



## **COURSE NUMBER AND TITLE**

NR.110.203 Microbiology with Lab

## **CREDITS**

4 credits

## **PRE- AND COREQUISITES**

None

## **COURSE DESCRIPTION**

Introduces the core concepts and basic principles in microbiology, examining microorganisms and how they interact with humans and the environment. Information regarding classification of microorganisms, characteristics of different cell types and processes critical for cell survival is presented. Topics such as bacterial metabolism, microbial nutrition, genetics, anti-microbial approaches and interaction of pathogenic bacteria with humans are discussed. The course includes a virtual laboratory component designed to complement lecture topics. The course content provides the foundation of general microbiology necessary for students who are interested in applying to health profession programs.

## **OBJECTIVES**

The course objectives are organized in line with the program outcomes. At the end of the course, the student will be able to:

1. Describe and differentiate among the broad classes of microorganisms, including bacteria, protozoa, fungi, helminthes, and viruses.
2. Describe in appropriate terminology the structure, function and characteristics of prokaryotes, eukaryotes and viruses.
3. Explain the metabolic processes necessary for microbe survival, focusing on the different methods of energy acquisition.
4. Describe ways microbes can cause infection and pathology in humans and apply this understanding to infection prevention and control in healthcare settings.
5. Identify strategies employed by antimicrobial drugs and how they specifically target certain pathogens and apply this understanding to antimicrobial treatment, drug resistance and interaction with host.
6. Demonstrate knowledge and skills in common laboratory procedures.

**REQUIRED TEXTBOOKS AND OTHER COURSE MATERIALS**

Cowan, M. K. (2017). *Microbiology: a Systems Approach (5th. ed.)*. New York, NY: McGraw-Hill Higher Education

*Access to McGraw-Hill Connect Plus with LearnSmart/LearnSmart Labs:* Students must purchase access code to Connect Plus in order to access the Lab assessments and other learning materials for this course. Please do not purchase from any 3rd party vendor before reviewing the information presented in the Blackboard course site.

*Access to a reliable computer and internet connection:* It is recommended that students using Windows- based computers should have the Windows 7 or newer operating system, and that Mac users have OS 10.6 or later. We also recommend that you use the most updated version of Firefox or Google Chrome as your web browser for this course. Other operating systems and web browsers may not be fully supported by the Blackboard and Connect software. Please see the Blackboard course site and the Connect website for detailed system requirements.

**SUMMARY OF LEARNING ASSESSMENTS/ASSIGNMENTS**

<b>LEARNING ASSESSMENT/ ASSIGNMENT</b>	<b>COURSE OBJECTIVES ADDRESSED</b>	<b>WEIGHT TOWARD FINAL COURSE GRADE</b>
Module Quizzes, 8 quizzes in total (10pts each)	1, 2, 3, 4, 5, and 6	20%
Lab Assignments, 8 labs in total (15pts each)	1, 2, 3, 4, 5, and 6	20%
Discussion Essay, 2 posts in total (20pts each)	1, 2, 3, and 4	20%
Midterm Exam	1, 2, 3, 4, 5, and 6	20%
Final Exam	1, 2, 3, 4, 5, and 6	20%

**LEARNING ASSESSMENTS/ASSIGNMENTS****Quizzes**

These are timed quizzes that are designed to test your mastery of the material covered in each module and keep you on track in your reading. The quizzes are open book and open notes. One attempt is allowed for each quiz. There are 8 graded quizzes in total in this course. You will find these quizzes under the “Assessment” section of each module.

**Labs**

Laboratory sessions are completed through McGraw Hill Connect. You are required to complete the lab procedures and corresponding questions for each lab assignment. There are eight labs in total. The maximum points possible for each lab session is 100 points. The lab assignment stops recording progress after the due date has passed. If

## 110.203 Microbiology with Lab

you miss a lab session, you will receive 0 for the lab component of that module.

### Discussion Essays

There are two Discussion Board essay posts that are due with Module 5 and Module 10. They can be accessed from the "Discussion Board" link on the left-side menu of the course site. Essay posts are approximately 500 words in length and will require outside research and analysis of a microbiology topic.

### Exams

Comprehensive exams consisting of multiple choice questions will be given to assess student understanding of course content. They are open book, open notes and timed. Only one attempt is allowed for each exam. There are no makeup exams.

## ACADEMIC POLICIES

For a full list of academic policies, please see the current academic catalog and handbook.

## COURSE POLICIES

All course assignments must be turned in by the specified due date and time. Once the due date and time have passed, 10% of the total points you have earned on the assignment will be deducted per day (per 24 hour period). There are no makeup or extra credit assignments allowed, and assignments submitted more than days late will not receive credit. Please contact the course instructor prior to the due date in the case of extenuating circumstances.

## GRADING SCALE

RANGE	LETTER GRADE	GRADE POINT
97 – 100	A+	4.0
93 – 96	A	4.0
90 – 92	A-	3.7
87 – 89	B+	3.3
83 – 86	B	3.0
80 – 82	B-	2.7
77 – 79	C+	2.3
73 – 76	C	2.0
70 – 72	C-	1.7
67 – 69	D+	1.3
63 – 66	D	1.0
60 – 62	D-	0.7
<60	F	0

## HONOR CODE

## 110.203 Microbiology with Lab

Students enrolled in the Johns Hopkins University School of Nursing are expected to conduct themselves in a manner that upholds the values of this institution of higher education. Each student is obligated to refrain from violating academic ethics and maintaining high standards of conduct. In addition, the School of Nursing upholds the professional code of ethics established in the Code of Ethics for Nurses (ANA, 2015). Each student is held accountable for adhering to the American Nurses Association Code of Ethics. For the full Johns Hopkins School of Nursing Honor code, please see the current [academic catalog and handbook](#).

### **EXAM INTEGRITY & STUDENT IDENTITY VERIFICATION**

This course may require the use of technology and/or software to ensure exam integrity and verify the identity of the student taking the exam. Additional information and directions will be provided in the course website.

### **COMMUNICATION POLICY**

Students may communicate with the instructor by email, which is provided in the Contact Information area. The instructor will respond to students within 48 hours. Assignment feedback will be provided to students within two weeks of submission.

All official communication, notices, & announcements will be distributed through student JHU-SON e-mail accounts via blackboard. The student is accountable for checking this account regularly and for all course communication sent to it.

Students are responsible for reading “Netiquette” which is located under Syllabus & Course Info on the Blackboard site. Netiquette provides simple guidelines for civil on-line discourse & behavior, that participants are to follow and expect of one another.

### **DISABILITY SERVICES**

If you have a disability and may require accommodation in this course, please contact the *Office of Student Affairs* at (410) 955-7545 or [SON-DSS@jhu.edu](mailto:SON-DSS@jhu.edu) to discuss your specific needs.

**COURSE SCHEDULE**

<b>Module</b>	<b>Module Subtopics</b>	<b>Learning Activities &amp; Resources</b>	<b>Learning Assignments/ Assessments</b>
<b>Welcome – Start Here</b>	<ul style="list-style-type: none"> <li>• Getting Started</li> </ul>	Familiarize yourself with Blackboard	Discussion Board: Introduce Yourself Avoiding Plagiarism Module
<b>Module 1: Introduction to Microbes &amp; the Tools to Study Them</b>	<ul style="list-style-type: none"> <li>• Organism taxonomy</li> <li>• Macromolecules</li> <li>• 5 I's of microbial culture</li> </ul>	<p>Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i>. New York, NY: McGraw-Hill Higher Education</p> <ul style="list-style-type: none"> <li>• Chapter 1: The Main Themes of Microbiology</li> <li>• Chapter 3: Tools of the Laboratory</li> </ul> <p>Review the lecture materials posted in the module for this week.</p>	Module 1 Quiz Module 1 Lab: Microscopy Microbiology
<b>Module 2: Bacteria &amp; Archaea</b>	<ul style="list-style-type: none"> <li>• Bacterial Structure and Arrangements</li> <li>• Introduction to Archaea</li> </ul>	<p>Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i>. New York, NY: McGraw-Hill Higher Education</p> <ul style="list-style-type: none"> <li>• Chapter 4: Bacteria and Archaea</li> </ul> <p>Review the lecture materials posted in the module for this week.</p>	Module 2 Quiz Module 2 Lab: Cell Anatomy
<b>Module 3: Eukaryotic Cells and Microorganisms</b>	<ul style="list-style-type: none"> <li>• Eukaryotic cell classification</li> <li>• Eukaryotic structures</li> </ul>	<p>Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i>. New York, NY: McGraw-Hill Higher</p>	Module 3 Quiz Module 3 Lab: Aseptic Technique

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
	and cellular arrangement • Eukaryotic life cycles and reproduction	Education • Chapter 5: Eukaryotic Cells and Microorganisms  Review the lecture materials posted in the module for this week.	
<b>Module 4: An Introduction to the Viruses</b>	• Classification of viruses • Capsids and envelopes • Viral life cycle	Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i> . New York, NY: McGraw-Hill Higher Education • Chapter 6: An Introduction to the Viruses  Review the lecture materials posted in the module for this week.	Module 4 Quiz Module 4 Lab: Staining
<b>Module 5: Microbial Nutrition, Ecology and Growth</b>	• Nutrient sources • Environmental factors that influence microbes Microbial Growth	Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i> . New York, NY: McGraw-Hill Higher Education • Chapter 7: Microbial Nutrition, Ecology and Growth  Review the lecture materials posted in the module for this week.	Module 5 Discussion Board Essay
<b>Exam 1</b>	None	Review content in Module 1 through Module 5	
<b>Module 6: Microbial Metabolism</b>	• Metabolism, anabolism, and catabolism	Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i> . New York, NY: McGraw-Hill Higher	Module 6 Quiz Module 6 Lab: Cellular Respiration

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
	<ul style="list-style-type: none"> <li>• Redox reaction</li> <li>• Bacterial and eukaryotic respiration</li> </ul>	Education <ul style="list-style-type: none"> <li>• Chapter 8: Microbial Metabolism</li> </ul> Review the lecture materials posted in the module for this week.	
<b>Module 7: Microbial Genetics</b>	<ul style="list-style-type: none"> <li>• Transcription, translation and the genetic code</li> <li>• Genotype and phenotype</li> <li>• Horizontal gene transfer</li> <li>• Gene regulation</li> </ul>	Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i> . New York, NY: McGraw-Hill Higher Education <ul style="list-style-type: none"> <li>• Chapter 9: Microbial Genetics</li> </ul> Review the lecture materials posted in the module for this week.	Module 7 Quiz Module 7 Lab: Bacterial genetics
<b>Module 8: Antimicrobial Agents</b>	<ul style="list-style-type: none"> <li>• Chemical control agents</li> <li>• Antimicrobial drugs</li> <li>• Antimicrobial resistance</li> </ul>	Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i> . New York, NY: McGraw-Hill Higher Education <ul style="list-style-type: none"> <li>• Chapter 11: Physical and Chemical Control of Microbes</li> <li>• Chapter 12: Antimicrobial Treatment</li> </ul> Review the lecture materials posted in the module for this week.	Module 8 Quiz Module 8 Lab: Control of Microbial Growth
<b>Module 9: Microbe-Human Interactions</b>	<ul style="list-style-type: none"> <li>• Colonization, infection and disease</li> <li>• Opportunistic pathogens</li> <li>• Disease epidemiology</li> </ul>	Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i> . New York, NY: McGraw-Hill Higher Education <ul style="list-style-type: none"> <li>• Chapter 13: Microbe-Human</li> </ul>	Module 9 Quiz Module 9 Lab: Medical Microbiology

110.203 Microbiology with Lab

Module	Module Subtopics	Learning Activities & Resources	Learning Assignments/ Assessments
		<p>Interactions</p> <p>Review the lecture materials posted in the module for this week.</p>	
<p><b>Module 10: Non-Specific Host Immunity</b></p>	<ul style="list-style-type: none"> <li>• Innate immune defenses</li> <li>• Anatomical barriers</li> <li>• Chemical defenses</li> <li>• Cellular defenses</li> </ul>	<p>Cowan, M. K. (2017). <i>Microbiology: a systems approach (5th. ed.)</i>. New York, NY: McGraw-Hill Higher Education</p> <ul style="list-style-type: none"> <li>• Chapter 14: Host Defenses I</li> </ul> <p>Review the lecture materials posted in the module for this week.</p>	<p>Module 10 Discussion Board Essay</p>
<p><b>Exam 2</b></p>	<p>None</p>	<p>Review content in Module 1 through Module 10</p>	