

MICROBIOLOGY (BIOL 275)



Number of Credits: 3 credits

Prerequisites: BIOL141 or 141H or BIOL 100 or 100H

Semester/Year: Summer I 6 week session-2015

Class Time/Location: Mon/Tues/Thurs 10:00AM-12:15 PM Performing Arts & Humanities 234

Course Instructor: Ms. Susan Schreier

Office: Public Policy #406

Office Hours: Directly before or after class/or by appointment

Office Phone: 410-455-1267

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COURSE DESCRIPTION: *Welcome to Biology 275; Microbiology Lecture!* In this course you will be learning about the basic biology, biochemistry, and genetics of microbes, followed by their role in the environment, food production, sanitation, diseases and host organism's defenses.

REQUIRED TEXTBOOK: *Microbiology, A Human Perspective*, 7th ed. By Nester, Anderson and Roberts. McGraw-Hill, 2012.

*Please note: An online resource called "ConnectPlus" is available that accompanies this textbook (www.mcgrawhillconnect.com). This is **NOT required** for this course. However, it contains self-quizzes, tutorials, videos, etc. that may be a helpful addition for you in this class. In addition, with ConnectPlus you will get access to the eBook version of the text.*

BLACKBOARD: All relevant information, communication and material for the course will be posted to the class Blackboard site. Blackboard will also be used to make course announcements, to administer quizzes, and to give you resources other than the lecture and textbook. Announcements will be emailed from Blackboard for which you will be responsible. Make sure your UMBC email address is working and that you check it frequently!

Microbiology Learning Outcomes

With the successful completion of this course the student will be able to:

- Outline the historical origins of microbiology including its interrelationship with the theory of biogenesis and germ theory of disease.
- Identify the major groups of microorganisms according to their taxonomic classification and describe their main characteristics including their medical significance.
- Compare and contrast prokaryotic and eukaryotic cells in terms of their structure, replication of DNA, and flow of genetic information within the cell.
- Relate how the biological features of a particular microbe enable it to cause disease.
- Describe general patterns of regulation of gene expression, recombination of genetic information, and exchange of genetic information.
- Identify the physical and chemical factors that influence the growth of microorganisms.
- Explain common physical and chemical methods used to inactivate or limit the growth of microorganisms, including antimicrobial therapies.
- Summarize the modes of transmission of disease including pathogenic mechanisms used by microbes to invade and damage the host.
- Describe the nonspecific and specific immune defenses of the host against microbial infection.
- Demonstrate the relationship between science and society by identifying and discussing topical/ethical issues in microbiology.

What you should already know:

The concepts and information presented in this course should be readily comprehensible since you have fulfilled the pre-requisite as stated in the UMBC catalog (BIOL 141 or equivalent) and you are expected to be familiar with the following terms and concepts:

- Atoms, molecules, and elements
- Chemical bonds: Covalent bond, ionic bond, hydrogen bond; pH
- Hydrophobic and hydrophilic interactions, polar and non-polar compounds
- Carbohydrates: Monosaccharides, Disaccharides, and Polysaccharides
- Lipids: Fatty acids, triglycerides, phospholipids, and sterols
- Proteins: Amino acids; primary, secondary, tertiary, and quaternary structure
- Nucleic acids: DNA, RNA (mRNA, tRNA, rRNA)
- Membrane structure: Lipid bilayer, membrane proteins, and fluid mosaic model
- Respiration and Photosynthesis
- Enzymes
- DNA Replication
- Gene Expression and Central Dogma: Transcription, and Translation

Note: *If you have trouble with this information, you should review it on your own; otherwise, it is strongly recommended that you drop the class and return when you have learned these basic concepts.*

COURSE INFORMATION AND EXPECTATIONS: On the last page is the tentative lecture schedule and reading assignments. We urge you to attend each of the lectures and to read the assigned material. You will not succeed in the course without doing both.

READING ASSIGNMENTS: The textbook we chose is an excellent one, both for the course, and for reference later in your career. We urge to keep up with your reading since it complements and reinforces lecture material. A good guideline is to do 2 ½ hours of out-of-class work for each class hour. No kidding! You will gain much more insight if you've done the reading before the lecture pertaining to that material. Use the textbook's index and glossary liberally. We may assign additional reading assignments in class or through Blackboard.

LECTURES: Take good notes. The PowerPoint slides we use in our presentations will merely highlight and outline what is being said, and should not be considered the only information learned. The slides will be made available on Blackboard for downloading and printing prior to each lecture. **Use of a laptop, tablet, or phone during lecture will not be permitted.** We do not expect you to be sponges, absorbing lecture material and squeezing it out during the exams. To do well, you will need to understand the concepts and to be able to think critically. Ask questions during lecture. If you do not understand something, feel free to visit during office hours or schedule an appointment. If you miss lecture, do not rely solely on lecture slides to cover the missed material but make sure you obtain notes from a classmate.

CELL PHONE POLICY: Please turn cell phones off or on silent during lecture. They are disruptive to us and to your fellow students.

GRADING: Your grade will depend upon your performance on three exams and a comprehensive final, as well as your performance on quizzes and class participation. The final will include material covered after Exam III, and the comprehensive part.

Exam I	20%
Exam II	20%
Exam III	20%
Final Exam	25%
Reading Quizzes	10%
Class participation	5%
TOTAL	100%

Grades for this course will be determined from the following scale:

$\geq 90\%$	= A
80%-89.9%	= B
70%-79.9%	= C
60%-69.9%	= D
$\leq 59.9\%$	= F

Note: If your grade falls within the ranges listed above, you are ASSURED of that letter grade. Depending on the class mean at the end of the semester, this range may be adjusted. In other words, if the course average is lower than the middle C range (i.e. 75%), we will adjust the ranges to reflect that.

EXAMINATIONS: The dates for each exam are listed on the lecture schedule. We expect everyone to take them as scheduled! If you become ill or a family emergency arises, let us know before the exam. Use email to contact me, or call the Biology Department secretary (410-455-2261). Make-up exams will be given only with a valid written excuse. Quizzes will be given through the course Blackboard web page. Scores will be posted in the online grade book and the course Blackboard page. Exams will not take the entire class period. Following each exam there will be a short break before class resumes.

The final exam is scheduled for the last day of class. We expect everyone to take the final in class as scheduled! If you become ill or a family emergency arises, let us know before this exam. Call the Biology secretary (410-455-2261). A make-up exam will be given only with a valid written excuse.

QUIZZES

You will be expected to take the online reading quizzes on Blackboard on assigned reading material before that particular class where we begin a new chapter. You will not be able to earn credit for reading quizzes once the due date has passed. Your lowest quiz score will be dropped.

CLASS PARTICIPATION

You will receive participation points for answers to in-class questions and in-class activities. You must be present to receive participation points. Details will be explained in class.

How Can Each and Every One of You Succeed in this Course?

First, get rid of the notion that you will learn all you need to know during class time. For science classes, educators have estimated that for every hour of in-class/or out of class lecture time, you should spend 2-3 hours of time on your own reviewing course content material. That is probably about right because you are responsible for your own learning and understanding. We cannot learn the information and understand the concepts for you and we cannot make you learn and understand simply through lecture. So the question becomes, how can you most profitably spend these hours outside class? The following list summarizes some strategies I have used as a student and that other students have shared with me.

1. **Read the textbook before class.** Read it through once to identify the "big ideas", then for the details that can't always be covered during the allotted class time. Don't highlight every line (this is painting, not studying). Select key concepts and definitions. Keep the textbook closed during lecture.
 2. Go over your **lecture notes** after each class. Use your text to fill in missed details and answer questions that you have. But if a question still persists after you have tried to answer it yourself - ASK YOUR INSTRUCTOR. Stop by my office or send me an email. Each class builds on information in preceding classes. If a key concept is missed early on, new information will be confusing. Most importantly, organize the material for yourself in terms of importance. It is critical that you know the difference between the large concepts and fine detail of what you are studying, otherwise the semester becomes nothing more than a long boring series of "facts" with no connections.
 3. Review the **chapter objectives** online that are provided by the instructor. Some of these WILL appear on the exams.
 4. **Study Resources:** Textbook study guides, questions, and activities throughout the book and especially at the end of each chapter. Improve your comprehension by using the Learning Objectives and any online resources that may be posted to blackboard.
 5. **Organize a study group.** Ask questions of one another. Try to figure out what questions we might ask on an exam. Analyze each answer as a group and work together to arrive at complete and accurate answers to the questions. Most importantly, take turns TEACHING TO one another. Studies show the best way to learn for most people is to teach the material.
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STUDENT ACADEMIC INTEGRITY:

Academic Integrity: Information on the UMBC policy on academic integrity can be found at: http://www.umbc.edu/undergrad_ed/ai/students.html

While we encourage you to study together and talk to each other about the course and assignments, ultimately anything you submit in this course with the expectation that it will be graded should be your own work. Unless stated otherwise for a particular assignment, there are no “group projects” in this course.

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, dishonesty, plagiarism, and helping others to commit these acts (facilitating) are all forms of academic dishonesty, and they are wrong. These terms, with examples, are defined in a two-page excerpt from the Undergraduate Student Academic Conduct Policy that we have posted in the Course Documents section of our Blackboard Homepage. You are required to read this document as one of your assignments for this week.

Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. As faculty members of this university, we are committed to fulfill our responsibility to maintain high standards of academic integrity in our course by reporting and penalizing any acts of academic misconduct occurring in this class in accordance with the Undergraduate Student Academic Conduct Policy.

Anyone charged with a violation of the UMBC policy on academic integrity in any aspect of this course that is graded, will, at a minimum, receive a grade of zero for that exam, quiz, or assignment and a letter grade deduction in the course. Academic misconduct means CHEATING, FABRICATION, FACILITATING ACADEMIC MISCONDUCT, PLAGIARISM, OR DISHONESTY BY A STUDENT.

Students are expected to be aware of UMBC policy on academic integrity. You should read the full Undergraduate Student Academic Conduct Policy.

STUDENTS WITH DISABILITIES: UMBC is committed to eliminating discriminatory obstacles that may disadvantage students based on disability. If you have a disability and want to request accommodations, contact SSS in the Math/Psych Building, Room 213 or Academic IV-B wing Room 345 (or call 410-455-2459 or 410-455-3250). SSS will require you to provide appropriate documentation of disability and complete a Request for Services form available at <http://my.umbc.edu/groups/sss>. If you require accommodations for this class, make an appointment to meet with either instructor to discuss your SSS-approved accommodations.

(and finally) **A Word About Student Conduct**

"Every student has the **right** to learn, as well as the **responsibility** not to deprive others of their right to learn."

To ensure that we observe this philosophy, I will ask you to respect the following policies:

1. Be on time for lecture. Late arrival is very disruptive and violates our basic philosophy. It is not acceptable to wander in and out of the classroom during the class period.
2. Do not schedule other engagements during class time. Leaving early is equally disruptive. If you have scheduled another engagement, do not attend class.
3. There will be no makeup for any work, quiz or examination you may miss after your departure.
4. If you have trouble hearing or concentrating due to distractions around you, quietly and politely ask those responsible for the distraction to stop.
5. DO NOT use laptops or cellular phones during the lecture. Put cell phones off or on silent during class. Students using cell phones and/or texting during class, may be asked to leave.
6. In addition, no cell phones, pagers or any other electronic device other than an approved calculator is permitted on desks during tests.
7. Classroom behavior determined to be inappropriate and cannot be resolved by the student and the faculty member may be referred for administrative or disciplinary review and the student will be barred from attending class.

Tentative Lecture Schedule Summer 2015		
DATE	LECTURE TOPIC	NESTER CHAPTER READING
May 26	Introduction/History and Nomenclature of Microorganisms	1, 10.1 & 10.2
May 28	Microscopy and Prokaryotic Cell Structure	3
June 1	Microbial Metabolism	6
June 2	Prokaryotic Growth	4
June 4	EXAM I (material from Ch. 1/10/3/6)	
June 8	Control of Microbial Growth The Blueprint of Life, from DNA to Protein	5 7
June 9	Bacterial Genetics	7, 8
June 11	Bacterial Genetics	8
June 15	Viruses, Viroids, and Prions	13
June 16	Exam II (material from Ch.4/5/7/8) Viruses continued	13
June 18	The Innate Immune Response	14
June 22	The Innate Immune Response	
June 23	The Adaptive Immune Response Immunization	15 18.1 & 18.2
June 25	Exam III (material from Ch. 13/14/15/18) Host Microbe Interactions	16
June 29	Antimicrobial Medications	20
June 30	Epidemiology	19
July 2	COMPREHENSIVE FINAL EXAM	

This schedule is tentative and may change slightly due to the pace of the class, instructor or class interest in a particular topic, new information/current events in microbiology, or loss of class time due to unforeseen circumstances.