

# **COURSE NUMBER AND TITLE**

NR.110.209 Advanced Microbiology with Lab

# CREDITS

4 credits

## **PRE- AND COREQUISITES**

None

## **COURSE DESCRIPTION**

Advanced Concepts in Medical Microbiology with Lab is a 10-week upper division course that explores advanced topics in molecular microbiology, microbial pathogenesis, and the immune system. Concepts covered include microbial cell structure and function with an emphasis on mechanisms of pathogenesis, as well as microbe-host interactions and disease. The virtual laboratory component of the course will introduce the application of immunological and molecular microbiological techniques for the isolation, identification, and characterization of clinically relevant microbes. This course is appropriate for students with a background in the biological sciences who require an upper division microbiology course as a prerequisite to health professional programs. It is also appropriate for students who have already taken Introductory Microbiology with Lab who are interested in furthering their knowledge of medical microbiology.

## **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. Differentiate microbes by their taxonomy, morphology, genetics, and metabolism.
- 2. Apply the principles of pathogenicity, disease, and epidemiology to clinically relevant microbes.
- 3. Explain how microbes interact with their hosts and environments and how alterations in these dynamics affect health and disease.
- 4. Propose diagnostic workups and potential treatments based on the clinical presentation of common infectious diseases.
- 5. Perform essential microbiology laboratory techniques through a virtual lab platform and evaluate their indications and results.

# **REQUIRED TEXTBOOKS AND OTHER COURSE MATERIALS**

*Textbook (included with Pearson+):* 

Tortora, G. L., Case, C.L., Bair, W. B., Weber, D., Funke, B.R. (2019). *Microbiology: An Introduction (14<sup>th</sup> ed).* Pearson.

Access to Pearson+: Students must purchase access code to Pearson+ in order to access the assessment items and other learning materials for this course. Please do not purchase from any 3rd party vendor before reviewing the information presented in the Canvas course site.

Access to a reliable computer and internet connection: It is recommended that students have a recent operating system. We also recommend that you use the most updated version of either Mozilla Firefox or Google Chrome as your web browser for this course. Other operating systems and web browsers may not be fully supported by the Canvas or Pearson +. Please see the Canvas course site and for detailed system requirements.

#### LEARNING COURSE WEIGHT TOWARD DUE DATE ASSESSMENT/ **OBJECTIVES** FINAL COURSE ASSIGNMENT ADDRESSED GRADE 5% Prerequisite N/A Module 1 Program Compliance Module Quizzes, 10 All 25% Monday 11:59 PM ET: See quizzes in total course syllabus for dates All 20% Monday 11:59 Lab Assignments, 8 labs in total PM ET; See course svllabus for dates 25% Module 5 Midterm Exam All Final Exam All 25% Module 10

### SUMMARY OF LEARNING ASSESSMENTS/ASSIGNMENTS

## LEARNING ASSESSMENTS/ASSIGNMENTS

#### Quizzes

At the end of each module there is a timed, multiple-choice quiz designed to test your mastery of the material covered in the module. The quizzes are open book and open notes but must be completed independently. One attempt is allowed for each quiz. There are ten graded quizzes in total in this course. You will find these quizzes under the "Assessment" section of each module.

#### Labs

Interactive laboratory sessions are performed through Pearson+. The labs are designed

to reenforce your understanding of the learning material in each module through realworld scenarios. There are eight labs in total.

#### Exams

There are two comprehensive, timed, multiple-choice exams. The Midterm Exam tests your mastery of material from Modules 1-5 and the Final Exam tests your mastery of material from Modules 6-10. The exams are open book and open notes but must be completed independently.

#### **GRADING SCALE**

RANGE	LETTER GRADE	GRADE POINT
07 400	Α.	4.0
97 – 100	A+	4.0
93 – 96	A	4.0
90 – 92	A-	3.7
87 – 89	B+	3.3
83 – 86	В	3.0
80 – 82	В-	2.7
77 – 79	C+	2.3
73 – 76	С	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

### **ACADEMIC POLICIES**

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

### **COURSE POLICIES**

The course is asynchronous, and students may work ahead. 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 10 days late will not receive credit. Please contact the course instructor prior to the due date in the case of extenuating circumstances.

### **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 Canvas. 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 Canvas site. Netiquette provides simple guidelines for civil on-line discourse & behavior, that participants are to follow and expect of one another.

## HONOR CODE

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.

## **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 <u>SON-DSS@jhu.edu</u> to discuss your specific needs.

# COURSE SCHEDULE

Module	Module Subtopics	Learning Activities, Formative Assessment & Resources	Evaluative Assessment
Welcome – Start Here Prior to <i>Module 1</i>	Getting Started	Familiarize yourself with Canvas and Pearson+	Discussion Board: Introduce Yourself Prerequisite Program Compliance Modules <b>Due: Prior to Module 1</b> Dates vary by term, see course syllabus
Module 1: Fundamentals of Microbiology	<ul> <li>Prokaryotes, eukaryotes, viruses</li> <li>Microbe structure and function</li> <li>Microscopy</li> </ul>	Microbiology: An Introduction(14 <sup>th</sup> Edition), Chapter 1 (pp 1-4, 16-19): The Microbial World and You; Chapter 4 (pp 72-99): Functional Anatomy of Prokaryotic and Eukaryotic Cells; Chapter 13 (pp 363-369): Viruses, Viroids, and Prions Review the lecture materials posted in the module for this week.	Module 1 Lab: Microscopy Module 1 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus
<b>Module 2:</b> Microbial Metabolism and Antimicrobial Approaches	<ul> <li>Microbial growth</li> <li>Physical and chemical methods of microbial control</li> </ul>	Microbiology: An Introduction(14 <sup>th</sup> Edition), Chapter 7: Control of Microbial Growth Review the lecture materials posted in the module for this week.	Module 2 Lab: Physical Control of Microbial Growth Module 2 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus
<b>Module 3:</b> Pathogenicity, Disease, Epidemiology, and Antimicrobial Drugs	<ul> <li>Infectious disease</li> <li>Microbiome</li> <li>Healthcare-associated infections</li> </ul>	Microbiology: An Introduction(14 <sup>th</sup> Edition), Chapter 15 (pp 427-445): Microbial Mechanisms of Pathogenicity; Chapter 14 (pp 401-417): Principles	Module 3 Lab: Chemical Control of Microbial Growth Module 3 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course

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	• Epidemiology	of Disease and Epidemiology Review the lecture materials posted in the module for this week.	syllabus
Module 4: The Immune Response to Microbes: Innate Immunity	<ul> <li>Host defenses</li> <li>Microbiome</li> <li>Immune cells</li> <li>Physiologic response to infection</li> </ul>	Microbiology: An Introduction(14 <sup>th</sup> Edition), Chapter 16: Innate Immunity: Nonspecific Defenses of the Host Review the lecture materials posted in the module for this week.	Module 4 Lab: HHMI Lab Module 4 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus
<b>Module 5:</b> The Immune Response to Microbes: Adaptive Immunity	<ul> <li>Cytokines</li> <li>Humoral Immunity</li> <li>Cellular Immunity</li> <li>Immunologic memory</li> </ul>	<i>Microbiology: An Introduction</i> (14 <sup>th</sup> Edition), Chapter 17: Adaptive Immunity: Specific Defenses of the Host Review the lecture materials posted in the module for this week.	Module 5 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus *Note that there is no lab assignment due this week-take this time to prepare for the exam
Exam 1 (During Module 5)	None	Review content in Module 1 through Module 5	Due: Monday, 11:59 p.m. ET; Dates vary by term, see course syllabus
<b>Module 6:</b> Microbial Diseases of the Skin and Eyes	<ul> <li>Anatomy</li> <li>Microbiome</li> <li>Portals of entry</li> <li>Diseases and common causative microbes</li> </ul>	<i>Microbiology: An Introduction</i> (14 <sup>th</sup> Edition), Chapter 21: Microbial Diseases of the Skin and Eyes Review the lecture materials posted in the module for this week.	Module 6 Lab: Gram stain Module 6 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus

Module	Module Subtopics	Learning Activities, Formative Assessment & Resources	Evaluative Assessment
<b>Module 7:</b> Microbial Diseases of the Nervous, Cardiovascular, and Lymphatic Systems	<ul> <li>Anatomy</li> <li>Microbiome</li> <li>Portals of entry</li> <li>Diseases and common causative microbes</li> </ul>	Microbiology: An Introduction(14 <sup>th</sup> Edition), Chapter 22: Microbial Diseases of the Nervous System; Chapter 23: Microbial Diseases of the Cardiovascular and Lymphoid Systems Review the lecture materials posted in the module for this week	Module 7 Lab: Biochemical Tests: Gram Positive Module 7 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus
<b>Module 8:</b> Microbial Diseases of the Respiratory System	<ul> <li>Anatomy</li> <li>Microbiome</li> <li>Portals of entry</li> <li>Diseases and common causative microbes</li> </ul>	<i>Microbiology: An Introduction</i> (14 <sup>th</sup> Edition), Chapter 24: Microbial Diseases of the Respiratory System Review the lecture materials posted in the module for this week.	Module 8 Lab: Acid-Fast Stain Module 8 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus
<b>Module 9:</b> Microbial Diseases of the Digestive System	<ul> <li>Anatomy</li> <li>Microbiome</li> <li>Portals of entry</li> <li>Diseases and common causative microbes</li> </ul>	<i>Microbiology: An Introduction</i> (14 <sup>th</sup> Edition), Chapter 25: Microbial Diseases of the Digestive System Review the lecture materials posted in the module for this week.	Module 9 Lab: Biochemical Tests: Gram Negative <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus
Module 10: Microbial Diseases of the Urinary and Reproductive Systems	<ul> <li>Anatomy</li> <li>Microbiome</li> <li>Portals of entry</li> <li>Diseases and common causative microbes</li> </ul>	<ul> <li>Microbiology: An Introduction(14<sup>th</sup> Edition), Chapter 26: Microbial Diseases of the Urinary and Genital Systems</li> <li>Review the lecture materials posted in the module for this week.</li> </ul>	Module 10 Quiz <b>Due: Monday, 11:59 p.m. ET;</b> Dates vary by term, see course syllabus *Note that there is no lab assignment due this week-take this time to prepare for the exam

Module	Module Subtopics	Learning Activities, Formative Assessment & Resources	Evaluative Assessment
Exam 2 (during Module 10)	None	Review content in Module 6 through Module 10	Due: Monday, 11:59 p.m. ET; Dates vary by term, see course syllabus