**Biology 235: Microbiology**
**Fall 2013**


**Instructor:** Dr. Heather B. Felise
**Classrooms:** Lecture – Collier Hall of Science Room 202
Lab – Collier Hall of Science Room 300
**Time:** Lecture - MWF 8:55 – 9:45am
Lab – MW 1:15 – 3:15pm
**Office:** Hall of Science Room 323
**Office Hours:** Tuesdays and Thursdays 9 – 10am; Fridays 1 - 3pm or by appointment
**Phone:** 610-861-1428
**Email:** feliseh@moravian.edu


**REQUIRED MATERIALS:**
***Required Textbook*:** *Prescott's Microbiology* 9e, by Joanne M. Willey, Linda M. Sherwood and Christopher J. Woolverton, McGraw-Hill Higher Education, 2013.
***Required Lab Manual*:** Laboratory Exercises in Microbiology 9e, by John P. Harley, McGraw-Hill Higher Education, 2013.
***Classroom Clicker*:** Response card NXT with backlight by Turning Technologies. May rent or purchase from the Moravian College Bookstore.

**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 the central role of microbes in the field of biology, the unique metabolic and organismal diversity of microbes, and their role in history from the origin of life to modern times. In addition, we will investigate the mechanisms used by all animals, including humans, to ward of infectious diseases and the pathogenesis, immune invasion, and mechanisms of toxin action of infectious agents. Although microbiology is a rapidly expanding field of science, 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 environment and health.

**COURSE OJECTIVES:**
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
- Methods of microbial control
- Range of biological diversity in the microbial world
- Role of microbes in food production
- Fundamental principles of genetics, with specific emphasis on prokaryotic genetics
- Host defenses
- 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 4th exam ***will NOT be cumulative*** and will be given the last day of lecture. 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 ***50 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, 25 of these points will be deducted from your lecture attendance grade and 5 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.

**LAB:**

***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 either the exercises found in the laboratory manual or provided handouts. The lab reports will include all data, as well as answering questions at the end of the exercises. They are due at the ***beginning of the lab period immediately following completion of the experiment***. 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 for quiz dates). Quizzes will be given at the beginning of the lab period and will assess student 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.

**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 Tuesday, September 3rd. For instructions visit the following website: http://home.moravian.edu/public/cit/_help/blackboard/bbstudent.asp. The course ID is BIO235.F13 and the enrollment code is "microbiology". When registering, ***please use the email account where you would like to receive course notifications***. I frequently send out course notifications and announcements via email.

**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 Elaine Mara, Assistant Director of Learning Services for Disability Support at 1307 Main Street or by calling 610-861-1510. Accommodations cannot be provided until authorization is received from the Academic Support Center.

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

***Lecture***: (approximately 60% of final grade)

- Lecture Exams 1-4 (4 x 100 points each) 400 pts.
- Attendance 50 pts.
- Reading Reflections 75 pts.
- Microbes in the News! 50 pts.

***Laboratory:*** (approximately 40% of final grade)

- Laboratory Reports/Exercises 120 pts.
- Laboratory Quizzes 80 pts.
- Laboratory Unknowns 50 pts.
- Independent Study Project 100 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 |

**Any portion of this syllabus is subject to change at the discretion of the instructor.

# September 2013

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | **Labor Day - No Class** | | Evolution, Microbial Life & the Bioshpere Chpt. 1 | | ***Class Discussion: "Microbe Hunters"*** | |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | Structure and Function of Bacteria and Archaea Chpt. 3 & 4 | | Structure and Function of Bacteria and Archaea Chpt. 3 & 4 | | Structure and Function of Bacteria and Archaea Chpt. 3 & 4 | |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| | Microbial Growth and Nutrition Chpt. 7 | | Microbial Growth and Nutrition Chpt. 7 | | Microbial Growth and Nutrition Chpt. 7 | |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | **EXAM 1** | | Control of Microbial Growth Chpt 8 & 9 | | ***Class Discussion: "Revenge of the Microbes"*** | |
| 29 | 30 | | | | | |
| | Introduction to Metabolism Chpt. 10 | | | | | |
| | **Notes:** | | | | | |
| | | | | | | |

# October 2013

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | | | Metabolic Diversity and Nutritional Types Chpt. 11 | | Aerobic Respiration Chpt. 11 | |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Aerobic Respiration Chpt. 11 | | Anaerobic Respiration & Fermentation Chpt. 11 | | Catabolism of other Organic Molecules & Phototropy Chpt. 11 | |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| | **Fall Recess - No Class** | | ***Classroom Discussion: Microbial Diversity*** | | **EXAM 2** | |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| | Bacterial Genome Replication & Expression Chpt. 13 | | Bacterial Genome Replication & Expression Chpt. 13 | | Bacterial Genome Replication & Expression Chpt. 13 | |
| 27 | 28 | 29 | 30 | 31 | | |
| | Regulation of Cellular Processes Chpt. 14 | | Regulation of Cellular Processes Chpt. 14 | | | |
| | | **Notes:** | | | | |
| | | | | | | |

# November 2013

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| | | | | | Mechanisms of Genetic Variation Chpt. 16 | |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | Mechanisms of Genetic Variation Chpt. 16 | | Microbial Genomics Chpt. 18 | | ***Class Discussion: "Revenge of the Microbes*** | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | **EXAM 3** | | Pathogenicity and Infection Chpt. 35 | | Viruses Chpt. 27 | |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| | Human Diseases Caused by Viruses Chpt. 38 | | Human Diseases Caused by Bacteria Chpt. 39 | | Human Diseases Caused by Bacteria Chpt. 39 | |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| | **Thanksgiving Recess - NO CLASS** | | **Thanksgiving Recess - NO CLASS** | | **Thanksgiving Recess - NO CLASS** | |
| | **Notes:** | | | | | |
| | | | | | | |

# December 2013

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Microbiology of Food Chpt. 41 | | ***Classroom Discussion: Microbes and Us!*** | | **EXAM 4** | |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | | | | | | |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| | | | | | | |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | | | | | | |
| 29 | 30 | 31 | | | | |
| | | | | | | |
| | | **Notes:** | | | | |
| | | | | | | |