CoSM Class Policy

Fall 2011 Semester
BIO 309L Sections 020 and 021
GENERAL MICROBIOLOGY LAB

Name: Mr. Ron Havner, Instructor
Department: Biology
Email: havnerronal@sfasu.edu
Phone: 468-5196
Office: Miller Science, Rm 237
Office Hours: Monday through Thursday, 8 to 9 am, 2:30 to 3:30 pm and by appointment.
Class meeting time and place: Mondays and Wednesdays
BIO309L020 11-12:50pm in Miller Science Room 208
BIO 309L021 4 pm-5:50pm in Miller Science Room 208

Text and Materials:

Required: Latex or Vinyl gloves, Lighter or matches, and an Alcohol Based Marker (Medium Black)

Course Requirements:
Students must be currently enrolled in BIO 309 Lecture. Students will learn basic microbiology laboratory protocols including specimen collection, cultivation, analysis, identification, and reporting (verbal and written). Students are provided with a specimen of medical, industrial, or environmental relevance and will maintain, analyze, identify and report, verbal presentation and written report, information concerning this specimen.

Course Calendar:
Introduction, Safety, Aseptic Technique 2 hours
Cultural and Growth Characteristics 8 hours
Cellular Characteristics 4 hours
Metabolic/Enzymatic Testing/Analysis 12 hours
Dilutions 4 hours
Applied Microbiology 6 hours
Exams 3 hours
Presentation of Data 2 hours
See attached lab schedule

Grading Policy:
Lab Practical Exam #1: 100 points
Lab Practical Exam #2: 100 points
Lab Daily Quizzes: 100 points
Dilution Exam: 100 points
Individual’s Lab Write-up: 50 points
Team Presentation: 50 points

Grading will be as follows:
(Percentages refer to points earned from points possible)
90% and above: A
80% to 89%: B
70% to 79%: C
60% to 69%: D
68% or less: F

Total points possible: 500 points
Attendance Policy:
At the beginning of each lab I will make available a signature roster. Since attendance is mandatory, you will receive no direct credit for it (although the effects of missing a lab will show up in other evaluated activities). In the event that a student must miss a lab period for unavoidable reasons (instructor’s discretion), the student will notify the instructor at least one day PRIOR to that lab. Failure to attend more than three scheduled labs will result in a failing grade for the lab. It is the responsibility of the student to arrange for any makeup activity with the instructor. Labs missed with prior approval will be made up Friday afternoons.

Academic Integrity (A-9.1)
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one’s own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one’s paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades
Semester Grades Policy (A-54)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.
BIO 309 General Microbiology Laboratory

Course Description:
Study of microorganisms to include bacteria, viruses, fungi, and protozoa with emphasis on laboratory methodology and the structure and function of common microorganisms.

Pre-requisites: One semester of Biology and one semester of Chemistry.
Co-requisite: BIO 309 Lecture.

Course Objectives:
- Provide students with an understanding of important facts, concepts, and the investigative procedures of a microbiology laboratory.
- Train students in the proper use and maintenance of the research grade laboratory microscope with emphasis on oil immersion methods.
- Train students in aseptic technique, prophylaxis, and the proper methods relating to the safe manipulation and maintenance of microorganism.
- Train students in fundamental laboratory methodology to include the use of differential media, metabolic/enzymatic testing and associated reagents.
- Provide students with a hands-on familiarity with basic research procedure and associated critical and investigative thinking skills utilizing identification of unknown microorganismal specimens.
- Provide students with a familiarity of the environmental, industrial, and medical aspects of microorganisms in a laboratory setting.

Student Learning Outcomes (Course Competencies):
Knowledge and Understanding
Student understanding will be evaluated by utilization of laboratory practical exams, weekly quizzes, and a selected written exam (laboratory dilutions). Students will demonstrate:
- The safe methods for isolation, subculture, and maintenance of bacterial, fungal, and viral specimens.
- An understanding of fundamental stains, basic staining techniques, and related bacterial and fungal physiology.
- An understanding of bacterial, fungal, and viral structure and metabolism as it relates to experimentation in the laboratory.
- An understanding of the uses of various media and testing protocols with focus on basic research.
- An understanding of the common microorganisms utilized in industry, medicine and environmental applications.

Subject Specific Skills
Students will demonstrate mastery of:
- Quantitative measures; weight, volume, concentrations.
- Aseptic technique; handling and analysis of specimens, reagents, other testing materials and the maintenance of a sterile work area.
- Analysis and identification of bacterial by genus and species utilizing methods mastered in the laboratory. Emphasis on critical thinking and interpretation of test results.
- Adequate utilization of reference resources such as Bergey’s Manual of Systematic Bacteriology.
- Skill in the logical communication of microbiology laboratory concepts through effective report writing and oral presentation.

Program Learning Outcomes:
Each of the student learning outcomes listed above address the Biology Department Program Learning Outcome #1: Demonstrate a good knowledge base in biological concepts and be able to integrate knowledge with critical thinking skills to become problem solvers. Knowledge base will include: levels of complexity (molecular/cellular through population/communities/ecosystems); biological principles and processes.

Required Textbook:
MICROBIOLOGY LABORATORY, Theory & Application, Brief Edition,
Course Content (Topical Outline):

- **Introduction to the Microbiology Laboratory [1 week]**
  - Safety materials and procedure
  - Aseptic Technique
  - Hand Washing
  - Normal Microbiota
  - Microbial Ubiquity

- **Microscopy [1 week]**
  - Operation of the research light microscope
  - Microbial scale
  - Oil Immersion technique

- **Microbial Specimens [1 week]**
  - Assignment of specimens
  - Subculture
  - Colony morphology and form of growth
  - Physical factors affecting growth and control

- **Stains [1 week]**
  - Negative and Simple stains; cell morphology and form of growth
  - Gram, Endospore, Acid-Fast stains; cellular structure

- **Dilution and Quantification of microorganisms [1 week]**
  - Spread, pour, and streak plates
  - Determination of bacterial concentrations

- **Metabolic and Enzymatic Analysis [6 weeks]**
  - Differential media
  - Hemolysis
  - Fermentation
  - Proteins and enzymes
  - Metabolic waste

- **Fungi [1 week]**
  - Classification of Fungal genera
  - Structure of common molds and yeasts
  - Culture of fungal specimens

- **Microbiology of Soil [1 week]**
  - Actinomycetes
  - Other common species

- **Microbiology of Water [1 week]**
  - Common protozoa
  - Identification by dichotomous key
  - Qualitative analysis of water samples

- **Cultivation and enumeration of bacteriophages (viruses) [1 week]**
  - Preparation of bacterial host
  - Preparation of plaque assay

- **Presentation of Data [1 day]**
  - Oral Group Presentation (PowerPoint)
  - Written Lab report

### BIO 309 General MICROBIOLOGY - Fall 2011 Laboratory Schedule

<table>
<thead>
<tr>
<th>Dates</th>
<th>Lab</th>
<th>Data Collection</th>
<th>Reference</th>
<th>Exercise Number and Topic</th>
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</thead>
<tbody>
<tr>
<td>Monday 29 Aug 11</td>
<td>GM 01</td>
<td>None</td>
<td>All of the preface/introduction</td>
<td>Intro to the Microbiology Lab Syllabus Schedule</td>
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<tr>
<td>Wednesday 31 Aug 11</td>
<td>GM 02</td>
<td>None</td>
<td>Handouts 1-2 and Demo pgs 7,19-25 and pgs 47-48, pg 101</td>
<td>Aseptic Technique, Hand Washing, Normal</td>
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<tr>
<td>Date</td>
<td>GM</td>
<td>Task Description</td>
<td>Handout Pages</td>
<td>Additional Info</td>
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<tr>
<td>Wednesday</td>
<td>GM 03</td>
<td>Analyze Hand Washing Plates</td>
<td>Handout 3, pgs 119-124</td>
<td>Ubiquity experiment</td>
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<td>7 Sep 11</td>
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<td>The Microscope, Nomenclature, Handling, G</td>
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<td>Operation</td>
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<tr>
<td>Monday</td>
<td>GM 04</td>
<td>Observe Ubiquity cultures</td>
<td>Handout 4, pgs 29-31, 55-69</td>
<td>Culture Specimens, Streak Plate, Slant, a</td>
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<td>12 Sep 11</td>
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<td>nd Characteristics</td>
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<tr>
<td>Wednesday</td>
<td>GM 05</td>
<td>Record Cultural Growth Characteristics</td>
<td>Handout 5, pgs 85-98</td>
<td>Optimal Growth Characteristics, Temperature (What happens to PROTEINS?)</td>
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<td>14 Sep 11</td>
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<tr>
<td>Monday</td>
<td>GM 06</td>
<td>Record ranges for optimal growth</td>
<td>Handout 6, pgs 77-84</td>
<td>Aerobicity: Aerobes, Anaerobes, Facultative and Aerotolerants</td>
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<td>19 Sep 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 07</td>
<td>Record Aerobicity Data Slants in Freezer</td>
<td>Handout 7, pgs 145-163, pg 166</td>
<td>Prepare freezer slants</td>
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<td>21 Sep 11</td>
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<td>Stains, Part I: Acidic, Basic, Negative, Simple Stains, Part II: Endospore, Acid-Fast and Cell Morphology</td>
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<td>Monday</td>
<td>GM 08</td>
<td>Retrieve freezer slants</td>
<td>Handout 8, pgs 167-180</td>
<td>(Genus Bacillus and Genus Mycobacteria) (Get slants from freezer)</td>
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<td>26 Sep 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 09</td>
<td>View all previous slides</td>
<td>Instructor's Notes</td>
<td>&quot;Through-Focus&quot; and Oil Immersion</td>
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<td>28 Sep 11</td>
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<tr>
<td>Monday</td>
<td>GM 10</td>
<td>None</td>
<td>Handout 9, pgs 197-202, 211-216, 221-224</td>
<td>Selectivity and Differential Media; Nutrient Agar, MacConkey's, Actinomycetes Agar, and Rose Bengal</td>
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<td>3 Oct 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 11</td>
<td>Record Media growth data</td>
<td>Instructor's Notes, Demo, pgs 289-290</td>
<td>Metabolism: Litmus Milk and Casein Digest</td>
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<td>5 Oct 11</td>
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<tr>
<td>Monday</td>
<td>GM 12</td>
<td>Record Metabolic data</td>
<td>pgs 231-233, 293, 279-280</td>
<td>Metabolism; Carbohydrate Fermentation, G</td>
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<td>10 Oct 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 13</td>
<td>Record Metabolic data</td>
<td>pgs 243-244, 247-248, 311-312 and pgs 321-322</td>
<td>Hemolysis, Catalase, Oxidase and Triple S</td>
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<td>12 Oct 11</td>
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<td>TSI</td>
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<tr>
<td>Monday</td>
<td>GM 14</td>
<td>Record Hemolysis and TSI data</td>
<td>pgs 285,237-240,257-259, 305-308, and 456</td>
<td>Enzyme Analysis; Urease, IMViC testing</td>
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<td>17 Oct 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 15</td>
<td>None</td>
<td>Study!</td>
<td>Lab Practical Exam #1</td>
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<tr>
<td>Monday</td>
<td>GM 16</td>
<td>Record Urease and IMViC data</td>
<td>Instructor's Notes and Demo</td>
<td>Introduction to Bergey's Manual of Systemat</td>
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<td>24 Oct 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 17</td>
<td>None</td>
<td>Demo</td>
<td>Lab Result Write-up and Presentation, Tenta</td>
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<td>26 Oct 11</td>
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<tr>
<td>Monday</td>
<td>GM 18</td>
<td>None</td>
<td>pgs 371-373</td>
<td>Kirby-Bauer Antibiotic Testing</td>
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<td>31 Oct 11</td>
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<tr>
<td>Wednesday</td>
<td>GM 19</td>
<td>Observe Antibiotic data</td>
<td>Instructor's Notes, Demo, and pgs 335-338</td>
<td>Simple and Serial Dilutions</td>
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<td>2 Nov 11</td>
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<tr>
<td>Monday</td>
<td>GM 20</td>
<td>Count Serial Dilution colonies</td>
<td>Demo, Handout 10</td>
<td>Serial Dilution Experiment, Counting Viable</td>
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<td>7 Nov 11</td>
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<tr>
<td>Date</td>
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<tr>
<td>Wednesday 9 Nov 11</td>
<td>GM 21</td>
<td>None</td>
<td>Handout 13, pgs 136-139</td>
<td>Cultivation of Fungi</td>
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<tr>
<td>Monday 14 Nov 11</td>
<td>GM 22</td>
<td>Analyze Fungal colonies</td>
<td>Instructor's notes</td>
<td>Microbiology of Soil</td>
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<tr>
<td>Wednesday 16 Nov 11</td>
<td>GM 23</td>
<td>TBD</td>
<td>pgs 387-390</td>
<td>Microbiology of Water</td>
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<tr>
<td>Monday 21 Nov 11</td>
<td>GM 24</td>
<td>Observe Water data</td>
<td>Instructor's notes</td>
<td>Biotechnology</td>
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<tr>
<td>Monday 28 Nov 11</td>
<td>GM 25</td>
<td>Observe Food data</td>
<td>N/A</td>
<td>Group Presentations and Lab Results Write-Up Paper turn in</td>
</tr>
<tr>
<td>Wednesday 30 Nov 11</td>
<td>GM 26</td>
<td>None</td>
<td>N/A</td>
<td>Lab Practical Exam #2</td>
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