# MCB3023L Principles of Microbiology Lab

**MCB3023L Principles of Microbiology Lab**

**Course Description:** This Laboratory course accompanies MCB3023. Students will learn and have direct experience with fundamental techniques for observation, isolation, cultivation, enumeration, biochemistry, identification, genetics, and control of microbes. Special fee. (4 hr. lab)

Prerequisite: BSC2010, CHM2211L, CHM2211, BSC2011L, BSC2011, BSC2010L

Corequisite: MCB3023

<table>
<thead>
<tr>
<th>Course Competency</th>
<th>Learning Outcomes</th>
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| **Competency 1:** The student will demonstrate proficiency in microscopy and different staining techniques by: | 1. Communication  
  2. Numbers / Data  
  3. Critical thinking  
  4. Information Literacy  
  10. Environmental Responsibility |

1. Demonstrating the proper use and care of the microscope. Explaining the principles of microscopy. Discussing the types of stains and their uses. Demonstrating correct procedures for simple, differential and special staining techniques. Preparing slides for the examination of living microorganisms.

| **Competency 2:** The student will demonstrate mastery of techniques for isolating, culturing and enumerating microorganisms by: | 1. Communication  
  2. Numbers / Data  
  3. Critical thinking  
  4. Information Literacy  
  8. Computer / Technology Usage  
  10. Environmental Responsibility |

1. Demonstrating aseptic techniques for transferring and handling of bacterial cultures. Demonstrating techniques for isolation of pure cultures. Performing serial dilution for plating and counting viable cells. Demonstrating the use of a colony counter. Demonstrating the use of spectrophotometry to measure bacterial growth. Assessing different microbial media for the ability to support microbial growth. Demonstrating the use of selective, differential and enrichment media. Analyzing data obtained from a growth curve experiment. Classifying microorganisms based on their ability to use oxygen for growth. Demonstrating the effects of temperature on bacterial growth. Demonstrating techniques for cultivation and enumeration of bacteriophages.

| **Competency 3:** The student will understand the basic physical and chemical methods of microbial control by: | 1. Communication  
  2. Numbers / Data  
  3. Critical thinking  
  4. Information Literacy  
  10. Environmental Responsibility |

1. Evaluating the effectiveness of heat and pH as microbial control methods. Documenting the
effect of ultraviolet irradiation on bacterial growth. Evaluating the activity of various disinfectants and antiseptics on microbial growth. Evaluating the effects of various antibiotics and chemotherapeutic agents on microbial growth.

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<th>Competency 4: The student will demonstrate knowledge of various biochemical testing procedures for identification of bacteria by:</th>
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| 1. Communication  
2. Numbers / Data  
3. Critical thinking  
4. Information Literacy  
8. Computer / Technology Usage  
10. Environmental Responsibility |

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<th>Competency 5: The student will demonstrate the presence of microorganisms in the environment and in their use in industry by:</th>
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<tr>
<td>1. Assessing the presence of microorganisms in various environments. Conducting hand scrubbing to control bacterial concentration on skin surface. Enumerating viable bacteria in a food and soil samples.</td>
</tr>
</tbody>
</table>
| 1. Communication  
2. Numbers / Data  
3. Critical thinking  
4. Information Literacy  
10. Environmental Responsibility |

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<th>Competency 6: The student will demonstrate knowledge of bacterial genetics and the various mechanisms of gene transfer by:</th>
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</table>
| 1. Communication  
2. Numbers / Data  
3. Critical thinking  
4. Information Literacy  
8. Computer / Technology Usage  
10. Environmental Responsibility |