SYLLABUS
BEGINNINGS IN MICROBIOLOGY
Biology 240  Fall 2004

Lecture:  Tues.  6:00-9:00 p.m.  201 Irving 1
Lab:     Thurs.  2:00-5:00 p.m. or 6:00-9:00 p.m.  207 Irving 1

Instructor:  Dr. Tracey Martinson
Email: fntam@uaf.edu
Office phone: 474-7156
Office: 314 Irving 1
Hours: TR: 4:30-5:30 p.m., or by appointment

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        Lisa Lawson     lisamichelle1@hotmail.com

       Online Learning Center: www.mhhe.com/nester4


Other materials:  Spiral-bound notebook for journal, black Sharpie permanent
                 marker for lab, old shirt/lab coat for lab (recommended).

Course objectives/goals:
1. To provide students with an overview of microbiology, with an emphasis on
   clinical/medical aspects
2. To provide students with skills in basic microbiological lab techniques
   (aseptic technique, microscopy, staining, identification, and
   control/assessment of microbial growth)

Course outline:
Lecture and lab topics are coordinated so that the concepts introduced in lecture are
reinforced through the lab exercises. The lecture portion of the course is divided into
three main sections:

1. The biology of bacteria:
   a. Structure of bacterial cells
   b. Growth of bacteria
   c. Control of bacterial growth

2. Bacterial genetics:
   a. Basics of DNA replication, transcription (DNA \rightarrow RNA), and
      translation (RNA \rightarrow protein)
   b. Bacterial genetics
3. **Bacteria and disease:**
   a. Basics of the immune response and immune disorders
   b. Host-microbe interactions
   c. Introduction to epidemiology
   d. Body systems and their diseases
   e. HIV

**Prerequisites:**
While the only prerequisite for this class is a high school diploma or GED, it is strongly recommended that students have at least 1 semester each of biology and chemistry, or be taking it concurrently.

**Grading:**
There are two parts to this course: lecture and lab, worth a total of 1000 points. The lecture portion of the course accounts for 665 points (66.5%), while the lab portion accounts for 335 points (33.5%).

**Breakdown of assignments:**

**Lecture**
- Disease project (13.5% of your grade):
  - Poster/brochure: 1 @ 50 points = 50 points
  - Presentation (5 min): 1 @ 35 points = 35 points
  - Weekly journal assignments: 10 @ 5 points each = 50 points

- Weekly concept maps (13%):
  - Exams (10% each): 13 @ 10 points each = 130 points
  - Final exam (20%): 2 @ 100 points each = 200 points

**Lab**
- Lab manual (23.5%): varies with exercise = 235 points
- Lab practical (10%): 1 @ 100 points = 100 points

**Explanation of assignments:**

**Lecture:**
1. **Disease Project:** At the beginning of the semester, you will be assigned a disease to study. Towards the end of the semester, you will turn in either a poster or a brochure covering certain aspects of your disease (more details later). In addition, you will give a brief (5 minute) presentation to the class on your disease during the last 2-3 lectures of the semester when we are covering diseases.

2. **Weekly journal assignments:** To help ensure steady progress on your Disease Project, weekly journal assignments will be given. Each journal assignment will address one of the aspects required for your poster/brochure and presentation. Journals will be due on Tuesday evenings, and will be returned to you in lab on Thursdays. Late journals will be docked 20% (1 point).

3. **Concept maps:** At the beginning of each lecture, you will be given a list of 10-20 terms that capture the essence of the material we are covering in lecture.
You will create a concept map that relates these terms to each other in some creative way, and provide a brief, one-paragraph summary of your concept map. The goal here is to help you form the "Big Picture" in your mind. Note that there are very few wrong ways to do this. We all think and learn differently. The only unacceptable concept maps would be ones that consist merely of a list of definitions, or contain large portions of figures/tables from the text. If you completely misunderstand a term and relate it incorrectly to the other terms, I will make corrections but will not dock you points unless I feel that you have not made an honest effort to understand the material and create your map. Please remember that the maps are not collaborative. In your map, feel free to use flow-charts, arrows, drawings, etc. Be creative! This is meant to be a learning tool. Concept maps will be due on Tuesday evenings, and can be written in the same notebook as your journal assignments. They will be returned to you on Thursdays. Late concept maps will be docked 10% (1 point).

4. Exams: There will be two exams during the semester, and one final exam. The final exam will be split between new material (100 points) and questions from the first two exams (100 points). Exams typically have opportunities for extra credit (2-5 points). On exam days, the first hour of the class will be allotted to the exam. The remaining time will be spent covering new material. Please make every attempt to be present for exams. Make-up exams will consist of all essay questions. If you are sick, please contact me as soon as possible so we can make other arrangements.

Lab:

Lab exercises are an integral part of this course. Missing three labs is equivalent to dropping the lab portion of the class, and a grade of F will be given. In general, missed labs cannot be made up due to the extensive amount of prep work that goes into setting up for the lab. If you are going to miss a lab, please let myself and/or your T.A. know as soon as possible so that we can attempt to accommodate you. Keep in mind that many of the exercises are completed over the course of two or more lab periods. Completion of the lab exercises (recording results and observations), as well as developing good lab techniques are critical to successful completion of this course (remember, lab is worth 33.5% of your grade). Please come to lab prepared (review the lab exercise(s) beforehand), and be on time. I have tried to arrange the labs so that they correlate with lecture topics as much as possible (e.g. we will do experiments on microbial growth at the same time we are learning about it in class).

You are responsible for completing all parts of your lab manual. This includes recording results and observations, and answering brief questions about your results. Since each lab exercise is different, the number of points varies for each exercise. A handout outlining point values for lab manual questions will be given to you. Basically, if you do all the exercises, record your results, and provide thoughtful answers to all questions, you will receive full credit. Failure to completely answer questions will result in partial credit being given. Your lab manuals will be due three times during the semester: October 7 for Exercises 1-8, October 28 for
Exercises 9 & 10, plus Synthetic epidemic/immunology handout, and December 9 for Exercises 11 & 12.

Your proficiency in and understanding of general microbiological techniques will be assessed during the **lab practical**, given at the end of the semester (December 9). It is important to thoroughly understand the concepts covered in lab, as well as to be proficient in standard methods such as pure culture techniques, Gram staining, and microscopy. So as you go through the lab exercises, take your time and make sure you understand what you are doing. You will have plenty of opportunities to practice your techniques, as well. Don’t be afraid to ask questions!

**Lecture outlines and exams:**
Lecture outlines are provided at the beginning of each lecture. I include a list of terms that you should know, as well as a few questions/statements on the key points of the lecture. On exams, my questions come from the Key Points section of the lecture outlines. This is the best tool for studying. The online quizzes/interactive learning tools provided by McGraw-Hill may be of use to you, as well, but if you have limited time, I would focus on the lecture outlines and your notes. Another good study tool is to review the Summaries and Review Questions at the end of each chapter (but note that not all questions will apply to you). I generally do not hold review sessions. There is ample time during lecture to ask questions and have things clarified. If you review your lecture outlines, you will be fine.

**Attendance:**
It is strongly recommended that you attend lecture every week. I have found that students who attend class do far better than those who do not. Due to the structure of the lectures (3 hours vs. 3x 1 hour), you will miss a lot of material and discussion if you miss one class. In addition, depending on the lecture topic, there may be some hands-on learning activities and demonstrations. At the beginning of lecture you get an outline (which is not on Blackboard for retrieval at a later time). Remember, journal assignments and concept maps are due in lecture every Tuesday. I do not take attendance as a rule, but I make a point of getting to know each of my students. Attendance will be noted in lab.

**Courtesy issues:**
Food: Food and drink are strictly prohibited in lab. Please do not bring food into the lecture, as it is a distraction to other students. Drinks may be brought in to lecture, but please try to avoid making a lot of noise.

Cell phones: Cell phones may not be brought into the lab, where they could easily become contaminated with pathogens and/or chemicals. Please do not bring cell phones into lecture. This is your time to listen and learn. Few things are more important than that.

Laptop computers: I prefer it if students do not bring laptop computers to class for note taking, as some students are distracted by the clicking of the keyboard.
Disabilities Services:
The Office of Disability Services insures that UAF students have equal access to campus and course materials. I will work with the Office of Disabilities Services (Whitman Bldg., room 203, 474-7043) to provide reasonable accommodation to students with documented disabilities.

Academic integrity:
It is assumed that the work you do for this course is your own, and not that of someone else. All aspects of the UAF Student Code of Conduct apply (pg. 71 of the 2004-2005 catalog). In lab we will sometimes be working with partners, and it is expected that each partner will contribute equally to the exercise.

Grades: Grades are given as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90% or higher</td>
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<td>B</td>
<td>80-89%</td>
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<td>C</td>
<td>70-79%</td>
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<tr>
<td>D</td>
<td>60-69%</td>
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<td>F</td>
<td>&lt;60%</td>
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I generally do not curve grades because I do not write my exams based on a curve. I provide current grade information at regular intervals during the semester (generally every time something is graded and returned to you).

Extra credit options:
Opportunities for extra credit will likely be available during the course of the semester. These may include additional questions on exams, a short summary of a seminar on some aspect of microbiology, and/or a short report to the class on a current event involving some aspect of microbiology. I will make announcements regarding seminars, but keep in mind that there may not be any this semester that deal with microbiology.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Text pages</th>
<th>Assignment(s) due</th>
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<tbody>
<tr>
<td>Sept 7</td>
<td>Introduction &lt;br&gt; Assignment of diseases &lt;br&gt; Chemistry and macromolecules</td>
<td>1-16 &lt;br&gt; 17-38</td>
<td>Choose a disease to focus on this semester (in class)</td>
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<tr>
<td>Sept 14</td>
<td>Structure of prokaryotic cells</td>
<td>49-68</td>
<td>Concept map 1 &lt;br&gt; Journal assignment 1</td>
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<td>Sept 21</td>
<td>Microbial growth</td>
<td>83-107</td>
<td>Concept map 2 &lt;br&gt; Journal assignment 2</td>
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<td>Sept 28</td>
<td>Control of microbial growth &lt;br&gt; Antimicrobial drugs &lt;br&gt; Antiviral drugs &lt;br&gt; Antifungal drugs</td>
<td>109-127 &lt;br&gt; 507-524 &lt;br&gt; 525-526 &lt;br&gt; 526-529</td>
<td>Concept map 3 &lt;br&gt; Journal assignment 3</td>
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<tr>
<td>Oct. 5</td>
<td>Exam I &lt;br&gt; Identification of prokaryotes &lt;br&gt; Metabolism</td>
<td>245-254 &lt;br&gt; 129-141 &lt;br&gt; 146-153</td>
<td>Concept map 4 &lt;br&gt; Journal assignment 4</td>
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<td>Oct 12</td>
<td>DNA, RNA, and proteins &lt;br&gt; Mutations and repair</td>
<td>167-179 &lt;br&gt; 183-186 &lt;br&gt; 191-198</td>
<td>Concept map 5 &lt;br&gt; Journal assignment 5</td>
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<td>Oct 19</td>
<td>FMH Mini-medical school lecture by Alaska CDC Director</td>
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<td>Concept map 6 &lt;br&gt; Journal assignment 6</td>
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<td>Oct 26</td>
<td>Viruses &lt;br&gt; Innate immune response</td>
<td>341-362 &lt;br&gt; 371-390</td>
<td>Concept map 7 &lt;br&gt; Journal assignment 7</td>
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<td>Nov 2</td>
<td>Adaptive immune response &lt;br&gt; Applications of immune responses</td>
<td>393-412 &lt;br&gt; 419-436</td>
<td>Concept map 8 &lt;br&gt; Journal assignment 8</td>
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<td>Nov 9</td>
<td>Exam II &lt;br&gt; Immunologic disorders &lt;br&gt; Host-microbe interactions</td>
<td>441-457 &lt;br&gt; 459-468</td>
<td>Concept map 9 &lt;br&gt; Journal assignment 9</td>
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<td>Nov. 16</td>
<td>Host-microbe interactions (cont.) &lt;br&gt; Epidemiology &lt;br&gt; Nosocomial infections</td>
<td>468-481 &lt;br&gt; 485-492 &lt;br&gt; 499-503</td>
<td>Concept map 10 &lt;br&gt; Journal assignment 10</td>
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<td>Nov 23</td>
<td>Anatomy/physiology of skin &lt;br&gt; Diseases of the skin &lt;br&gt; Anatomy/physiology of the respiratory system &lt;br&gt; Respiratory diseases</td>
<td>533-536 presentations &lt;br&gt; 561-564 presentations &lt;br&gt; 597-601 presentations</td>
<td>Concept map 11 &lt;br&gt; Poster or brochure Presentations</td>
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<td>Nov 30</td>
<td>Anatomy/physiology of the nervous system &lt;br&gt; Diseases of the nervous system</td>
<td>663-666 presentations</td>
<td>Concept map 12</td>
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<td>Date</td>
<td>Topic</td>
<td>Presentations</td>
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<td>Anatomy/physiology of wound infections</td>
<td>691-693 presentations</td>
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<td>Wound infections</td>
<td>715-717 presentations</td>
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<td>Anatomy/physiology of the blood and lymphatic systems</td>
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<td>Diseases of the blood/lymphatic system</td>
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<td>Dec. 7</td>
<td>Anatomy/physiology of the genitourinary system</td>
<td>633-635</td>
<td>Concept map 13</td>
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<td>Diseases of the genitourinary system</td>
<td>636-642</td>
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<td>STDs</td>
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<tr>
<td>Dec 14</td>
<td>Final exam</td>
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