湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	General Microbiology
Course Code	BIOL 3163
Semester	Summer 2025
Course Length	10 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	BIOL 2413 Principles of Genetics and Molecular Biology
Antirequisite	BIOL 3161 General Microbiology (5 Weeks)

Course Description:

The purpose of this course is to introduce the student to the general study of microorganisms. It provides an in-depth exploration of microbiology, covering the following key areas: microbial structure and function (including cellular organization, metabolism, and growth), microbial genetics, microbial ecology, microbial diversity (prokaryotes, eukaryotes, and viruses), host-microbe interactions, and clinical microbiology (focusing on immunity, pathogenicity, epidemiology, and disease control).

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical Thinking Skills** – Students will engage in analytical thinking, demonstrating the ability to critically evaluate, synthesize, and apply knowledge to complex problems, and construct well-reasoned solutions and arguments.
- **Independent Research and Inquiry** – Students will conduct independent research, utilizing academic resources to explore relevant topics, formulating research questions, analyzing data, and presenting findings in a coherent, scholarly manner.
- **Problem-Solving and Application** – Students will apply theoretical concepts and methodologies learned in the course to real-world problems, demonstrating the ability to develop practical solutions informed by academic inquiry.
- **Global and Cultural Awareness** – Students will gain awareness of the global and cultural contexts relevant to the course, appreciating diverse perspectives and considering the implications of their studies in a broader, international context.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- demonstrate an understanding of the structural similarities and differences among microbes and the unique structure/function relationships of prokaryotic cells;
- comprehend the fundamentals of molecular microbiology;
- appreciate the diversity of microorganisms and microbial communities and recognize how microorganisms solve the fundamental problems their environments present;
- recognize how the underlying principles of epidemiology of disease and pathogenicity of specific microbes affect human health.

Textbooks/Supplies/Materials/Equipment/ Technology or Technical Requirements:

Textbooks:

- Willey, et al. *Prescott's Microbiology,* 12th Edition. McGraw-Hill.
- M. K. Cowan. *Microbiology Fundamentals: A Clinical Approach*, 4th edition. McGraw Hill.

Lab manual:

James G. Cappuccino. *Microbiology: A Laboratory Manual*, 12th edition. Pearson.

Course Requirements:

Quizzes (4) – 20%

Quizzes will be conducted at strategic points in the course to reinforce essential concepts and test students' understanding of lecture and lab material. These will include a mix of multiple-choice, short-answer, and problem-solving questions, designed to evaluate students' retention and comprehension of topics like microbial metabolism, genetics, and diversity.

Case Studies and Problem Sets – 15%

Students will tackle real-world microbiological problems and case studies, which will require applying theoretical knowledge to practical scenarios. These assignments may include analyzing genetic mutations, interpreting epidemiological data, and solving microbiological challenges related to public health and environmental issues.

Laboratory Work (Reports and Experiments) – 25%

The laboratory component is a crucial part of the course, designed to develop hands-on skills in microbiological techniques. The laboratory work is made up of 2 parts:

- Experiments (10%): Students will perform experiments such as bacterial staining, growth curve analysis, viral assays, and antimicrobial sensitivity testing.
- Reports (15%): Lab reports will be graded on the clarity of scientific writing, accuracy of data analysis, and critical interpretation of experimental results.

Midterm Exam – 20%

The midterm exam will cover the first half of the course, focusing on foundational microbiological principles, microbial structure and function, metabolism, and genetics. The exam format will include multiple-choice, short-answer, and essay-style questions that test both conceptual understanding and analytical skills.

Final Exam – 30%
The final exam will be comprehensive, covering the entire course with an emphasis on microbial diversity, clinical microbiology, and immunology. The exam will assess students' ability to synthesize knowledge, apply concepts to novel situations, and critically evaluate microbiological phenomena.

Assessments: Activity	**Percent Contribution**
Quizzes	20%
Case Studies and Problem Sets	15%
Laboratory Work	25%
Midterm Exam	20%
Final Exam	30%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Grade	**Percentage of available points**
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D	64-69
D-	60-63
F	0-59

Course Schedule:
The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, major ones provided in writing.

BIOL 3163 Schedule		
Lecture	Topic	Readings
L1	Introduction to Microbes and Their Building Blocks History of Microbiology	*Cowan* Ch. 1
L2	Naming, Classifying and Identifying Microorganisms Macromolecules: Superstructures of Life	*Cowan* Ch. 1
L3	Bacteria Prokaryotic Structure Form and Function of Bacteria The wall and Membrane(s) **Lab 1**	*Cowan* Ch. 3
L4	Bacterial Internal Structures Classification Systems for Bacteria	*Cowan* Ch. 3
L5	Microbial Nutrition and Growth Environmental Factors That Influence Microbes	*Cowan* Ch. 6
L6	Bacterial Growth **Lab 2**	*Cowan* Ch. 6
L7	Microbial Metabolism	*Cowan* Ch. 7

	Metabolism and the Role of Enzymes The Pursuit and Utilization of Energy	
L8	Bacterial Catabolism	*Cowan* Ch. 7 *Willey Ch. 11*
L9	Bacterial Anabolism and Crossing Pathways of Metabolism	*Cowan* Ch. 7 *Willey Ch. 12*
L10	Microbial Genetics Introduction to Genetics and Genes Transcription and Translation Genetic Regulation of Protein Synthesis	*Cowan* Ch. 8
L11	DNA Replication and Recombination events Mutations: Changes in the Genetic Code	*Cowan* Ch. 8
L12	**Midterm Exam**	/
L13	Bacterial Diversity and Evolution **Lab 3**	*Willey* Ch. 19
L14	Viral Structure and Multiplication Virus and Prion Structure and Replication Viral Diversity	*Cowan* Ch. 5 *Willey* Ch. 26
L15	Models of Viral Multiplication Techniques in Cultivating and Identifying Animal Viruses Viruses and Human Health **Lab 4**	*Cowan* Ch. 5
L16	Eukaryotic Cells and Microorganisms Structures of the Eukaryotic Cells	*Cowan* Ch. 4
L17	The Fungi The Protozoa **Lab 5**	*Cowan* Ch. 4
L19	Interactions Between Microbes and Humans The Human Host Progress of an Infection	*Cowan* Ch. 11
L20	The Human-Microbe Ecosystem **Lab 6**	*Willey* Ch. 34
L21	Infection and Pathogenicity	*Willey* Ch. 35
L22	Epidemiology	*Cowan* Ch. 11
L23	Host Defenses I: Overview and Nonspecific Defenses Defense Mechanisms of the Host The Second and Third Lines of Defense	*Cowan* Ch. 12
L24	Host Defenses II: Specific Immunity and Immunization Specific Immunity: The Third and Final Line of Defense Vaccination	*Cowan* Ch. 13
L25	Disorders in Immunity Types of Allergic Reactions	*Cowan* Ch. 14
/	**Final Exam**	/

Accommodation Statement:

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

Lab Policies

- **Attendance:** Attendance at all lab sessions is mandatory. Missing a lab without a valid excuse will result in a grade penalty.
- **Late Reports:** Late lab reports will incur a 10% penalty per day.
- **Safety:** Proper lab attire (lab coat, gloves, safety goggles) is required at all times. Failure to follow safety protocols may result in dismissal from the lab.
- **Academic Integrity:** Plagiarism and fabrication of data will not be tolerated and will result in disciplinary action.

Lab Materials

- Lab manual (provided during class).
- Lab notebook for recording data and observations.
- Personal protective equipment (lab coat, gloves, safety goggles).

Attendance and Expectations

All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates

All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work

The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs, and Disabilities
Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.