

**Biology 206: Microbiology for the Health Sciences
Spring 2013**

Instructor: Dr. Heather B. Felise

Classrooms: Lecture – Priscilla Payne Hurd Academic Complex Room 102
Lab – Collier Hall of Science Room 300

Time: Lecture - MWF 8:55 – 9:45am
Lab – WF 1:15-2:45pm (section LA) **OR** WF 2:45 – 4:15pm (section LB)

Office: Hall of Science Room 323

Office Hours: Monday 1-3pm; Thursday 1-2pm or *by appointment*

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Required Textbook: *Microbiology: A Human Perspective 7th Edition*, by Eugene W. Nester, Denise G. Anderson and C. Evans Roberts, Jr. and Martha T. Nester, McGraw-Hill Higher Education, 2012.

Required Lab Manual: *Microbiology Experiments: A Health Science Perspective 7th Edition*, by John Kleyn, Mary Bicknell and Anna Oller, McGraw-Hill Higher Education, 2012.

COURSE DESCRIPTION: This course serves as an introduction to microbiology (the study of organisms too small to be seen with the naked eye), with a focus on microbes in the field of biology, such as their unique metabolic and organismal diversity, and their role in human health. We will investigate the mechanisms used by humans, to ward of infectious diseases and the pathogenesis, immune invasion, and mechanisms of toxin action of microbial pathogens, particularly of bacteria and viruses. Although microbiology is a rapidly expanding field, too broad to be completely covered in a single semester course, I hope that you will leave with an appreciation and enthusiasm for the breadth of microorganisms that exist and the critical role they play in our health.

COURSE OBJECTIVES:

By the end of this course students should have mastered content in the following areas:

- Function of prokaryotic cell structures in comparison to those found in eukaryotes
- Mechanisms involved in energy flow and transformation
- Fundamental principles of prokaryotic genetics
- Range of biological diversity in the microbial world
- Methods of microbial control
- Role of microbes in food production
- Immunology
- Microbial diseases

By the end of this course students will have had the opportunity to:

- Use qualitative and quantitative microbial techniques
- Objectively analyze and interpret data
- Apply means by which scientists ask and answer questions
- Practice scientific writing and oral communication
- Work together on collaborative projects

LECTURE:

Lecture Exams: There will be four exams, each worth 75 points, given during the designated lecture sessions (Please see the attached course schedule). The 5th exam will be given during the final exam period, but it **will not be cumulative** and will also be worth 75 points. Both lecture material and textbook readings are fair game for lecture exams. Lecture exams will be a combination of multiple-choice and short-answer essay questions.

In the event of special needs (such as medical excuse or family emergency) make-up exams will be given, but arrangements must be made **in advance** and **documentation for the absence, e.g. a doctor's note, is required**. If there is an emergency please contact me ASAP. **Make-up exams may be oral** and will be given at a time I deem appropriate.

Attendance and participation: It is my experience that those students who do not show up for class, do not perform well in class. Therefore to further encourage you to attend class you will receive **100 points for attending lecture and actively participating in class**. Students are allowed a maximum of four absences during the semester. If you miss class more than the allowed number of absences, 50 points will be deducted from your lecture attendance grade and 10 points will be deducted for each additional absence. **Please note that absences are not divided into excused and unexcused**. If you arrive late to class after attendance has been taken, you will be marked absent for the class.

Active Learning Exercises: In this class I will be using a variety of teaching strategies, including both traditional lecture and active learning pedagogies. Therefore some of these activities will require active involvement on your part. It is my hope that you find these approaches interesting and engaging and that they enable you to be more successful in this course. Active learning techniques that will be used in this course include the following:

Clicker Questions – Multiple-choice questions will be embedded within lectures to provide an opportunity for students to test their newly acquired knowledge as well as allowing me to gauge student comprehension and to adjust the remainder of the lecture accordingly.

Think, Pair, Share – In this approach students think about a question, and then share it with one or two other students. Often this will be followed by a class debrief of responses.

Brainstorming – Class discussion to generate ideas about a topic. Responses will be recorded on the blackboard.

Small Group Problem Based Activities – Students will work together in a small group setting to investigate a scenario or solve a problem provided by the instructor.

Reading Reflections – Written summaries of a scientific news stories and/or reading assignments. These will also include student's personal opinions or reflections of the article.

Level of student engagement and participation in these activities will be considered when assessing the student's participation grade for the course.

LABORATORY:

Attendance: Attendance in the laboratory is mandatory and you should assume each lab will take the entire class period. Due to the nature of the experiments, **there will be no make-up labs**. You are expected to read the assigned lab exercises **prior** to coming to lab. This includes assigned sections of the lab manual. **It is my experience that students who do not attend and actively participate in laboratory exercises, do not do well in this course.**

Safety: Close-toed shoes are required - that means no flip-flops or sandals! If you wear inappropriate footwear, you **will not be allowed to stay in lab**. Protective lab coats will be provided and **their use is mandatory**. Be sure to wash your hands and clean your bench prior to leaving the lab! Additional safety information will be provided in the laboratory.

Lab reports: The lab reports will consist of the exercises found in the laboratory manual and will include all data, as well as answering questions at the end of the exercise. They are due at the **beginning of the lab period following completion of the experiment** (Please see attached laboratory schedule). Due to copyright laws, please use and submit the sheets from the lab notebook. Lab reports will be worth 10 points each, unless otherwise noted by the instructor.

Quizzes: In order to encourage attendance and preparedness for lab, **4 quizzes, each worth 20 points**, will be given during the designated laboratory sessions (Please see attached course schedule). These quizzes will be given at the beginning of the lab period and will assess basic information about lab exercises either to be performed that day or recently completed. You will have the first 15 minutes of the laboratory period to take the quiz; if you are late to class your quiz will be due when the rest of the class finishes with their quiz.

Practicum: The laboratory practical exam will be based on experiments done in class and will include specimen slides under the microscope, cultures on specific growth media and identification of biochemical reactions. In other words, anything done in the lab may show up on this exam. You may not use your notes or lab manual for the exam. Due to the nature of the experiments, **there will be no open labs for review**.

GRADING: The final grade in the course will be based upon the following items:

Lecture: (60% of Final Grade)

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| ➤ Lecture Exams 1-5 (5 x 75 points each) | 375 pts. |
| ➤ Classroom Attendance and Participation | 100 pts. |
| ➤ Case Study Presentation | 50 pts. |
| ➤ Revenge of the Microbes Reading Reflections | 75 pts. |

Laboratory: (40% of Final Grade)

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| ➤ Laboratory Reports/Exercises | 160 pts. |
| ➤ Laboratory Practicum | 100 pts. |
| ➤ Laboratory Quizzes | 80 pts. |
| ➤ Laboratory Unknown | 50 pts. |

Grading Scale

%	GRADE
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
59% & below	F

BLACKBOARD: All information, including announcements, lecture slides and study guides, associated with this course will be posted on Blackboard. You must register for this course on Blackboard the first week of class. Your opportunity to register will **expire** on Monday, January 28th. For instructions visit the following website: <http://home.moravian.edu/public/cit/help/blackboard/bbstudent.asp>. The course ID is BIO206.SP13 and the enrollment code is “microbes”. When registering, **please use the email account where you would like to receive course notifications**.

CLASS POLICIES:

Cell phones: *As a courtesy to the professor, turn all cell phones OFF before class! No calls or texting during class.* If you are observed texting during class you will be asked to leave the classroom. If this occurs, you will not receive credit for attendance.

Academic Integrity: I expect all class members to adhere to the Moravian College policy on academic honesty (please see **Student Handbook**). If dishonesty is observed on a student’s exam, a course grade of an F will be assigned for the class and the individual will not be allowed to withdrawal from the course. If dishonesty is observed on an assignment, the student will receive a zero for that assignment.

Disability Support: Students who wish to request accommodations in this class for a disability should contact Mr. Joe Kempfer, Assistant Director of Learning Services for Disability Support, 1307 Main Street (extension 1510). Accommodations cannot be provided until authorization is received from the office of Learning Services.

BIO206 TENTATIVE LECTURE SCHEDULE

DATE	DAY	LECTURE TOPIC	BACKGROUND READING
1/14	M	Introduction	Syllabus
1/16	W	Humans and the Microbial World	Chapter 1
1/18	F	Microscopy and Prokaryotic Cell Structure	Chapter 3
1/21	M	NO LECTURE (Martin Luther King Day)	
1/23	W	Cell Structure	Chapter 3
1/25	F	Dynamics of Prokaryotic Growth	Chapter 4
1/28	M	Dynamics of Prokaryotic Growth	Chapter 4
1/30	W	Microbial Metabolism: Fueling Cell Growth	Chapter 6
2/1	F	Metabolism	Chapter 6
2/4	M	EXAM I	
2/6	W	The Blueprint of Life: From DNA to Protein	Chapter 7
2/8	F	The Blueprint of Life: From DNA to Protein	Chapter 7
2/11	M	Bacterial Genetics: Mutations	Chapter 8.1-8.5
2/13	W	Viruses	Chapter 13 (selected pages)
2/15	F	Bacterial Genetics: Horizontal Gene Transfer	Chapter 8.6-8.9; 13.3
2/18	M	Recombinant DNA and Biotechnology	Chapter 9 (selected pages)
2/20	W	DISCUSSION: <i>Revenge of the Microbes</i>	Chapters
2/22	F	EXAM II	
2/25	M	The Immune System: Innate Host Defenses	Chapter 14
2/27	W	The Immune System: Innate Host Defenses	Chapter 14
3/1	F	The Immune System: Adaptive Defenses	Chapter 15
3/4-3/8	M, W, F	NO LECTURE (Spring Break)	
3/11	M	The Immune System: Adaptive Defenses	Chapter 15
3/13	W	Host-Microbe Interactions	Chapter 16
3/15	F	Host-Microbe Interactions	Chapter 16
3/18	M	DISCUSSION: <i>Revenge of the Microbes</i>	Chapters
3/20	W	EXAM III	
3/22	F	Skin Infections: <i>Staphylococcus</i> , <i>Streptococcus</i> & HSV	Chapter 22
3/25	M	Respiratory Infections: Pneumonia & TB	Chapter 21
3/27	W	Respiratory Infections: Influenza	Chapter 21
3/29-4/1	F, M	NO LECTURE (Easter Break)	

4/3	W	Intestinal Pathogens: <i>Helicobacter</i> & Shigellosis	Chapter 24
4/5	F	Intestinal Pathogens: Cholera, <i>E. coli</i> & Salmonellosis	Chapter 24
4/8	M	Intestinal Pathogens: Hepatitis	Chapter 24
4/10	W	DISCUSSION: Revenge of the Microbes	Chapters
4/12	F	EXAM IV	
4/15	M	Genitourinary Infections: Gonorrhea, Chlamydia & Syphilis	Chapter 25
4/17	W	Genitourinary Infections: HSV & AIDS	Chapter 25
4/19	F	Nervous System Infections: Meningitis, Botulism & Polio	Chapter 26
4/22	M	Case Study Presentations	
4/24	W	Case Study Presentations	
4/26	F	Case Study Presentations	

EXAM V

TENATIVE LAB SCHEDULE

DATE	DAY	EXERCISE	EXERCISE	LAB REPORT DUE
1/16	W	Introduction to Safety and Laboratory Guidelines		
1/18	F	Ubiquity of Microorganisms / Introduction to the Microscope	1, 3	
1/23	W	Ubiquity (day 2) / Oil Immersion Lens / Simple Stains	1, 4, 5	3
1/25	F	Differential and Other Special Stains (Gram Stain)	6	1, 4, 5
1/30	W	Pure Culture and Aseptic Technique / Differential and Other Special Stains	2, 6	
		QUIZ #1 / Pure Culture (day 2) / Chemically Defined, Complex, Selective & Differential		
2/1	F	Media	2, 7	6
2/6	W	Media (day 2) / Quantitation of Microorganisms	7, 8	2
2/8	F	Quantitation (day 2) / Aerobic and Anaerobic Growth	8, 9	7
2/13	W	Aerobic and Anaerobic Growth (day 2) / Control of Microbial Growth with UV	9, 12	8
2/15	F	UV (day 2) / Selection of Bacterial Mutants Resistant to Antibiotics	12, 16	9
2/20	W	Resistant Mutants (day 2) / Transformation	16, 17	12
2/22	F	QUIZ #2 / Resistant Mutants (day 3) / Transformation (day 2)	16, 17	
2/27	W	Transformation (day 3)	17	16
3/1	F	Normal Skin Biota	22	17
3/6-3/8	W, F	NO LABS (Spring Recess)		
3/13	W	Normal Skin Biota (day 2)	22	
3/15	F	Normal Skin Biota (day 3) / Streptococci & Respiratory Microorganisms	22, 23	
3/20	W	Normal Skin Biota (day 4) / Streptococci (day 2)	22, 23	
3/22	F	QUIZ #3 / Streptococci (day 3) / Antibiotics	23, 14	22
3/27	W	Identification of Enteric Gram Negative Rods / Antibiotics (day 2)	24, 14	23
3/29	F	NO LAB (Easter Recess)		14
4/3	W	Gram Negative Rods (day 2) / Antiseptics & Disinfectants	24, 15	
4/5	F	Antiseptics & Disinfectants (day 2)	15	24
4/10	W	Clinical Unknown Identification	25	15
4/12	F	Clinical Unknown Identification (day 2)	25	
4/17	W	Clinical Unknown Identification (day 3) / Epidemiology	25, 30	
4/19	F	QUIZ #4 / Clinical Unknown Identification (day 4) / Epidemiology (day 2)	25, 30	
4/24	W	LAB PRACTICUM		25, 30
4/26	F	Laboratory Cleanup & Checkout		