# Microbiology MICR 202Lab  Course Outcome Guide (COG)

| **Course:** | MICR 202 Microbiology Lab | **Credits:** | 1 | **Date Updated** | April 2016 |
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| **Course Description:** | Prerequisite: C or higher in a course in chemistry or biology or instructor approval. Topics include microbial survey, bacterial structure and physiology, viral and bacterial diseases, immune system, personal and community health. Experiments and exercises in Microbiology. A study of the characteristics and importance of microorganisms with emphasis on their identification, control and relationships to health and disease. This course and BIOL 302 are equivalent. A general survey on the morphology and physiology of selected microbes with major emphasis on the medical aspects of bacteria, viruses, and fungi to humans. Corequisite MICR 202 Microbiology Lecture 1. Gain an appreciation of the diversity of microbes; in the context of this course, “microbes” include diverse organisms, e.g., viruses, bacteria, fungi, protists, and small worms. 2. Describe the structure and function of microbes. 3. Understanding diagnostic tests and procedures used to identify microbes. 4. Understanding the relationship between microbes, disease and the disease process. 5. The role of microbes in microbial ecology. 6. Understanding the roles of microbes in community health. | | | | |

| Concepts and Issues | Process Skills | Assessment Tasks | Intended Outcomes | | |
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| | | | Course | General Education or Program | Institutional |

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| 1. Scientific method scientific notation and metric system.<br><br>2. Use of equipment and instruments.<br><br>3. Bacterial identification including: morphology, clustering patterns and Gram stain.<br><br>3. Microbial genus and species for common diseases.<br><br>4. Microbial media<br><br>5. Handwashing and epidemics<br><br>6. Aseptic technique and common microbial techniques including microbial stains and MPN.<br><br>7. Bacterial identification and physiology using a variety of media, culturing techniques, and staining techniques. | Study effectively<br><br>Use scientific instruments safely and appropriately including microscopes, centrifuge, microfuge, incubator, pipets, micropipet, scale, spectrometers, shaker bath, electrophoresis apparatus,<br><br>Learn the steps of and apply the Scientific method, scientific notation, metric system to various problems.<br><br>Demonstrate the ability to find bacteria and focus and calibrate a microscope.<br><br>Demonstrate the ability to identify bacteria including: morphology, clustering patterns and Gram stain.<br><br>Demonstrate the ability to make microbial media and differentiate between selective and differential media and list examples. Explain when each is used and be able to apply this to microbial identification. | 1. Complete assignments of readings and worksheets, lab worksheets ("portfolio"), term paper, study guides, movies and worksheets.<br><br>2. Lab quizzes.<br><br>3.Lab exams with objective and subjective questions.<br>.<br>4. Lab attendance and participation. | 1. Demonstrate the safe appropriate use of scientific instruments such as a microscope, shaker bath, incubator, micropipet, spectrometer, electrophoresis,<br><br>2. Demonstrate the ability to perform the common techniques in microbiology.<br><br>2. Practice the application of Microbiological information to solve health issues in life (personal and professional).<br><br>3. Use scientific methods to quantitatively describe microbial characteristics, processes and understand their relationship to the identification of microbial species.<br><br>4. Use an understanding of | 1. Students will use reasoning skills to analyze and solve problems.<br><br>2. Students will apply health-related knowledge to physical and mental well-being. | 1. Students will use reasoning skills to analyze and solve problems.<br><br>2. Students will apply health-related knowledge to physical and mental well-being. |

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| 8. Antimicrobial chemicals<br><br>9. ELISA<br><br>10 Western Blot<br><br>. | Demonstrate the effective use of the following microbial techniques: streak plate, dilutions, spread plate, pour plate.. Demonstrate sterile/aseptic technique. Memorize the microbial genus and species for common diseases including shapes, clustering patterns and Gram stain.<br><br>Demonstrate the ability to culture viruses in bacteria and calculate the number of organisms per ml<br><br>Document bacterial growth, Be able to calculate generation time and graph the Optical density (OD) vs log number of cells using spectrometer data. Be able to label the parts of a bacterial growth curve.<br><br>Know and identify the components of cells and explain their functions. Understand the relationship between cell structure and function.<br><br>Describe the processes | | research and laboratory experiences to organize, evaluate, and present data and information to illustrate and articulate basic microbiology concepts.<br><br>5. Practice the application of biological information in other classes | | |

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| | by which materials are transported across cell membranes .<br><br>List and describe the steps of the Gram Stain, Acid Fast stain, and spore stain. List examples of microbes they would be useful for. Explain the purpose of each type of stain. Analyze the results of microbes that are Gram stained and explain the implications. Explain what each reagent's purpose is.<br><br>Describe endospore formation<br><br>Describe and list examples of viruses, bacterial, fungi and Protista and the diseases they cause. Discuss how microbial structure relates to disease treatment and disinfection.<br><br>Describe common infectious diseases/disorders of the human body and the symptoms, causes and | | | | |

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| | treatment.<br><br>Describe and discuss the use of various types of microscopy, stains, and media for study of bacteria.<br><br>Describe the classification system used to identify bacteria<br><br>Bacterial morphology and physiology<br><br>Compare the cell components of eukaryons and prokaryons<br><br>Describe bacterial growth and factors that influence it.<br><br>Demonstrate the ability to perform the MPN test and describe the implications.<br><br>Demonstrate the ability to identify unknown microbes using Gram stain, various differential and selective media.<br><br>Demonstrate the ability to compare and contreast the effectiveness of | | | | |

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| | various antibiotics and disinfectants. Describe alpha, beta and gamma hemoloysis. List examples of organisms that demonstrate each and explain why.<br><br>Demonstrate the ability to perform an ELISA test and a Western Blot. Describe the results and explain why they occur. Describe how each test works. | | | | |