GENERAL MICROBIOLOGY  BIOL 310

Fall Semester 2015  Dr. Susan J. Morrison
Lecture: 9:55--11:10 am TR  Office: 310 Harbor Walk West
                      Phone: (843) 953-7363
Microbiology Lab: Med Univ. of SC, SC School of Pharmacy Bldg (280 Calhoun St)  e-mail: MorrisonS@CofC.edu
Room 402

Lab Instructors:    Ms. Tracy Hirsch (Sections 1, 2, 3, 4, 6  Mondays & Tuesdays & Wed 11:30 am-2:30 pm)
                    Phone messages for lab instructor:  953-5504 (Biology Office) to leave message
                    Dr. Susan Morrison (Section 5, Wednesday 2:30-5:30 pm)

Mailboxes(mail goes below the name) : Biology Office, SSMB 2nd floor [Note that I don’t pick up my mail daily in SSMB, so if there is any urgency, please deliver it to HWWE. In HWWE, it should be slid under my office door (if it isn’t too thick) OR placed in a secondary mailbox in HWWE Room 304 (except door is usually locked).

SCOPE OF COURSE--CATALOG DESCRIPTION
An introduction to the microbial world with special emphasis on bacteria. Topics include cellular structures, bacterial metabolism, microbial genetics, bacterial growth and its control, virology and the epidemiology and pathogenicity of disease-producing microorganisms. The laboratory emphasizes proper handling techniques, identification methods, & properties of microorganisms.

COURSE OBJECTIVES
At the completion of this course, a student should:

IN LECTURE
1. be able to integrate prerequisite knowledge of basic chemistry and college-level mathematics with the study of microorganisms;
2. be able to identify and explain the basic concepts of microbiology and describe the properties of microorganisms (primarily bacteria and viruses), including: (a) cell structure, function and growth; (b) methods of growing and studying microbes; (c) metabolism; (d) genetics and molecular biology; (e) factors affecting microbial growth and survival, including environmental and chemical agents; (f) the major groups of bacteria; (g) the role of microorganisms in daily life, including such topics as human health and disease, food, and/or biogeochemical cycling; and (h) the major groups of bacteria and their characteristics;
3. be able to define, understand, use, and spell and pronounce correctly the basic vocabulary of microbiology;
4. be able to summarize the historical development of microbiology and to explain the contributions of microbes in modern day events;
5. display the ability to apply factual knowledge to new situations, such as interpretation of results, analysis of current news events, or understanding of a phenomenon;
6. to apply critical thinking skills to the subject of microbiology and its applications.

IN LABORATORY
1. display the ability to work with Class I microorganisms safely and correctly in laboratory;
2. display the ability to perform basic microbiology laboratory techniques (including stains, dilutions, streak plates, microscopy, media preparation, biochemical tests);
3. display the ability to explain the theoretical basis of the tests, procedures and the observed microbial activity;
4. be able to state the key characteristics of the groups of bacteria used in lab;
5. display the ability to identify bacteria, including culture isolation and maintenance, laboratory analysis, use of references and reporting of results using professional (American Society for Microbiology) journal format.
TEXT:  In lieu of requiring you to purchase a specific text, there is a list of possible text books. You may choose to purchase any one of these from a discount source, borrow one from someone else, use a next-to-the-last edition (rather than the current one), and/or use an online source (such as the free textbook by Todar). Several different texts are on reserve in the library under my name.

COURSE PACK (required): at SAS-E-Link (219 Calhoun St)  (Bring appropriate part to every lecture & lab class.)
Suggestions for making more effective use of the course pack:
   a. get some dividers and split into sections corresponding with the major topic areas:
      Intro & History; Medical Intro; Microscopy & Cell Structures; Nutrition & Metabolism; Growth & Environment; DNA, RNA, Protein & Regulation; Viruses; Genetics; other
   b. provide additional 3-hole paper for notes too extensive to fit on the printed pages
   c. develop your own additional pages to help you study, e.g. charts comparing two things or references to specific pages or topics in the text
   d. use the coursepack as a means to reduce your note taking, not as a substitute for taking notes, for reading a text or for attending lecture
   e. use a new copy to get the full benefit.

RECOMMENDED BOOKS (Optional):
2. Borror, Donald J. Dictionary of Word Roots and Combining Forms (or similar sources)
3. Campbell, Neil A., & Jane B. Reece. Biology. Current or earlier editions. [the BIOL 111-112-211 lecture text; this introductory biology text or comparable text books will be a useful reference for basic concepts in biology]

Some additional books may be found in the non-text book section of the college bookstore. These include:
deKruif, Paul, and F. Gonzalez-Crussi. 1926, 2002. Microbe Hunters  Harcourt 357 pp. [a classic]
Preston, Richard. 1994. The Hot Zone  (about Ebola)  & 2002. The Demon in the Freezer  (about smallpox)  [Both are best-selling, non-technical, non-fiction books. You should critique as a microbiologist.]
Books by Laurie Garrett


i-CLICKERS may be employed. You will receive instructions.

OAKS may be used for class information, announcements and other material related to the class. If we are using it, you should check it regularly.

OFFICE HOURS I will be available immediately following lecture on most Tuesdays (11:15 am-noon) & Thursdays (11:15 am-noon), as well as most Wednesdays from 10:30 to 11:30 am. You are encouraged to see me at these times or to arrange an appointment. Additional hours &/or review sessions will be announced for critical times in the semester. If I am available, I will also be happy to meet with you on a walk-in basis. Please introduce yourself by full name each time you come to see me to help me learn all of your names. Feel free to call ahead to be sure I am in before you trek from Main Campus to Harbor Walk.

TRANSIT to/from class is a challenge that we are adapting to. Since Harbor Walk courses are off-set by 30 minutes, you should have no problem reaching class on time. Options include bicycling, walking or the DASH shuttle. To reach MUSC, you will need to ride two different shuttles or ride half-way & walk the other.
E-Mails If you send me an e-mail, please lead off the subject with the words “CLASS” or “MICRO.” I get inundated daily with e-mails and am less likely to overlook your message with this word displayed prominently. Please remember that I can send confidential information only to your official College of Charleston e-mail account or MUSC e-mail account.

A TENTATIVE LECTURE SEQUENCE is attached. It is highly beneficial to read the corresponding text material before each topic is covered in lecture and to also familiarize yourself with what is in the course packet.

PREREQUISITES for this course are BIOL 111, 111L, 112, 112L and 211 and One Year of Chemistry. "One Year of Chemistry" means you must have already completed, with passing grades, CHEM 101-101L-102-102L or CHEM 111-111L-112-112L, or the equivalent. For transfer students, the course must have transferred to the CoFC as equivalent to the above. BIOL 305 is a prerequisite or corequisite, although CHEM 231 can be substituted for BIOL 211 & 305. Biology also requires MATH 205 Statistics as a prerequisite to all of its upper-level classes.

ATTENDANCE at all lectures is expected and can be an important factor in your class performance; roll will be taken regularly though not necessarily every time. Signing someone else's name or permitting someone else to sign your name is a violation of the Honor Code. An excessive number of unexcused absences from lecture (excessive = more than 2 in lecture) or from lab (one = excessive in lab) constitutes grounds for dismissal from class and assignment of a grade of WA (equivalent to an F) or voiding eligibility for bonus/project/score adjustment points. Roll will also be taken in laboratory where no unexcused absences are permitted. Official absence notices are handled by the Absence Memo Office, located in the white house at the corner of Glebe & George Streets (67 George Street) next to the Stern Center. If you will be absent on official college business, please provide documentation in advance. The usefulness of the coursepack will be sharply reduced if you aren't present in lecture, since it serves to make note-taking easier, not replace the lecture.

Please make every effort to be on time. Leaving the back row of seats vacant will help accommodate anyone who does come late. Once class has begun, you are expected to remain seated unless you have a genuine emergency. Please do not bring food to class; beverages will be disregarded as long as they aren’t spilled and aren’t heard. Electronic devices such as cell phones and smart pads may not be used. Texting and similar activities during class are forbidden. Laptops or netbooks may be used only for note-taking during class. Also, be sure there will be no audible signals from cell phones or other devices.

IF you have a DISABILITY that qualifies you for academic accommodations, please provide a letter from Disability Services at the beginning of the semester. I will be happy to discuss your situation in my office. For more information regarding accommodations, please contact the Office of Disability Services at (843)-953-1431, stop by their office in Lightsey Center Room 104 &/or refer to their web site at http://www.cofc.edu/~cds/ Any SNAP student must turn in their envelope at least 48 hours before the scheduled test.

The deadline for WITHDRAWAL from the course with a grade of "W" is Thursday October 29, 2015. In accordance with College regulations, withdrawal from the course after that date will be permitted only under dire and unpredictable circumstances, such as sudden serious illness (see "Withdrawal from Courses" in the Undergraduate Catalog). [Note that this deadline is after Express II begins, so if you need an Express II course to replace a dropped class, you will need to make your decision before the W date.]

You will be expected to do a variety of mathematical calculations in this class, including use of exponents and logarithms. The computations are simple enough that CALCULATORS should not be necessary for most of the calculations you will do in this class (lecture or lab). Programmed and/or wireless-compatible calculators are not acceptable on lecture tests. Very inexpensive scientific calculators, can be found at the major office supply stores or general stores. If you bring a calculator, it is your responsibility to know how to use it.
BIOL 310 MICROBIOLOGY

The LABORATORY SCHEDULE is in your course pack. Come to the first lab and all other labs prepared. This semester, labs begin on August 31 or September 1 or 2, the second week. The FIRST TWO lab weeks, where many basic techniques are introduced, are critical for your success in lab. There is a zero tolerance policy for unexcused absences. You do not receive separate credit or grade for lab; instead, your lab grade comprises almost 25% of the grade for the entire course. **You must sign a safety statement for lab, and then observe the safety rules** which are extensive.

**NAMETAGS:** MUSC requires all of its faculty, staff, students & contractors to wear nametags. Be sure you have your ID available at all times in case you are asked to show it. If you want a holder to clip on your lab coat, we can issue one.

All students are expected to be very familiar with and to adhere to **THE HONOR SYSTEM OF THE COLLEGE OF CHARLESTON.** In this class, removal of a test or copies of test questions from the classroom is a violation of the Honor Code. Anyone who shares contents of tests from prior semesters with someone in the class or anyone who uses this material for study for a test is also in violation of the Honor Code. Material from other sources must be properly attributed. Work *claimed* as your own (e.g. for mini-projects, posters, unknown report) must be your own work. Plagiarism is unacceptable.

**FINAL GRADE DETERMINATION:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tr>
<td>Three one-hour tests (130 points each)</td>
<td>390</td>
</tr>
<tr>
<td>Mini-projects for lecture</td>
<td>30</td>
</tr>
<tr>
<td>Final examination</td>
<td>200</td>
</tr>
<tr>
<td>Laboratory</td>
<td>200</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>820</strong></td>
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**GRADING SCALE:**

- 93-100% A Superior (762.5—820 points)
- 90-92.9% A- (738.0—762.4 points)
- 87-89.9% B+ Very Good (713.5—737.9 points)
- 82-86.9% B Good (672.5—713.4 points)
- 80-81.9% B- (656.0—672.4 points)
- 77-79.9% C+ Fair (631.5—655.9 points)
- 73-76.9% C Acceptable (598.5—631.4 points)

Grades below C do not transfer

- 71-72.9% C- (582.0—598.4 points)
- 69-70.9% D+ (566.0—581.9 points)
- 66-68.9% D Barely acceptable (541.0 — 565.9 points)
- ≤65.9% F less than 541 points

**QUESTIONS** about semester tests and assignments must be addressed *no later than* the start of the final exam.

There will be three (3) full-period TESTS based on lectures, text and assigned reading. Tests are **tentatively** scheduled for the following dates:

- September 29 (Tuesday)
- October 27 (Tuesday)
- November 24 (Tuesday)

Make-up tests will be given only if your absence from an examination is due to illness certified by a physician’s excuse or, at the discretion of the instructor, to a documented occurrence beyond your control. You must notify the instructor in advance when possible or immediately after a missed test; if you can’t reach me personally, you should send an e-mail and/or leave a voice message. Scheduling of the make-up test will be determined by the instructor, and must be at the earliest possible opportunity. Make-up tests must be taken before the graded test is shown to other students (except in extraordinary circumstances).

Tests & other assignments will usually be reviewed in class. Tests must be returned & will be kept on file by the instructor. If you are absent, it is your responsibility to examine your test during office hours or to arrange an appointment. There will be blocks of scheduled times for you to review your old tests prior to the final exam.
The **FINAL EXAMINATION** will be cumulative and will be an objective test (with the possible exception of the bonus questions). Final exams are scheduled for December 9-16, 2015; the **final exam** for this class (9:55 TR) is scheduled for **8:00—11:00 am** on **Saturday, December 12, 2015**. [The acceptable reasons for moving the time of a final exam are clearly defined—3 exams in a 24-hour period or two conflicting exams]. Changing the time of an exam requires approval by the department chair and possibly others who must sign the form.

**SOME OTHER IMPORTANT DATES---TENTATIVE**

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates/Details</th>
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<tbody>
<tr>
<td>Lab Test #1</td>
<td>Mon--Wed, October 5–7, 2015</td>
</tr>
<tr>
<td>Unknown Reports Due for Lab</td>
<td>Mon--Wed, October 2–4, 2015, Start of lab</td>
</tr>
<tr>
<td>Pathogen Posters (Lab)</td>
<td>Mon--Wed, November 2–4, 2015</td>
</tr>
<tr>
<td>Mini-projects Due for Lecture</td>
<td>Friday, November 13, 2015, 5:00 pm***</td>
</tr>
<tr>
<td>Cumulative Lab Test #2</td>
<td>Mon--Wed, November 9–11, 2015*</td>
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*For lab test #2 only, you may take yours with an earlier section.

[***Please don’t wait until the last minute! All of these should be done as you go along.]

See lab schedule for other lab dates.

**CODE OF ETHICS:** The following statement is derived from the Code of Ethics of the American Society for Microbiology (to which Dr. Morrison belongs) and a statement by the ASM Council Policy Committee.

The American Society for Microbiology is dedicated to the utilization of microbiological sciences for the promotion of human welfare and for the accumulation of knowledge. This long-standing position of the Society affirms that microbiologists will work for the proper and beneficial application of science and will discourage any use of microbes contrary to the welfare of humankind. Bioterrorism violates the fundamental principles expressed in the Code of Ethics of the society and is abhorrent to the ASM and its members.

************THE HONOR SYSTEM OF THE COLLEGE OF CHARLESTON************

**PREAMBLE:** The Honor System of the College of Charleston is intended to promote and protect an atmosphere of trust and fairness in the classroom and in the conduct of daily life. Students at the College of Charleston are bound by honor and by their acceptance of admission to the College to abide by the codes and to report violations. Faculty members are equally required to report violations of the Honor Code or Code of Conduct.

As members of the College community, students are expected to evidence a high standard of personal conduct and to respect the rights of other students, faculty, staff members, community neighbors and visitors on campus. Students are also expected to adhere to all federal, state and local laws.

Alleged violations of the Honor Code or Code of Conduct which are not admitted by the student will be heard by the honor board, a body composed of students, faculty and staff members. A student who admits to a violation of the Code of Conduct may elect to have the violation adjudicated by the Office of Student Affairs, a disciplinary panel, or by a full honor board. A student who admits to a violation of the Honor Code may elect to have the violation adjudicated by a disciplinary panel or by a full honor board.

The Honor Code at the College of Charleston specifically forbids: Lying; Cheating or Attempted cheating; Stealing or Attempted stealing; and Plagiarism. Plagiarism is:

> The verbatim repetition, without acknowledgment, of the writings of another author. All significant phrases, clauses, or passages taken directly from source material must be enclosed in quotation marks and acknowledged either in the text itself or in footnotes/endnotes.
> Borrowing without acknowledging the source.
> Paraphrasing the thoughts of another writer without acknowledgment.
> Allowing any other persons or organization to prepare work which one then submits as his/her own.

**PENALTIES FOR VIOLATIONS OF THE HONOR CODE:**

Penalties for violations of the Honor Code range up to and include expulsion from the College. Attempted cheating, attempted stealing, and the knowing possession of stolen property shall be subject to the same punishment as the other offenses. Because the potential penalties for an Honor Code violation are extremely serious, all students should be thoroughly familiar with the definitions and be guided by them.

from **College of Charleston Student Handbook: A Guide to Civil and Honorable Conduct**. Students are referred to the Student Affairs web site for the full Honor Code, Student Code of Conduct and the Classroom Code of Conduct and related information.

8/22/2015/sjm
LECTURE TOPIC SEQUENCE & READINGS—SYLLABUS
BIOL 310 GENERAL MICROBIOLOGY
Dr. Susan Morrison
Spring 2015

TEXT (required): see notes on information handout. Text details are in coursepack.

COURSEPACK: Morrison, Susan J. 2014. BIOL310 & BIOL310L Coursepack for Fall 2014 (available at SAS-E-Ink, 219 Calhoun St)

Microbial Life: Overview & Introduction; The History of Microbiology (general and medical)  Coursepack 31-43
  o Brock  Chapter 1  Sections 1.6-1.10 (pages 10-23)
  o Prescott  Chapter 1  (pages 5-12)
  o Slonczewski  Chapter 1  (pages 11-26, Sec 1.2 & 1.3) Table 1.2
  o Tortora  Pages 6-15
  o Wessner  inside front cover, pages 27-33

Basic Concepts & Terminology of Microbial Interactions, Infection, Infectious Disease & Epidemiology  Coursepack 44-50
  o Brock  Chapters 27, 32, 33, 34 (pp. 787-815, pp. 913-943, 961-1003)
  o Prescott  Part 8 Chapters 30 & 33 (pages 726-745; 787-808)
  o Slonczewski  Chapters 25 & 26 (pp. 937-1028)
  o Tortora  Chapters 14 & 15 (pp. 401-450)
  o Wessner  Part IV, Chapters 18, 21, 24 (pp. 600-635, 714-759, 822-853)

Biological Molecules: Chemical Bonds; Water; Proteins; Polysaccharides; Nucleic Acids; Lipids  [no lecture—inde
dependent review  Refer to appropriate section when needed.]
  o Brock  none
  o Prescott  Appendix I
  o Slonczewski  Appendix I
  o Tortora  Chapter 2
  o Wessner  none

Observing Microbial Cells: Microscopy & Specimen Preparation; Cell Sizes & Shapes  Coursepack 51-60
  o Brock  Chapter 2-Part I, pp 25-31 (See Chapters 16-19 for micrographs)
  o Prescott  Chapter 2
  o Slonczewski  Chapter 2
  o Tortora  Chapter 3  (see Chapter 11 for lots of micrographs)
  o Wessner  Appendix B; Gram stain on page 55

Membranes and Transport  Coursepack 61-65
  o Brock  Chapter 2 (Sec. 3.3-3.5, pp. 47-58); pp. 141-143
  o Prescott  Sec. 3.2 (pp. 38-41); Section 6.6 (pp. 114-118)
  o Slonczewski  Sec. 3.3 (pp. 82-88); Sec. 4.2 (121-127)
  o Tortora  Chapter 4 (pp. 88-93, 100-101)
  o Wessner  Chapter 2 (pp. 45-50), page 79

Procaryotic Cell Structure and Function  Coursepack 61-79
  o Brock  Chapter 3 (pp. 47-84)
  o Prescott  Chapter 3 (pp. 33-64)
  o Slonczewski  Chapter 3 (pp. 73-82, 88-113) Se
  o Tortora  Chapter 4 (pp 75-110)
  o Wessner  Chapter 2 (pp. 36-71)

Three Domains; Universal Phylogenetic Tree; Comparison of Procaryotes & Eukaryotes  Coursepack 80-88
  o Brock  Section 2.7 (pp. 34-36); Chapter 16 (Sec 16.8, pp 459-462; Table 16.1); Sec 7.4 (p. 196)
  o Prescott  Chapter 17 (pp. 385-388); Sec 3.1, 4.1 and esp. Sec. 4.8 (pages 79-80); Table 4.2; inside front cover
  o Slonczewski  Chapter 1 (pp 29-31), Chapter 17 (pp 656-661), inside back cover
  o Tortora  Chapter 10 (pp. 272-280)
  o Wessner  Chapter 1 (pp. 8-15); Table 1.3; Appendix C, E
Microbial Nutrition & Metabolism: Energy, Enzymes & Regulation; Coursepack 89--97
- Brock Chapter 4 (pp. 92-94, 111-115)
- Prescott pp. 169-183
- Slonczewski pp. 473-475
- Tortora pp. 113-119
- Wessner pp. 403-404, 418

- Brock Chapter 4, Sec. 4.4-4.16 (pp 92-114); Chapter 14 (pp. 373-383)
- Prescott Chapter 10, Sec 10.1-10.10 (pp. 188-208); Appendix 2
- Slonczewski Chapter 13 (pp. 458-482, 482-496); pp 506-507, 525-529
- Tortora pp. 122-135
- Wessner pp. 400-433

Microbial Metabolism: Metabolic Diversity: Phototrophy, Chemolithotrophy, Anaerobic Respiration

Microbial Metabolism: Anabolism; The Use of Energy in Biosynthesis Coursepack 98-108
- Brock Chapter 4, Secs. 4.13-4.16 (pp. 108-114)
- Prescott Sec. 11.1-11.2 (pp. 219-222)
- Slonczewski Chapter 15, Sec. 15.1 (pp. 547-550)
- Tortora Chapter 5, Sec. 5.24-5.25 (pp. 144-147)
- Wessner Sec 13.8 (pp. 447-453)

Microbial Nutrition Coursepack 109-113
- Brock Sec. 2.8; Chapter 4 (pp. 86-90); Sec. 13.6
- Prescott Chapter 6 (pp. 109-125)
- Slonczewski Sec. 4.1
- Tortora pp. 140-143, 158-166
- Wessner Chapter 6 (Sec 6.1-6.3; pp. 165-184); Sec 13.4 (pp. 428-429)

Culture, Enumeration, Growth & Development of Microorganisms Coursepack 114-124
- Brock Chapter 5 (pp. 128-132) Fig. 5.14-5.17
- Prescott Sec. 7.3 (pp. 134-137)
- Slonczewski Sec. 4.4
- Tortora pp. 171-177
- Wessner Sec. 6.4 (pp. 184-187)

Biofilms Coursepack 125-127
- Brock Chapter 5-sidebar (page 133); Chapter 8 (Sec. 8.9), Chapter 23 (Sec. 23.4)
- Prescott Chapter 7 (Sec. 7.6); Chapter 30 (Sec. 30.5, Figs. 3.9-3.10)
- Slonczewski Chapter 4 (Sec. 4.6), Chapter 17 (Special Topic 17.2)
- Tortora Fig. 1.8; page 56—Slime; pages 160-161, 432-433; Fig. 6.5
- Wessner Page 67; Chapter 15 (pages 488-490)

Effects of Environmental Conditions on Growth & Survival of Microorganisms Coursepack 128—140
- Brock Chapter 5 Part IV & V (pages 132-149); Chapter 19 (pages 557-583, 1022-1029)
- Prescott Chapter 8 Sec. 8.4 (pages 157-160, 810-816)
- Slonczewski Chapter 5 (pages 149-180)
- Tortora Chapter 7 (pp. 181-189); pages 800-806
- Wessner pages 119-125, 170-172, 525-534
### DNA; Replication
- **Coursepack** 141–157
  - **Brock**  Chapter 6, Secs. 6.1-6.7 (pp.151-168)
  - **Prescott**  Chapter 12, Sec. 12.1-12.5 (pp. 240-255)
  - **Slonczewski**  Chapter 7, Sec. 7.1-7.2-7.3 (pp. 221-242)
  - **Tortora**  Chapter 8 (pp. 207-214)
  - **Wessner**  Chapter 7 (pp. 203-216)

### RNA & Protein Synthesis: Transcription, Translation; Metabolic Regulation
- **Coursepack** 141-157
  - **Brock**  Chapter 7  Sec. 7.1-7.2 (pp 192-195); Chapter 6  Sec 6.16-6.21 (pp. 174-189)
  - **Prescott**  Chapter 12  pp. 255-270
  - **Slonczewski**  Chapter 8  Sec. 8.1-8.4 (pages 258-285)
  - **Tortora**  Chapter 8: pp. 210-218   Figs. 8.7, 8.9
  - **Wessner**  Sec. 7.3-7.4 (pp. 216-228)

### Virology: History; Properties of Viruses; Growth & Quantification; Viral Replication; Viral Diversity; Viral Pathogenesis; Subviral Particles—Viroids, Prions
- **Coursepack** 158–175
  - **Brock**  Chapter 9 (pp. 236-262), Chapter 21 (pp 613-641); Chapter 33 (sec. 33.6-33.8, 33.11, 33.14
  - **Prescott**  Chapter 5 (pages 87-108), Chapter 24 (pages 554-592)
  - **Slonczewski**  Chapter 6 (pages 181-217), Chapter 11 (pages 389-430), Sec. 25.8 (pages 971-978)
  - **Tortora**  Chapter 13 (pp. 369-400; Part 4 (pp. 626-631, 662-5, 685-6, 697-701, 727-734, 763-4)
  - **Wessner**  Chapter 5 (pages 130-201); Chapter 22 (pages 760-791)

### Bacterial Genetics: Gene Transfer, Mutation & Recombination, Genome Evolution
- **Coursepack** 176–194
  - **Brock**  pp. 157-162; pp. 273-279 (Figs. 10.9, 10.14, 10.15); pp. 270-290
  - **Prescott**  Chapter 14 (pp. 312-324) (pp. 324-327; Fig 14.28-14.29)
  - **Slonczewski**  Chapter 9 (pp. 303-344) (pp. 311-314; Fig. 9.7, 9.9)
  - **Tortora**  Chapter 8 (pp. 231-243, Fig 8.29); Chapter 13 (p. 384, Fig 13.13)
  - **Wessner**  pp. 203-207, 231-243; Chapter 9 (pp. 297-298)

### Antiseptics & Disinfectants
- **Coursepack** 195
  - **Brock**  Chapter 26  Sec. 26.4-26.5 (pages 762-766)
  - **Prescott**  Chapter 8 (pages 153-160-167)   Fig. 8.1
  - **Slonczewski**  Pages 170-172, 175-176
  - **Tortora**  Chapter 7 (pages 181-184, 190-203, Table 7.8)
  - **Wessner**  Pages 195-199
  - **Pearson Custom Lab Manual**  pages 251-254

### Antimicrobial Chemotherapy; Antibiotics
- **Coursepack** 196–200
  - **Brock**  Chapter 26 (pp. 767-786)
  - **Prescott**  Chapter 31
  - **Slonczewski**  Chapter 27
  - **Tortora**  Chapter 20
  - **Wessner**  Chapter 24, Sec. 24.1-24.3 (pp. 822-849)  Perspectives 24.1-24.3

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*For the following topics, we will cover selected examples as time permits and/or incorporate the topics into other parts of lecture*

- Microbial Diversity & Ecology; Origins & Evolution
- Prokaryotic Diversity: Bacteria & Archaea
- **Food Microbiology**
  - Brock: Chapter 36 (pp. 1022-1043)
  - Prescott: Chapter 34 (pp. 809-830)
  - Slonczewski: Chapter 16 (pp. 589-615)
  - Tortora: Chapter 28 (pp. 799-810)
  - Wessner: Chapter 16 (pp. 522-543)

- **Water and Wastewater**
  - Brock: Chapter 35 (pp. 1004-1021)
  - Prescott: Chapter 35 (pp. 831-847)
  - Slonczewski: Chapter 22, Sec. 22.3 (pp. 839-842)
  - Tortora: Chapter 27 (pp. 782-796)
  - Wessner: Chapter 16 (pp. 541-559)

- **Biotechnology, aka Genetic Engineering, Bioengineering, Molecular Technology, DNA Technology, Recombinant DNA Technology, Genetic Modification Technology**
  - Brock: pp. 291-312
  - Prescott: pp. 351-380
  - Slonczewski: pp. 431-457
  - Tortora: pp. 244-263
  - Wessner: pp. 362-399

- Microbial Ecology
- Microbes and Biogeochemical Cycles
- Host Defenses; Immunology
- Microbial Pathogenesis
- Microbial Diseases
- Virulence Factors
- Genomics

- **Vaccines, Serology, Diagnostic Immunology**
  - Brock: pp. 892-906
  - Prescott: pp. 779-786
  - Slonczewski: pp. 906-907
  - Tortora: pp. 504-526
  - Wessner: pp. 853-857

- **Diagnostic Microbiology & Immunology; Clinical Microbiology**
  - Brock: pp. 879-912
  - Prescott: pp. 768-786
  - Slonczewski: pp. 1063-1096
  - Tortora: pp. 281-198; Appendix C
  - Wessner: pp. 164-180