10  

Print:   Marvin Boluyt    
Department Chair

Signature   Marvin Boluyt   Date:   1/14/10  

Print:   Martha Showalter    
Dean/Administrator

Signature   Martha Showalter   Date:   JAN 19 2010  

*logged 1/21/10 sjv*  
Approved by the Assessment Committee 11//08

**COURSE ASSESSMENT REPORT**

**Background Information**

**I. Course assessed:**

Course Discipline Code and Number: Bio 237

Course Title: Microbiology

Division Code: MBNS Department Code: LIF

**II. Semester assessment was administered (check one):**

- Fall 20\_\_
- Winter 2006
- Spring/Summer 20\_\_

**III. Assessment tool used (check one):**

**Please attach a copy of the tool and scoring rubric used.**

- Portfolio
- Standardized test
- Other external certification/licensure exam (please describe): \_\_\_\_\_
- Survey
- Prompt
- Departmental exam
- Capstone experience (please describe): \_\_\_\_\_
- Other (please describe): Questions on unit exams; lab skill checks

**Has this tool been used before?**

- Yes
- No

If yes, has this tool been altered since its last administration? If so, briefly describe changes made.

A few of the questions are not exactly the same as those submitted with the master syllabus as sample questions.

**IV. Please list the section(s) in which this tool was administered:**

CRNs 11804, 10481, 11661

\_\_\_\_\_

**V. How many students were assessed? 63 - 69**

COURSE ASSESSMENT REPORT

**Results**

**I.** Briefly describe assessment results based on data collected for the course assessed, demonstrating to what extent students are achieving the learning outcomes as found in the master syllabus (see attached).  
Please attach any data collected.

See attached. Students met expectations for Outcomes 1 – 5. I forgot to do Outcome 6.

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**II.** Based on the outcomes outlined in the master syllabus for the course assessed, did students meet expectations of the learning outcomes of that course?

Yes  
 No

Percentage of students meeting outcomes: at least 77%

**III.** What areas of strength and weakness in students' achievement of the learning outcomes of the assessed course (as stated in the master syllabus) did assessment results show?

**Strengths:** All areas of Outcome 3 were strengths.

Lab skills were good.

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**Weaknesses:** Students are baffled by the genetic code.

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COURSE ASSESSMENT REPORT

**Changes influenced by assessment results**

I. If weaknesses were found (see III above) or students did not meet expectations, what action will be taken to address this?

A new homework on the genetic code will be developed.

II. Identify any other intended changes that will be instituted based on results of this assessment activity (check all that apply). Please describe changes and give rationale for change.

Master syllabus

Description and rationale: \_\_\_\_\_

Curriculum

Description and rationale: \_\_\_\_\_

Course syllabus

Description and rationale: \_\_\_\_\_

Course assignments

Description and rationale: \_\_\_\_\_

Course materials (check all that apply)

Textbook

Handouts

Other: \_\_\_\_\_

Description and rationale: \_\_\_\_\_

Teaching methodology

Description and rationale: \_\_\_\_\_

X Other: Outcomes 5, 6.

Description and rationale: Students will be told the criteria used to grade these outcomes. I hope this will help them understand their grade, and help them understand what to aim for in their lab preparations.

COURSE ASSESSMENT REPORT

Future plans

I. Was the assessment tool used effective in measuring student achievement of learning objectives for this course? If not, why?

Reasonably so. Overall scores are very high. I would probably learn more if more students

were unsuccessful.

\_\_\_\_\_  
\_\_\_\_\_

II. If the assessment tool was not effective, what changes will be made in future assessments?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Submitted by:

Name: Anne Heise *Anne Heise* Date: 5/01/2006

Department Chair: Esta Grossman and Bill Nevers *Esta Grossman* Date: 5/11/06

Dean: M. Shover Date: 6/15/06

*Please return completed form to the Office of Curriculum & Assessment, SC 247.*