

# BIO330 COURSE SYLLABUS

## BIOLOGY OF MICROORGANISMS

### COURSE INFORMATION

4 CREDITS (3 HOURS LECTURE, 3 HOURS LAB)  
**PREREQUISITES:** BIO I AND GENETICS  
**TIMES:** Lectures MWF from 9 to 9:50AM (LS114) or from noon to 12:50PM (CH232); Labs (LS203) T from 11 to 1:45AM or R from 8 to 10:45  
**LOCATIONS:** Lecture LS114 or CH232; Lab LS203

### INSTRUCTOR INFORMATION

Carolyn F. Mathur, PhD  
Professor  
Department of Biological Sciences  
York College of PA  
York, PA 17403  
Phone: 717-815-1409  
Email: [cmathur@ycp.edu](mailto:cmathur@ycp.edu)  
Office location: LS231  
Office hours: MWF from 1-2PM: T from 2-3: R from 11-noon  
Biology Office phone number: 717-815-1335

### TEXTBOOKS

*Microbiology with Diseases by Taxonomy* (2<sup>nd</sup> edition) by Robert Bauman, 2007, Pearson/Benjamin Cummings  
*Laboratory Exercises in Microbiology* (7<sup>th</sup> edition) by John Harley, 2008, McGraw-Hill

### COURSE CATALOG DESCRIPTION

Microbiology is the study of living organisms that can be seen only with a microscope. It also includes viruses, which are microscopic but not cellular. As a basic science it provides the biologist with an excellent experimental model for studies of essential life processes. Microbiology is also concerned with many applied fields, such as medicine, agriculture and industry. Both the basic and applied areas of microbiology will be explored in this course through readings, lectures, laboratories, and written and oral reports and exams.

### COURSE POLICIES

**ACADEMIC POLICY:** Science and the teaching of science represent a search for truth and they rest on ethical behavior and intellectual honesty. As such, both the Department of Biological Sciences and York College of Pennsylvania unequivocally condemn academic dishonesty. Academic dishonesty is defined in the York College Student Handbook as “all situations where a student makes use of the work of others and claims such work as his/her own.” Because the Department of Biological Sciences maintains high expectations for all students and is committed to stringent standards of academic honesty, we contend that all published information, in any

form, must not be used unless rigorously paraphrased and properly cited. Moreover, all tests, projects, assignments, and lab reports require a solo effort **unless specifically noted otherwise by the instructor**. This means that the sharing of text, images, tables, figures, or data analyses with classmates is a breach of academic honesty. Furthermore, providing such information to others will be considered as dishonest as accepting or taking the information.

Work done in lab may involve partners, but the formal partnerships end when the laboratory period ends. At the end of a lab, each partner should leave with his or her group's protocols, hypotheses, data, and any information about procedural problems. Once the in-lab work is completed, the work shifts from a group effort to a solo effort. This does not mean that students shouldn't discuss lab concepts, problems, and general strategies and broad interpretations. Talking about science is healthy and is encouraged. And, it is understood that lab groups may obtain similar or identical quantitative data for a given project. In the end, however, data analyses and report writing as well as the overall presentation and interpretation of these data are to be done independently by the individual and not by the group.

If work submitted by two or more students appears unexplainably and unreasonably similar, academic dishonesty will be assumed. In this event, the instructor will provide written notification to the student, the Department Chair, and the Dean of Academic Affairs of the charge and the sanction. Documentation related to instances of academic dishonesty will be kept on file in the student's permanent record. If the academic dishonesty is the student's first offense, the instructor will have the discretion to decide on a suitable sanction up to a grade of 0 for the course. If the Dean of Academic Affairs determines that the academic dishonesty is the student's second offense. The Student Welfare Committee will automatically conduct a hearing to review the charge and decide on an appropriate sanction, which will involve academic suspension or dismissal from the College. Students are not permitted to withdraw from a course in which they have been accused of academic dishonesty.

**MISSED EXAMS: Excused exams will be made up at the end of the semester during one proctored time period.**

**WRITING STANDARDS:** You are expected to use proper English grammar and spelling on all written material submitted for this course. Failure to do so may result in a lower grade.

## **GRADING**

4 lecture exams	40%
lecture quizzes	20%
lab notebook	20%
semester project	20%
class participation	instructor discretion

### **Current events bonus points opportunities:**

To earn 1 bonus point, write a summary of a recent (within past 3 months) news, journal or on-line article in microbiology to be handed in each Friday. The summary should be no more than one page, must be handed in with a copy of the original article, and must

include your name and the date you are handing in the material. You must be prepared to discuss the article in class at the time you hand it in, although not all articles will be discussed each week due to time limitations. One point per week is added to the % value on a major lecture exam for each summary submitted. Your participation in this opportunity will be considered part of the class participation aspect of the course.

## **GRADE CALCULATIONS**

The college recently expanded the grade reporting system at York College of PA to include a 3.5 and a 2.5 when reporting the final grade for your transcripts. This change was requested by the student senate. The conversion system for this course is as follows:

**4.0 = Excellent (90-100)**

**3.5 = Very Good (85-89.9)**

**3.0 = Good (80-84.9)**

**2.5 = Above Average (75-79.9)**

**2.0 = Average (70-74.9)**

**1.0 = Below Average (60-60.9)**

**0 = Failure (<60)**

Your final grade will be based on the numbers as calculated by the computer. In this course, you can earn bonus points by writing summaries of current events in microbiology-one per week. In some cases, a student can increase their average by one letter grade! Because this opportunity is reflective of your initiative, and since the newer grading system allows for greater discrimination in calculating the student average between 70 and 89.9, no grade will be rounded up. Therefore, it is important that you participate fully in class, and participate in the current events bonus portion of the course

## **TENTATIVE LECTURE TOPICS**

- Overview of microbial life
- Microscopy
- Prokaryotic cell structure and function
- Prokaryotic nutrition, metabolism, genetics and growth
- Microbial growth control
- Microbial systematics and evolution
- The Bacteria and Archaea
- Essentials of virology
- Microbial genomics
- Metabolic diversity

- Medical microbiology
- Epidemiology
- Microbial habitats, nutrient cycles, and interactions with plants and animals
- Wastewater treatment, water purification and waterborne microbial diseases
- Food preservation and foodborne microbial diseases
- Industrial microbiology and Biotechnology

### **TENTATIVE LABORATORY EXERCISES AND PROJECTS**

- Microscopic methods using bright-field, phase-contrast and fluorescence
- Examine the factors that influence microbial growth, both in vivo and in vitro
- Do a comparative study of various methods for measuring numbers of bacteria
- Design an experiment to generate a bacterial growth curve and calculate the generation time
- Examine methods to detect microorganisms from natural sources
- Compare methods of producing and measuring microbial biofilms
- Estimate microbial diversity from an environmental sample
- Isolate and quantify viruses from an environmental sample
- Design an experiment to measure the efficacy of control procedures and/or antimicrobials on microorganisms
- Isolate antibiotic-producing microbes from natural sources