# Course and Program Assessment Summary

**Division:** Biology  
**Program:** Pre Allied Health  
**Course(s):** General Microbiology  
**Date:** 02/29/12

**Program Core/Required Courses:** Bio 204, Bio 205, Bio 206

**Program Faculty:** Silvio Favoreto Jr.

|   | Student Learning Outcome Statements | 1. Understand and apply laboratory biosafety procedures.  
|   |   | 2. Define microorganisms; describe their main cell components and their functions.  
|   |   | 3. Explore metabolic pathways and apply metabolic parameters in the taxonomy of prokaryotes.  
|   |   | 4. Define the factors that regulate prokaryotic growth and the principles to control the growth of microorganisms.  
|   |   | 5. Understand the principles of bacterial genetics, and its applications in medicine, biotechnology, industry and environmental sciences.  
|   |   | 6. Explore the role of microorganisms in food production and water treatment, as well as their function in ecological systems of soil and water.  
|   |   | 7. Understand the biological features of major bacteria and viruses, as well as the mechanism and application of antimicrobial drugs.  
|   |   | 8. Understand the biological cycle and pathogenic mechanisms of major mycoses and parasitic diseases.  
|   |   | 9. Identify the main components of the immune system and their importance for diagnostic and disease outcome.  
|   |   | 10. Understand the biological mechanisms that lead to antibody production, activation of immune cells and regulation of host-microbe interaction.  

|   | Assessment Methods Plan (attach any assessment instruments, scoring rubrics, SLO mapping diagrams) | Assessment is performed using online quizzes (Blackboard). During the semester the students answer 10 quizzes, each quiz involves laboratory activities and current events in Microbiology. In every quiz I add 2-3 questions related to our SLO’s and/or general themes in Microbiology copied from the bank question on the Review for National Board Tests (phase I and II - Nursing, Medicine and Dentistry)  
|   |   | Results of the selected question on the student’s quizzes are compared with national average in each topic and reported as:  
|   |   | a. Below National Average  
|   |   | b. Meets National Average  
|   |   | c. Exceeds National Average  

<p>|   | Assessment Administration | I started collecting data for SLO#1 and SLO#3 in the Fall of 2011 |</p>
<table>
<thead>
<tr>
<th><strong>Plan (date(s), sample size and selection of course sections, scoring procedures, etc.)</strong></th>
<th>I plan to collect data for 1 year (~240 students), in order to achieve accurate statistical comparisons. Once data collection is completed the data is analyzed and a specific plan is devised to improve or maintain the score achieved by the students. I initiated the data collection for SLO#2 and SLO#4 in the Spring semester of 2012. I will start the collection of data for 2 new SLO’s each following semester, thus, I expected to have all SLO’s within the evaluation cycle in 5 semesters from the beginning date.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4 Assessment Results Summary (attach any Data/Statistical Reports)</strong></td>
<td>SLO#1 – Understanding and applying laboratory biosafety procedures – Quiz#1 (Questions 1,2 and 3). See attached sample. Results – 94.76% of our students answered the questions correctly (average). Our results Exceed the national average. SLO#3 - Explore metabolic pathways and apply metabolic parameters in the taxonomy of prokaryotes. Quiz#2 (Question 5,6 and 7) Results – 50.33% of our students answered the questions correctly (average). Our results meets the national average</td>
</tr>
<tr>
<td><strong>5 Discussion of Assessment Procedure and Results, and Effectiveness of Previous Improvement Plans</strong></td>
<td>SLO#1 – Understanding and applying laboratory biosafety procedures – The lecture in Biosafety is based on the WHO publication on biosafety, which is a reading assignment for the students prior to lecture. I reinforce the importance of biosafety by listing events when biosafety measures were applied (e.g. Bioterrorism attack 2001). SLO#3 - Explore metabolic pathways and apply metabolic parameters in the taxonomy of prokaryotes. Metabolism, DNA Replication, Transcription / Translation and Immunology are the most challenging concepts in General Microbiology. The students have to integrate previous knowledge in chemistry and basic biology to comprehend metabolic pathways.</td>
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</tbody>
</table>
| **6 Recommended Changes & Plans for Implementation of Improvements** | Suggestions to keep and improve student success in SLO#1:  
  a. Incorporate videos (CDC biosafety videos)  
  b. Acquire the new version of WHO biosafety guidelines.  

Suggestions for improvement in student success in SLO#3:  
  c. Improve PowerPoint presentations on the subject  
  d. Incorporate videos (Khan Academy videos)  
  e. Produce Podcasts to reinforce important concepts in metabolism  
  f. Acquire flexible models (DNA and RNA) to better illustrate the process of replication, transcription and translation. |
SLO#1 – Understanding and applying laboratory biosafety procedures

<table>
<thead>
<tr>
<th>Question Title</th>
<th>N</th>
<th>Percent Answering Correctly</th>
<th>Standard Deviation</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Biosafety Manual 1</td>
<td>158</td>
<td>96.63</td>
<td>18.15%</td>
<td>72%</td>
</tr>
<tr>
<td>Laboratory Safety Procedures 2</td>
<td>158</td>
<td>91.01</td>
<td>28.76%</td>
<td>87%</td>
</tr>
<tr>
<td>Laboratory Biosafety Manual 3</td>
<td>158</td>
<td>96.63</td>
<td>18.15%</td>
<td>76%</td>
</tr>
<tr>
<td>Results</td>
<td>158</td>
<td>94.76</td>
<td>0.22</td>
<td>78%</td>
</tr>
</tbody>
</table>

Laboratory Biosafety Manual - 1
A microorganism that usually causes serious human or animal disease and can be readily transmitted from one individual to another. Should be classified as Risk Group_____.

- a. 4
- b. 3
- c. 1
- d. Impossible to know.
- e. 2
Laboratory Safety Procedures 2
If you accidentally spill a bacterial culture on the bench, you should first wipe your bench with a paper towel, discard the contaminated paper towel in a trash can and then spray the disinfectant solution on the area of the spill.

- True - False

Laboratory Biosafety Manual - 3
A microorganism that is unlikely to cause human or animal disease should be classified as Risk group____.

- a. 1
- b. Impossible to know.
- c. 2
- d. 3
- e. 4

SLO#3 - Explore metabolic pathways and apply metabolic parameters in the taxonomy of prokaryotes

<table>
<thead>
<tr>
<th>Question Title</th>
<th>N</th>
<th>Percent Answering Correctly</th>
<th>Standard Deviation</th>
<th>National Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobic Respiration</td>
<td>142</td>
<td>46</td>
<td>28.35%</td>
<td>41%</td>
</tr>
<tr>
<td>Fermentation</td>
<td>142</td>
<td>54</td>
<td>32.12%</td>
<td>60%</td>
</tr>
<tr>
<td>Energy Expenditure</td>
<td>142</td>
<td>51</td>
<td>23.35%</td>
<td>45%</td>
</tr>
<tr>
<td>Results</td>
<td>142</td>
<td>50.33</td>
<td>28</td>
<td>49</td>
</tr>
</tbody>
</table>
The following are features of aerobic respiration. Mark all that apply.

A. Oxygen is used as the final electron acceptor in respiration.
B. Sulfur is used as the final electron acceptor in respiration.
C. Aerobic respiration produces more ATP than the fermentation process.
D. Aerobic respiration happens in bacteria that thrive in 0% oxygen.

Fermentation produces more energy in the form of ATP than Respiration. This affirmative is:

A. Correct
B. False

Active transport of essential elements from outside of the bacterial cell to the inside requires energy expenditure. This energy is provided by either ________________.
A. NADH or NADH₂
B. glucose or FAD⁺
C. ATP or the proton motive force
D. sugar or FADH
E. DNA or ATP