Department: Life Sciences (Biology)

**MICROBIOLOGY**  
Spring 2013  
BIOL 2420 CRN 34604

| Course location and times: | Stafford Campus Scarcella Science and Tech. Bldg.  
M – lab (Rm.S118) ; W – lecture (Rm.W125)  
2:00 pm – 5:00 pm M W |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Course semester credit hours:</td>
<td>4 Semester Credit hours</td>
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<tr>
<td>Course contact hours:</td>
<td>96 total hours; 48 hrs lecture, 48 hrs laboratory</td>
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<tr>
<td>Course length:</td>
<td>16 weeks</td>
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<tr>
<td>Instruction type:</td>
<td>In-person, Lecture –lab; Web-enhanced</td>
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</table>

Instructor: Dr. Joy L. Marshall  
Phone: 713-718-7771  
Email address: Joy.marshall@hccs.edu  
Office location and hours: Stafford Campus  
M W by appointment

**Course Description:**  
This course is a study of microbes, including a description of basic cell structure, biochemistry, metabolism, nutrition, reproduction, and genetics. Mechanisms of transmission, microbial entry, pathogenesis, prophylaxis, epidemiology, and microbial control of selected human pathogens will be explored. Basic body defense mechanisms and immunological responses to pathological conditions will be examined. Study of medically important microbes that cause disease will be taught. Core Curriculum Course.

*Note:* You are spending a good deal of time, energy and money on this course – please, make the most of your investment! It takes approximately **2-3 hours of study time for each hour of class time to master the material.** This class will have over 96 contact hours (4 hr. credit) compared to 48 contact hours that comprise the normal class (3 hr. credit).

The class and study time necessary to succeed in this class will be close to 300 hours (20 hours per week)!

**Course Prerequisites:**  
*General Biology 1406 is a Prerequisite.*  
Must be placed into college-level reading (or take GUST 0342 as a co-requisite) and be placed into college-level writing (or take ENGL 0310 /0349 as a co-requisite)

If you have not taken the prerequisite course, your full understanding of the material will be limited and this will affect your grade. Human Anatomy and Physiology does not replace the required prerequisite and success in Human A & P does not predict your grade outcome in Microbiology.
**Course Goals:**
This course is intended for students majoring in one of the physical sciences or life sciences, engineering, or for students who are pursuing pre-professional programs in medicine, dentistry, nursing, pharmacy, veterinary medicine, or other allied health programs. The course is also beneficial to students who are preparing themselves for higher level science courses in their respective curricula.

**Biology 2420 Program Learning Outcomes:**
1. To recognize, identify, and describe the structure, function, and significance of microbes.
2. To develop standard and accepted laboratory techniques in the field of Microbiology.
3. To develop attitudes and work habits applicable to the healthcare field.

**Course Student Learning Outcomes:**
"The following Student Learning Outcomes with their associated assessment criteria are not meant to be all inclusive, and are meant to be used along with all other course learning outcomes and assessment devices, listed under Course Objectives, in the determination of the student’s final course grade. Completion of the specific Student Learning Outcomes listed below, at any assessment grading level, does NOT and will NOT guarantee the student that final course grade at the end of the semester!

1. The student will recognize and compare the structure and function of microbes (and their respective organelles) including bacteria, fungi, viruses, selected protozoa, and helminthes.
2. The student will explain the process of identification and classification of microbes.
3. The student will explain the clonal selection theory of Adaptive Immunity.
4. The student will demonstrate aseptic technique in the laboratory and an understanding of microbial control.
5. The student will exhibit competence with Microscopy, including the use of the oil immersion objective lens.
6. The student will develop the habit of reliable attendance by being absent from class no more than four times per semester.
7. The student will demonstrate punctuality in class attendance and in the submission of class assignments by the deadline.

**Instruction Methods:**
A General Biology proficiency exam will be administered at the beginning of the semester.

Lecture format may include use of whiteboard, Powerpoint outlines, videos, film clips, transparencies, photos, or animations. Assigned textbook chapters should be read prior to class. Lecture material will correspond to the topics covered in the required textbook. Topics and concepts covered during lecture or included in the assigned reading will be included in exams.

Laboratory sessions will emphasize learning standard microbiological lab techniques. The instructor will demonstrate methods and assist reinforcement of lecture material. Lecture may be included during lab sessions to clarify or detail concepts.

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<thead>
<tr>
<th>Student Assignments:</th>
<th>Students are required to read assigned chapters before lecture and laboratory exercises are scheduled.</th>
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<tr>
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<td>Unannounced quizzes will be given in lab or lecture.</td>
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</table>

| Student Assessments: | Students will be assessed via lecture and laboratory examinations, chapter quizzes, comprehensive final lecture and lab examinations. Additionally, there is a required General Biology proficiency examination at the beginning of the semester. |
### Instructional Materials:

**Textbook:**

**Laboratory Manual:**

**Web resources:**
1. Southwest College Learning Web: Syllabus, Chemistry Review file, and Chapter review questions.
2. Textbook Website: CONNECT- you must purchase a code if you do not buy a new textbook or the ebook.
3. Moodle learning system: Powerpoint lectures and images, and lab images

### HCC Policy Statement: ADA

Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Services Office at the respective college at the beginning of each semester. Instructors are authorized to provide only the accommodations requested by the Disability Support Services Office. If you have any special needs or disabilities that may affect your ability to succeed in college classes or participate in any college programs or activities, please contact the DSS office for assistance. At Southwest College, contact:
Dr. Becky Hauri
5407 Gulfton
Houston, Texas 77081
Phone: 713-718-7909
Fax: 713-718-7781
TTY: 713-718-7909

### HCC Policy Statement: Academic Honesty

Students are responsible for conducting themselves with honor and integrity in fulfilling course requirements. Disciplinary proceedings may be initiated by the college system against a student accused of scholastic dishonesty. Penalties can include a grade of "0" or "F" on the particular assignment, failure in the course, academic probation, or even dismissal from the college. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion.

### HCC Policy Statement: Attendance

**Attendance**
Students are expected to attend classes regularly. Students are responsible for materials covered during their absences, and it is the student's responsibility to consult with instructors.
for make-up assignments.

Instructors check class attendance daily. A student may be dropped from a course for excessive absences after the student has accumulated absences in excess of 12.5% of the hours of instruction (including lecture and laboratory time). Note that 12.5% is approximately 4 classes or labs for a 4-semester hour course.

Habitual tardiness will not be tolerated. Students are expected to be in attendance for the entirety of the scheduled class and are responsible for completing assignments scheduled during their absence/s. It is the responsibility of each student to amend their professional/personal schedule to meet the class schedule.

If you wish to drop the class, it is your responsibility to complete the paperwork and get it to the registration desk or the online system before the deadline. I do not drop students for lack of attendance.

Repeaters
Students who repeat a course for a third or more times may soon face significant tuition/fee increases at HCC and other Texas public colleges and universities. Please ask your instructor / counselor about opportunities for tutoring / other assistance prior to considering course withdrawal or if you are not receiving passing grades.

Withdrawals
Withdrawal from the course after the official day of record (see current catalog) will result in a final grade of “W” on the student transcript and no credit will be awarded. It is the student’s responsibility to initiate and complete a withdrawal from any course. Abandoning the course or failing to formally drop, will result in a grade being given based on the work completed for the entire course (including missed exams).

The State of Texas has begun to impose penalties on students who drop courses excessively. For example, if you repeat the same course more than twice, you have to pay extra tuition. Beginning in fall 2007, the Texas Legislature passed a law limiting first time entering freshmen to no more than SIX total course withdrawals throughout their educational career in obtaining a certificate and/or degree.

Receiving a "W" in a course may affect the status of your student Visa. Once a W is given for the course, it will not be changed to an F because of the visa consideration. Please contact the International Student Office at 713-718-8520 if you have any questions about your visa status and other transfer issues.
Instructor Requirements:

1. Students should be on time for class and be prepared (having read and studied the assignments) with required materials including textbook and lab manual. Breaks will be given; any abuse of break time will be noted.
2. No eating or drinking in labs or classrooms (water bottles are permitted)
3. No electronic devices are permitted to be on and in use. If family/personal situations require you to be available via phone, place it on vibrate and wait until break to respond or quietly exit to outside. Taking calls, texting, etc. during class is disruptive and discourteous to instructor and classmates.
4. **All exams and scantrons are to be returned to the instructor at the end of the semester.** After testing, some exams may not be returned. Exams are not to be photocopied.
5. If you have a condition which will affect performance of a lab or assignment, please inform the instructor. We will be handling infectious, living pathogens.
6. **All rules of the college apply.** Know the safety rules as applied to the lab component of this course. Repeat violations of safety rules endanger the entire class and will result in a deduction of points from your grade.
7. The use of recording devices, including camera phones and tape recorders, is prohibited in classrooms, laboratories, faculty offices, and other locations where instruction, tutoring or testing occurs. Students with disabilities who need to use a recording device as a reasonable accommodation should contact the Office for Students with Disabilities for information regarding reasonable accommodations.
8. Testing procedures:
   a. Come prepared to take the test. You will need a scantron for most exams, a #2 pencil, and a smudge-proof eraser.
   b. Be sure to arrive early for your examinations. There are time limits for exams and if you arrive late, you will not be given additional time. Once the exam has begun you will not be allowed to leave the room, so take care of restroom needs before we begin.
   c. Do not plan to leave after a test or schedule appointments, as we will continue with class or lab.
9. You will need to purchase a box of coloring pencils for preparing your lab reports.

Department Guidelines:
Students are expected to conduct themselves as adults. This includes courteous and respectful behavior towards instructor and classmates. Disruptive behavior or any behavior that interferes with any educational activity being performed by the instructor will not be allowed. Additionally, no student may interfere with his/her fellow students’ right to pursue their academic goals to the fullest in an atmosphere appropriate to a community of scholars. Disruptive behavior may result in removal from the class.

Lab policy:
Lab safety rules are stated in lab manual. Lab rules and regulations will be discussed during the first lab and must be followed at all times. Each student is responsible for cleaning up after labs; this includes disinfection of table surfaces, microscope lens cleaning, prepared slide cleaning, glassware washing (no, clean up is not covered by your lab fees). Cleaned prepared specimen slides are to be replaced in the labeled boxes in the correct order and correct format. **No one may leave until the laboratory is clean and the instructor has released the class.** This is a team effort.
Hand washing is required before leaving the lab for any reason.

Lab reports are due the next class day after the lab (not the next lab session) unless we must wait until the next lab session to read results.
Lab reports count about 5 points each toward the lab average.

There are no make-up lab practical exams; at the discretion of the instructor and with proper medical excuse (or other) from the student, a written exam may be administered.

<table>
<thead>
<tr>
<th>Program/Discipline Requirements</th>
<th>Proficiency Exam for General Biology</th>
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<tbody>
<tr>
<td>HCC Grading Scale:</td>
<td>A = 90-100%</td>
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<td></td>
<td>B = 80-89%</td>
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<td></td>
<td>C = 70-79%</td>
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<td>D = 60-69%</td>
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<td>F = less than 60%</td>
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**Instructor Grading Criteria:**
Failure to take a test (lab or lecture) will result in a “0” for the missed exam. A test may be made up (lecture, no lab practical) with proper documentation from the student.
Only one make-up exam per semester is allowed (with proper documentation) and must be arranged with instructor ASAP.

**Examination format:**
Lecture exams may consist of any type of question: essay, multiple choice, true-false, matching, diagrams, and/or short answer. They will cover the material we cover in class as well as assigned reading, and may be comprehensive to include previous material. Lab exams will cover the material we cover in labs (but information sometimes overlaps with lecture) and may have a written as well as practical component. Exams may not be permanently returned to the student after testing.

**Grade Calculation**

<table>
<thead>
<tr>
<th>Lecture Exam 1</th>
<th>100</th>
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<tbody>
<tr>
<td>Lecture Exam 2</td>
<td>100</td>
</tr>
<tr>
<td>Lecture Exam 3</td>
<td>100</td>
</tr>
<tr>
<td>Lecture Exam 4</td>
<td>100</td>
</tr>
<tr>
<td>Lecture Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>Lab Exam 1</td>
<td>100</td>
</tr>
<tr>
<td>Lab Exam 2</td>
<td>100</td>
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<tr>
<td>Lab Reports/Performance</td>
<td>100</td>
</tr>
<tr>
<td>POP Quizzes</td>
<td>100</td>
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<tr>
<td><strong>TOTAL POINTS</strong></td>
<td><strong>1000</strong></td>
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**NOTE:** The Instructor reserves the right to modify this syllabus should circumstances arise during the semester and with adequate notification to the students.
### Assessment Rubrics

**Microbiology 2420**

<table>
<thead>
<tr>
<th>PSLO #1</th>
<th>F</th>
<th>D</th>
<th>C</th>
<th>B</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will recognize and compare the structure and function of microbes (and their respective organelles) including bacteria, fungi, viruses, selected Protozoa, and Helminthes.</td>
<td>Unable to demonstrate knowledge of structure and function of most microbes (and organelles) including bacteria, fungi, viruses, selected Protozoa, and Helminthes</td>
<td>Occasionally able to demonstrate knowledge of structure and function of a few microbes (and organelles) including bacteria, fungi, viruses, selected Protozoa, and Helminthes</td>
<td>Occasionally able to demonstrate knowledge of structure and function of most microbes (and organelles) including bacteria, fungi, viruses, selected Protozoa, and Helminthes</td>
<td>Consistently able to demonstrate knowledge of structure and function of most microbes (and organelles) including bacteria, fungi, viruses, selected Protozoa, and Helminthes.</td>
<td>Consistently able to demonstrate knowledge of structure and function of all microbes (and organelles) including bacteria, fungi, viruses, selected Protozoa, and Helminthes.</td>
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<table>
<thead>
<tr>
<th>PSLO #1</th>
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<th>A</th>
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<tbody>
<tr>
<td>2. The student will explain the process of identification and classification of microbes.</td>
<td>Unable to demonstrate and apply knowledge of the five “I’s”, standard methods of identification, or use of culture media.</td>
<td>Rarely able to demonstrate and apply knowledge of the five “I’s”, standard methods of identification, or use of culture media.</td>
<td>Able to sometimes demonstrate and apply knowledge of the five “I’s”, standard methods of identification, or use of culture media.</td>
<td>Able to consistently demonstrate and apply knowledge of the five “I’s”, standard methods of identification, or use of culture media.</td>
<td>Able to consistently demonstrate and apply knowledge of the five “I’s”, standard methods of identification, or use of culture media.</td>
</tr>
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<th>A</th>
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<tbody>
<tr>
<td>3. The student will be able to explain Clonal Selection Theory.</td>
<td>Unable to explain the origin and development of T and B lymphocytes, specificity and diversity of receptors on T and B lymphocytes, the origin of immune tolerance, and neither major stage of Clonal Selection Theory.</td>
<td>Unable to fully explain the origin and development of T and B lymphocytes, specificity and diversity of receptors on T and B lymphocytes, the origin of immune tolerance, and neither major stage of Clonal Selection Theory.</td>
<td>Able to consistently explain the origin and development of T and B lymphocytes, specificity and diversity of receptors on T and B lymphocytes, the origin of immune tolerance, and neither major stage of Clonal Selection Theory.</td>
<td>Able to consistently explain the origin and development of T and B lymphocytes, specificity and diversity of receptors on T and B lymphocytes, the origin of immune tolerance, and one major stage of Clonal Selection Theory.</td>
<td>Able to consistently explain the origin and development of T and B lymphocytes, specificity and diversity of receptors on T and B lymphocytes, the origin of immune tolerance, and two major stages of Clonal Selection Theory.</td>
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<tr>
<th>PSLO #1</th>
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<th>D</th>
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<th>A</th>
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<tr>
<td>4. The student will demonstrate aseptic technique in the laboratory and an understanding.</td>
<td>Consistently disregards aseptic technique in performing lab exercises and consistently disregards rules of the microbiology lab.</td>
<td>Consistently disregards aseptic technique in performing lab exercises and occasionally fails to follow the rules of the microbiology lab.</td>
<td>Occasionally fails to demonstrate aseptic technique in performing lab exercises and occasionally fails to follow the rules of the microbiology lab.</td>
<td>Able to consistently demonstrate aseptic technique in performing lab exercises and occasionally fails to follow the rules of the microbiology lab.</td>
<td>Able to consistently demonstrate aseptic technique in performing lab exercises and consistently follow the rules of the microbiology lab.</td>
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<tr>
<td>5. The student will exhibit competence with Microscopy, including use of the oil immersion lens.</td>
<td>Consistently unable to locate the microbe on the microscope slide and consistently unable to focus using oil immersion lens or other objective without instructor’s help.</td>
<td>Occasionally able to locate the microbe on the microscope slide, but unable to focus using oil immersion lens or other objective without instructor’s help.</td>
<td>Occasionally able to locate the microbe on the microscope slide, and occasionally able to focus using oil immersion lens or other objective without instructor’s help.</td>
<td>Consistently able to locate the microbe on the microscope slide and consistently focus using oil immersion lens or other objective without instructor’s help.</td>
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<tr>
<td>PSLO #2</td>
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</table>

| 6. The student will develop the habit of reliable attendance by being absent from class no more than four times per semester. | Is absent frequently enough to interfere with instruction and the completion of the course objectives, and/or is frequently not where he/she is expected to be. Infracts the HCC attendance policies. | When absent, is never aware of the schedule for the day upon return, and must be reminded or encouraged to complete objectives missed during the absence. Is occasionally not where he/she is expected to be. | When absent, is only occasionally unaware of the schedule for the day upon return. Completes objectives missed during the absence only with the help of the instructor and/or classmates, and is where he/she is expected to be at all times. | Is consistently on time for class and for assignment turn-in. Always submits assignments on the due date. | Is never absent, always aware of the schedule for the day, and is where he/she is expected to be at all times. Consistently and willingly follows HCC attendance policies without being reminded. |
| PSLO #3 | | | | | |

| 7. The student will demonstrate punctuality in class attendance and in the submission of class assignments by the deadline. | Is frequently late for class enough to interfere with class instruction. Submits assignments two or more weeks late, or ignores assignments. | Is occasionally late for class and occasionally late for assignment turn-in. Submits assignments no more than one week late. | Is consistently on time for class and rarely late for assignment turn-in. Always submits assignments on the due date. | Is consistently on time for class and for assignment turn-in. Always submits assignments on the due date. | Is never absent, always aware of the schedule for the day, and is where he/she is expected to be at all times. Consistently and willingly follows HCC attendance policies without being reminded. |
| PSLO #3 | | | | | |
I acknowledge that I have read the syllabus for Biology 2420 and understand the effort and time commitment necessary to succeed in this Science Major, Medical Professional Class. (approximately 300 hours, 20 hr./week) I will prepare for class and perform all exercises and assessments on time and to the BEST of my ability. I understand that I will get the grade I earn, as determined by my performance on my work and the Departmental Final Exam. Please remember that you are preparing for a medical career so there will be no exceptions.

Name_____________________________________________________

Email Address _____________________________________________
Current Phone # ________________________________
<table>
<thead>
<tr>
<th>Week Number</th>
<th>Mon. - Lab (exercise number)</th>
<th>Wed. - Lecture (text chapter)</th>
</tr>
</thead>
</table>
| 1: 1/14-1/20 | (1) Care and Use of the Microscope  
              (2) Simple Staining and Bacterial Morphology | (1) Introduction; Proficiency Exam for General Biology  
                                      (2) The Chemistry of Biology |
| 2: 1/21 – 1/27 | School closed (no lab) – MLK, Jr. Day Holiday | (3) Tools of the Laboratory  
                (4) Survey of the Prokaryotes |
| 3: 1/28 – 2/3 | (4) Isolation of Bacteria Using the Streak Plate Method  
                (5) Gram Staining | (5) Survey of Eukaryotes |
| 4: 2/4 – 2/10 | (6) Acid Fast Staining  
                (7) Bacterial Spores | LECTURE EXAM 1  
                       (7) Microbial Nutrition |
| 5: 2/11 – 2/17 | (8) Bacterial Capsules  
                 (9) Bacterial Flagella and Motility Testing  
                 (10) Selective, Differential and Enriched | (8) Microbial Metabolism  
                                (9) Microbial Genetics |
| 6: 2/18 – 2/24 | School closed (no lab) – President’s Day Holiday | (10) Genetic Engineering  
                                     (11) Physical and Chemical Agents |
| 7: 2/25 – 3/3 | LAB EXAM 1  
              Lab Reports / Performance | (6) Introduction to Viruses  
                                     (24) DNA Viruses |
| 8: 3/4 - 3/10 | (11) Gas Requirements for the Growth of Bacteria | LECTURE EXAM 2  
                      (25) RNA Viruses |
| 3/11 – 3/17 | SPRING BREAK | SPRING BREAK |
                (14) Control of Microbial Populations: Effect of Chemicals | (13) Microbe-Human Interactions  
                                     (14) Host Defense and Innate Immunities |
                                                  (17) Identify Pathogens and Diagnosing Infections |
| 11: 4/1 – 4/7 | (15) Carbohydrate Fermentation by Bacteria | LECTURE EXAM 3  
                     (18) Gram Positive and Gram Negative Cocci of Medical Importance |

**Tentative Schedule:** While we will follow the academic schedule, please note that it is subject to change.
<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Exam/Exercises</th>
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</table>
| 12: 4/8 – 4/14 | (16) Triple Sugar Iron Agar (TSI) Fermentation Test  
(17) The IMViC Biochemical Test | (19) Gram Positive Bacilli of Medical Importance |
| 13: 4/15 – 4/21 | (19) Bacteriophages                                                  | (20) Gram Negative Bacilli of Medical Importance  
(21) Miscellaneous Bacterial Agents |
(22) Fungi |
| 15: 4/29 – 5/5 | LAB EXAM 2  
Lab Reports / Performance                                            | (23) Parasites                        |
| 16: 5/6 – 5/12 |                                                                      | COMPREHENSIVE FINAL EXAM              |