

**Syllabus  
Biology 414  
General Microbiology  
Fall 2008**

**Prerequisites:** BIO 111 – 112 and CHE 141 – 142.

**Catalog**

**Description:** BIO 414 General Microbiology

**Credit, 4 sem. hrs.**

*Prerequisites: BIO 111-112 and CHE 141-142.* Lecture three hours a week. Laboratory three hours a week.

A study of the natural history of bacteria, fungi, and viruses. Laboratory emphasis is given to the isolation of bacteria and fungi from both the biological and physical environment and their subsequent identification and metabolic characterization. Student receiving credit for BIO 414 cannot receive credit for BIO 251.

**Lecture Schedule:** TR, 1:30 – 2:45 p.m., H100

**Laboratory**

**Schedule:** Lab 1 – TR, 3:00 – 4:30 p.m., H208

Lab 2 – TR, 4:45 – 6:15 p.m., H208

**Instructor:** Theodore E. Snazelle, Ph.D.

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Telephone: 924-7959 (home--no calls after 9:00 p.m.)

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Personal webpage: <http://www.mc.edu/~snazelle>

**Rationale for**

**Course:** The Mississippi College Mission Statement stipulates that Mississippi College *stimulates the intellectual development of its students through the . . . sciences and . . . preprofessional . . . programs.* A requisite to the preceding is an understanding of the interaction between microbes and man, both beneficial and deleterious. A beneficial aspect of microbes is that they are the source of most of the antibiotics used in the treatment of infectious diseases; an obvious deleterious effect of microbes is their role in infectious disease. Thus, an understanding of microbiology by the student will hopefully contribute to living a balanced satisfying and meaningful life. *Furthermore, the university environment . . . encourages them (students) to utilize their skills, talents, and abilities as they pursue meaningful careers, life-long learning, and service to God and others.* Additionally, this

course can taken by biology majors in medical sciences (premedical and pre dental students), research (students planning on going to graduate school), associated medical professions (pre-physician's assistant students), laboratory sciences (pre-medical technology students), and teacher education degree tracks. It is hoped that students who complete this course and a major in the biological sciences will ultimately utilize their skills, talents, and abilities in service to God and man as teachers, professors, physicians, dentists, physician's assistant, medical technologists, and in other biology-related professions.

**Learning**

**Objectives:** Student will become familiar with the great events in the history of microbiology, e.g. Leeuwenhoek's Animalcules, Germ Theory of Disease, Koch's Postulates, etc.

Student will become familiar with the structure and organization of bacteria and viruses.

Student will become familiar with the techniques for culture and preservation of bacteria.

Student will become familiar with the culture of bacterial viruses.

Student will become familiar with sterilization, disinfection, and antisepsis.

Student will become familiar with bacterial growth: bacterial growth curve and dynamics of bacterial growth.

Student will become familiar with antibiotics: chemical types, modes of action, and drug resistance.

Student will become familiar with bacterial metabolism: glycolysis, respiration, and fermentation.

Student will become familiar with normal microbial flora.

Student will become familiar with Pathogenicity virulence factors - invasiveness and toxigenicity.

Student will become familiar with bacteria and viruses and the diseases they cause in man.

Student will become familiar with the isolation and characterization of Gram negative enteric and non-enteric bacteria from water.

**Textbook:** Willey, Joanne M.; Sherwood, Linda M.; and Christopher J. Woolverton. 2008.

*Prescott, Harley, and Klein's Microbiology*, 7<sup>th</sup> edition. McGraw Hill.  
**Dr. Snazelle expects each student to have a textbook as he uses it extensively in class and expects each student to do the same.**

**Lecture  
Guide and  
Laboratory**

**Manual:** *General Microbiology Lecture Guide and Laboratory Manual*. Fall Semester 2008. Theodore E. Snazelle.  
**(\$15.00 [check or cash] – Purchase in Biology Office, H104)**

**Laboratory  
Supplies:**

Every student should have a three-ring notebook (clear plastic cover) into which the lecture guide and laboratory manual should be placed. ***Each student is required to wear safety glasses and latex (vinyl) gloves while in the laboratory.*** Additionally, you will need to bring a three-pack of paper towels with you to the second laboratory period (5 quiz bonus points).

**Evaluation**

**Methods:** Five 100 point unit exams will be given. ***During the semester, a ten point quiz will be given most weeks.*** A total of two quiz scores will be dropped. A missed quiz is a dropped quiz. Exams, covering both lecture and laboratory material, will be largely objective in format, e.g. true-false, multiple choice, fill-in-the-blank, diagrams for labeling, etc. Some short discussion and/or listing type questions may be included on the exams as well. Quizzes will be largely short answer. Additionally, a research report (not a research paper) will be written by each student about carbohydrate metabolism urine culture isolates of *Escherichia coli*. The research report is worth a maximum of 25 points.

**Grading:**

The grading scale is as follows:

90 - 100 A  
80 - 89 B  
70 - 79 C  
60 - 69 D  
0 - 59 F

Your final average for the course will be determined by dividing the total number of points you make on your five exams, quizzes, and research report by the total points possible; then, this decimal fraction is multiplied by 100 to give your final average as a percentage. Your final letter grade will be determined by comparing your final average for the course with the preceding grading scale.

## Lecture

### Topics:

An Introduction to Microbiology  
Procaryotic Cell Structure and Function  
Microbial Nutrition  
Microbial Growth  
Microbial Metabolism  
Antimicrobial Drugs for Bacteria  
Normal Microbial Flora  
Pathogenicity  
Selected Topics in Bacterial Genetics  
Bacteria: Gram-Negative Rods – Enterobacteriaceae  
Bacteria: Gram-Negative Rods – Vibrionaceae  
Bacteria: Gram-Positive, Spore-Forming Bacilli – *Bacillus* and *Clostridium*  
Bacteria: Gram-Positive Cocci - *Staphylococcus* and *Streptococcus*  
Bacteria: Gram-Negative Cocci – The Neisseriaceae  
Viruses  
Viral Diseases of Man

## Laboratory

### Topics:

Streak Plate for Isolation of Bacteria  
Media: Selective, Differential, and Enriched  
Enumerating *Escherichia coli* in a Colony – Spread Plate Technique  
Smear Preparation and Gram Stain  
Correlation of Phenol Red Sugar Broth Tube and TSI Slant Tube Inoculation  
Results  
IMViC  
Colilert<sup>®</sup> - Presence/Absence of Coliform Bacteria and Media Differentiation  
Biolog Microstation III – Carbohydrate Metabolism in Urine Culture Isolates of  
*Escherichia coli*  
API 20E System - Identification of an Unknown Enteric, Gram-Negative  
Bacterium  
Anaerobic Culture of Bacteria  
Antiseptics and Disinfectants  
Antimicrobial Drug Susceptibility Testing – Modified Kirby-Bauer Technique  
Transformation: Plasmid-Conferred Ampicillin Resistance in *Escherichia coli*  
Bacteriophages – Titer Determination and Plaque Morphology

## Important

**Dates:** Microbiology laboratory begins, Tuesday, August 26, 2008  
Exam #1- Tuesday, September 23, 2008  
Fall Recess – Monday/Tuesday, October 13 – 14, 2008  
Exam #2 - Tuesday, October 21, 2008  
Last Day to Drop a Class, Friday, October 31, 2008  
Exam #3 - Tuesday, November 18, 2008  
Research Report due – Tuesday, November 25, 2008  
Thanksgiving Recess – November 26 – 30, 2008  
Exam #4 - Tuesday, December 1, 2008  
Exam #5 - Tuesday, December 16, 2008, 11:00 a.m. - 1:00 p.m.

**E-mail:** Like Mississippi College, I will only make contact with you at your [\\_\\_\\_\\_\\_@mc.edu](mailto:_____@mc.edu) address. Check your e-mail frequently.

**Attendance:** See p. 55, of the online 2007 - 2008 Mississippi College Undergraduate Catalog for the University's attendance policy, i.e. 8 absences (excused or unexcused) in a semester class meeting 2 times a week will result in the student receiving an "F" for the course.

**Academic  
Honesty**

**Statement:** See p. 59, of the online 2007 - 2008 Mississippi College Undergraduate Catalog for what the University considers to be academically dishonest, the student's responsibility and consequences for academic dishonesty.

**If you need special accommodations due to learning, physical, psychological, or other disabilities, please contact Dr. Buddy Wagner in the Counseling and Career Development Center, Lowery Hall 106. He may be reached by phone at (601) 925-3354 or by mail at P. O. Box 4016, Clinton, MS 39058. E-mail: [bwagner@mc.edu](mailto:bwagner@mc.edu)**

**During the duration of this course, Dr. Snazelle reserves the right to make any changes in the syllabus that he deems appropriate or necessary.**

***TURN OFF YOUR CELL PHONE!!  
During class, keep your cell phone and other electronic devices in your backpack, purse, etc. Cell phones and other electronic devices are not allowed to be on the desk, in your hand, etc. while class is underway. Also, iPods, MP3 players, etc. may not be used in class. Like cell phones and other electronic devices, iPods, MP3 players, etc. must be kept inside your backpack, purse, etc.***

