# Course Description

BIO 111L is a laboratory course that teaches basic microbiological techniques, biochemical and physiological reactions and identification of selected microorganisms.

# University Learning Outcomes (ULO)

* **ULO1:**Knowledge of Human Cultures and the Physical and Natural World
* **ULO2:**Intellectual and Practical Skills
* **ULO3:**Personal and Social Responsibility
* **ULO4:**Integrative and Applied Learning­
* **ULO5:**Immersed in the Critical Concerns of the Sisters of Mercy of the Americas

# Program Learning Outcomes (PLO)

* **PLO1**: Express an appreciation and understanding of a variety of aesthetic, literary, cultural and ideological traditions.(ULO 2, 3)
* **PLO2**: Engage meaningfully in a community of scholarship through inquiry, research and the communication of ideas. (ULO 2, 4)
* **PLO3**: Evaluate historical, political, economic and scientific data while recognizing the interrelatedness of events and processes. (ULO 1, 2, 3, 4)
* **PLO4:** Demonstrate an understanding of the impact of technology on society. (ULO7)
* **PLO5**: Reflect upon the relationship of the Divine to the human experience. (ULO 2, 3, 4)
* **PLO6**: Examine and understand the dynamics of individual and group behavior. (ULO 2, 4)
* **PLO7**: Demonstrate an understanding of quantitative reasoning. (ULO 1, 2, 4)
* **PLO8**: Engage in constructive activities of service to the community in light of the Gospel tradition as experienced through the Mercy charism that shapes the College. (ULO 2, 3, 4)

# Course Learning Outcomes (CLO)

* **CLO1:** Develop an understanding of basic techniques required to identify microbial infections will be assessed through post lab activities, exams, lab practical and case studies. (PLO2, PLO3, PLO7)
* **CLO2:** Demonstrate the ability to use proper microbiological laboratory techniques will be assessed through post lab activities, lab practical and participation. (PLO2, PLO3, PLO4, PLO7)
* **CLO3:** Demonstrate the ability to use basic laboratory techniques to identify unknown microbial species will be assessed through species unknown project and cases studies. (PLO2, PLO3, PLO7)
* **CLO4:** Develop an ability to solve case studies of unknown microbial species will be assessed through case studies. (PLO2, PLO3, PLO7)

# Student Expectations

Students are expected to:

* Ask probing and insightful questions related to course content.
* Make meaningful and relevant connections and application to their own learning process.
* Be productive and contributing members of class discussions.

# Required Course Materials

* Microscope with at least 600X Magnification and oil immersion capability.You may purchase one from HOLSciences or another vendor.
* **HOLSciences Mail-Order Lab Kit #LP-2230-MB-03**
* Go to [www.holscience.com](http://www.holscience.com).
* Under the **Lab Kits** drop-down menu at the top, click on **Student Ordering**.
* When it asks if you have a log-in and password, click **Yes**.
* Enter the following:
  + Login: *C002464*
  + Password: *labpaq*
* Click **Login**.
* Under the **LABPAQS** section in the left-hand column, select **MICROBIOLOGY**.
* Select **Labpaq, Microbiology, 7 labs (SKU: LP-2230-MB-03)** and follow the prompts to complete your order.
* Contact Hands-On Learning immediately if you notice that you have received any missing, spoiled, or damaged materials in your lab kit:
  + Email: info@holscience.com
  + Phone: 866-206-0773
  + HOL Web Form Contact: <http://holscience.com/contact/>
  + Hands-On Learning FAQ Page: <http://holscience.com/orders/faq/>
  + Hands-On Learning Returns and Refunds Policy: <http://holscience.com/orders/returns-refunds/>
  + Hands-On Learning Safety Information: <http://holscience.com/safety/>

# Suggested Point Values

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| --- | --- | --- |
| **Assessment** | **Point Value** | **Due** |
| **Week 1** |  |  |
| Microbiology Laboratory Preparation | 100 |  |
| **Week 2** |  |  |
| Laboratory 1: Microscopy for Microbiology-Use and Function | 200 |  |
| **Week 3** |  |  |
| Laboratory 2: Aseptic Technique and Culturing Microbes | 200 |  |
| **Week 4** |  |  |
| Laboratory 3: Bacterial Morphology and Staining Techniques | 200 |  |
| **Week 5** |  |  |
| Laboratory 4: Bacterial Enumeration- Dilution and Plate Counts | 200 |  |
| **Week 6** |  |  |
| Laboratory 5: Biochemical Testing for Microbial Identification | 200 |  |
| **Week 7** |  |  |
| Laboratory 6: Antibiotic Sensitivity | 200 |  |
| **Week 8** |  |  |
| Laboratory 7: Food Safety | 200 |  |
| **Total Points** | **1500** |  |

**Grading Scale**

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| --- | --- |
| **Grade** | **Range** |
| A | 93-100 |
| A- | 90-92 |
| B+ | 87-89 |
| B | 83-86 |
| B- | 82-80 |
| C+ | 77-79 |
| C | 73-76 |
| C- | 70-72 |
| D+ | 67-69 |
| D | 63-66 |
| D- | 60-62 |
| F | 59 |

# Course Schedule

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| **Week** | **Start** | **End** |
| One | <insert start date> | <insert end date> |
| Two |  |  |
| Three |  |  |
| Four |  |  |
| Five |  |  |
| Six |  |  |
| Seven |  |  |
| Eight |  |  |

# Weekly Learning Modules

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| **Week One: Introduction to Microbiology; Chemistry of Microbiology; and Tools of the Laboratory** | | |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Name and define the three ways to categorize media. | CLO1, CLO2, CLO3, CLO4 | |
| * 1. List and describe the three elements of good microscopy. | CLO1, CLO2, CLO3, CLO4 | |
| * 1. Give examples of a simple, differential, and special stain. | CLO1, CLO2, CLO3, CLO4 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Tutorials**  During this course you will be asked to use and participate in various technologies to complete activities and assignments.  **Review** the tutorials available on Blackboard as needed.  **Click** the **Student Resources** button from the menu on the left. | N/A | N/A |
| **Weekly Participation and Discussion**  The purpose of the weekly discussions is to provide you with a way to synthesize the concepts presented in this course. Each week, you will respond to the discussion questions with a substantive post of 200-to 250-words that addresses all the prompts for the question by 11:59 p.m. EST of the listed due date. By the conclusion of each week, Sunday at 11:59 p.m. EST, you will make at least one substantive comment of 100-to 150-words to three of your classmates’ posts for each assigned discussion question. Your comments must further the discussion by following the RISE Model for meaningful feedback. It is recommended that you check in periodically throughout the week to ensure that you are meeting the participation requirement.  **Review** the RISE Model for Peer Feedback, located on Blackboard. |  |  |
| **HOLCloud Registration**  You will complete the laboratory assignments (listed under the *Laboratory* section in each week) using your Hands-On Learning lab kit and its companion site HOLCloud. Complete the following as early as possible in Week 1:   * After receiving HOLSciences lab kit, confirm all materials are present. * Ensure that you have the following information before attempting registration:   + HOL Lab Kit Code: A Kit Code is located on the white label on the side of your lab kit box, but if you have difficulty locating it, please contact HOLSciences Support (see below).   + HOLCLOUD COURSE LINK: Your instructor will post a link to this course’s instance of HOLCloud in the Announcements forum. * Navigate to HOLCloud using the course link provided by your instructor. * Follow directions as outlined in HOLCloud Getting Started on the HolSciences website to complete the registration using your HOLCloud Kit Code. * For questions, please contact HOLSciences support (email: info@holscience.com, Phone: 866-206-0773).   Once you have registered, complete this week’s lab. As you complete your lab, remember to the following precautions:   * Follow all lab and safety guideline as described in the HOLCloud Lesson procedures. * Wear the appropriate safety gear during labs, including gloves, goggles, and any other designated equipment. * Conduct each lab as described in the HOLCloud Lesson procedures. * Use lab equipment only in the specifically designated manner. | N/A |  |
| ***Supplemental Resources and Activities***  *Explore these optional resources to deepen your understanding.* | ***Alignment*** | ***AIE*** |
| **Adobe Connect Live Discussion**  **Review** [Adobe Connect Resources](https://sites.gmercyu.edu/student-resources/adobe-connect-resources/).  **Participate** in the scheduled live session with the course instructor. This session will provide an overview of the class and discuss the major assignments in the course.  **Prepare** to ask questions concerning the content of the week and the course as a whole.  Note: A recorded lecture will be made available to those who are unable to attend the live session. |  | Live Discussion: lecture and discussion = **1 hour** |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Microbiology Laboratory Preparation**  This course includes a laboratory assignment each week. Post general questions regarding the required course materials, including the lab kit and microscope, in the Required Course Materials Discussion Forum.  **Complete** the following labs on your HOLCloud website. These labs are ungraded but must be completed to unlock the remaining labs in this course:  Getting Started (not graded but required to continue)  Laboratory Safety (not graded but required to continue)  **Complete** the Microbiology Laboratory Preparation lab and accompanying lab report on your HOLCloud website. Your lab report should which should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Microbiology Lab Preparation Lab Report by the end of this week.    **Note:** These labs will take a minimum of 4 hours to complete. | 1.1, 1.2, 1.3 | Complete the lab and review instructor feedback =  **4 hours** |

# Faculty Notes

**Lab Instructions:** As a reminder, faculty must post the **HOLCloud course link** within the Announcements forum for students to access their HOLCloud lab class and to properly register the lab kit’s access code.

**Course Setup**

**General Questions and Discussion Forum:** This course includes a discussion forum for general questions, comments, and concerns. This forum is intended for any course-related commentary not found within a specific weekly discussion. This forum is not graded. Make sure to monitor this forum for student posts. You are encouraged to make an announcement advertising this forum and monitor and post regularly to build engagement.

**Adobe Connect:** Consider posting an announcement asking students to submit any questions or topics they'd like addressed ahead of time. The instructor can then utilize those questions that come up in the first part of the week to tailor the live Adobe Connect class session that would be scheduled toward the later part of the week. That 1-hour synchronous session will allow students the opportunity to go over any questions they had with the homework and clarify any misconceptions they have about the course content. All Adobe Connect sessions should be recorded and a link to the recording be posted to the course page so any student who misses the session can review it later in the week.

*Note:* It is the instructor’s choice as to what day they will schedule the Adobe Connect Live Session, but it is recommended that they schedule this session for Wednesday of the week so students have plenty of time to review their homework prior to the deadline on Sunday.

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| Week Two: Bacteria and Archaea |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Observe bacteria and blood under the microscope. | CLO1, CLO2, CLO3, CLO4 | |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 1: Microscopy for Microbiology**  **Complete** the Microscopy for Microbiology Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Microscopy for Microbiology Lab Report by the end of this week.  **Note:**  This lab will take a minimum of 4 hours to complete. | 2.1 | Complete the lab and review instructor feedback =  **4 hours** |

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| Week Three: Eukaryotes: Parasites and the Fungi |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. List and describe aseptic techniques and culturing methodologies related to the clinical laboratory. | CLO1, CLO2, CLO3, CLO4 | |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 2: Aseptic Technique and Culturing Microbes**  **Complete** the Aseptic Technique and Culturing Microbes Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Aseptic Technique and Culturing Microbes Lab Report by the end of the week.  **Note:** This lab will take a minimum of 3 hours and 30 minutes to complete, and includes a *48-hour (minimum) incubation period.* | 3.1 | Complete the lab and review instructor feedback =  **3 hours,**  **30 minutes** |

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| Week Four: Viruses |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Grow bacteria on media and isolate individual colonies. | CLO1, CLO2, CLO3, CLO4 | |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 3: Bacterial Morphology and Staining Techniques**  **Complete** the Bacterial Morphology and Staining Techniques Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Bacterial Morphology and Staining Techniques Lab Report by the end of the week.  **Note:** This lab will take a minimum of 5 hours and 30 minutes to complete. There is also a *4-day (minimum) incubation period.* | 4.1 | Complete the lab and review instructor feedback =  **6 hours** |

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| Week Five: Chemotherapy and Antimicrobials |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Perform a differential bacterial stain. | CLO1, CLO2, CLO3, CLO4 | |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 4: Bacterial Enumeration- Dilutions and Plate Counts**  **Complete** the Bacterial Enumeration Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Bacterial Enumeration Lab Report by the end of the week.  **Note:** This lab will take a minimum of 3 hours and 45 minutes to complete. It also has a *48-hour (minimum) incubation period.* | 5.1 | Complete the lab and review instructor feedback =  **4 hours,**  **15 minutes** |

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| Week Six: Infectious Diseases of the Skin, Eye, and the Nervous System |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Perform a differential bacterial stain. | CLO1, CLO2, CLO3, CLO4 | |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 5: Biochemical Testing for Microbial Identification**  **Complete** the Biochemical Testing for Microbial Identification Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Biochemical Testing for Microbial Identification Lab Report by the end of the week.  **Note:** This lab will take a minimum of 4 hours to complete. This also includes a *48- to 72-hour (minimum) incubation period.* | 6.1 | Complete the lab and review instructor feedback =  **4 hours,**  **30 minutes** |

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| Week Seven: Infectious Diseases of the Cardiovascular System and the Respiratory System |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Explain the methods used for antibiotic susceptibility testing and perform a Kirby-Bauer susceptibility test. | CLO1, CLO2, CLO3, CLO4 | |
| * 1. Describe how sugar fermentation can be helpful in identifying bacterial infections and perform a Methyl Red Voges-Proskauer Test. | CLO1, CLO2, CLO3, CLO4 | |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 6: Antibiotic Sensitivity Test**    **Complete** the Antibiotic Sensitivity Test Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Antibiotic Sensitivity Test Lab Report by the end of the week.  **Note:** This lab will take a minimum of 2 hours and 30 minutes to complete. This also includes a 48-hour (minimum) incubation period. | 7.1, 7.2 | Complete the lab and review instructor feedback =  **3 hours** |

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| Week Eight: Infectious Diseases Affecting the Gastrointestinal Tract and the Genitourinary System and Capstone Report |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Explain the methods used for antibiotic susceptibility testing and perform a Kirby-Bauer susceptibility test. | CLO1, CLO2, CLO3, CLO4 | |
| ***Laboratory Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Laboratory 7:** **Food Safety**  **Complete** the Food Safety Lab and accompanying lab report on your HOLCloud website. Your lab report should include:   * Photographs of you actually performing the laboratory * References beyond the textbook and the lab manual   **Submit** your completed Food Safety Lab Report by the end of the week.  **Note:** This lab will take a minimum of 3 hours and 30 minutes to complete. This also includes a *48-hour (minimum) incubation period.* | 8.1 | Complete the lab and review instructor feedback =  **4 hours** |

# Breakdown of Academic Instructional Equivalencies

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|  | **AIE Hours** |
| **Week 1** |  |
| Required | 4 |
| Supplemental |  |
| **Week 2** |  |
| Required | 4 |
| Supplemental |  |
| **Week 3** |  |
| Required | 3.5 |
| Supplemental |  |
| **Week 4** |  |
| Required | 6 |
| Supplemental |  |
| **Week5** |  |
| Required | 4.25 |
| Supplemental |  |
| **Week 6** |  |
| Required | 4.5 |
| Supplemental |  |
| **Week 7** |  |
| Required | 3 |
| Supplemental |  |
| **Week 8** |  |
| Required | 4 |
| Supplemental |  |
|  |  |
| **Total Required Hours** | 33.25 |
| **Total Supplemental Hours** |  |
| **Total Hours** | 33.25 |