

Syllabus for BMS 127 Medical Microbiology, Daytime Lectures, Fall 2023

CRN 37985: Lecture M,W 12:45–2:05, EBS 309; Lab T 2:40–5:45, EBS 313
CRN 37410: Lecture M,W 12:45–2:05, EBS 309; Lab W 7:50–10:55, EBS 313
CRN 30995: Lecture M,W 12:45–2:05, EBS 309; Lab W 2:30–5:35, EBS 313

Course Description: Welcome! BMS 127 is a 4-unit, college-level course designed to meet the needs and interests of students of the health-related sciences. It includes investigations of bacteria, viruses, fungi, and protists, with emphases on microbe–host interactions and bacterial biology. This course also investigates the principles of disease transmission and prevention, virology, genetics, and immunology. We're excited to work with you in this course.

Professors:

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| <u>Robbie Haines Fischer</u> Email: rhfischer@sbcc.edu Phone: 805-730-8780 Office Hours: M,W 11:30–12:30; T 5:30–6:00 Office Location: EBS 323 | <u>Dr. Jennifer Betancourt</u> Email: jabetancourt1@pipeline.sbcc.edu Phone: 805-730-4123 Office Hours: announced in lab Office Location: EBS 314 |
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Required Texts: Bauman's *Microbiology with Diseases by Taxonomy*, used, any previous edition. These can be easily found online for less than \$20.
SBCC, *Microbiology Reader* (available in Campus Store)
SBCC, *Microbiology Lab Manual* (available in Campus Store)

Optional/Alternate Text: Openstax, *Microbiology* (2016). Free download at <https://openstax.org/details/microbiology>

Your Success: Our job in this course is to guide, challenge, and inspire you, not to simply present a stream of facts. Your job in this course is to work diligently, creatively, and proactively to learn the material, not to simply memorize everything we say. (Memorization is the lowest level of learning; see next page.) If we do our job, you will get a sense of how fascinating and relevant microbiology is. If you do your job, you will succeed in and enjoy this course.

Study Tips: The only difference between passing and failing this course is the amount and quality of work that you put into it. Always remember that successful students *engage* with and *use* course material; those who passively wait to hear what they "need to know" are less successful. Although we will do everything we can to help you, your grade is ultimately up to you. Here are the best ways we know of to use the course material.

- A powerful way to study is to attempt to teach the material to someone else. Listening to and understanding information is *completely different* than being able to use it or reproduce it under pressure without your notes!
- You should budget into your schedule at least three hours of study and reading time for every one hour of lecture time. That's a *minimum* of 8–9 hours every week, exclusive of exam and lab preparation.
- Use your textbook as a resource. Consult the index and table of contents for the topics you want to read about. If you don't understand something after reading about and studying the material, ask me about it.
- Take notes on paper! Studies show it's significantly better for learning. Do not use a laptop or tablet.
- Take notes on your post-lecture reading, and incorporate these notes into your lecture notes. Re-write all these notes, cleaning up and re-organizing them as you do.
- Join or form a study group. You're more likely to study if it's scheduled and others are depending on you. Plus, in a study group, you have people to whom you can teach the material. (See first bullet point.)
- Write tests for yourself to *evaluate* and *use* the material. Take your tests (or those of a study partner) later to practice doing well on exams.
- Different techniques work for different people, so be creative and proactive in how you use the lecture material.

Grades: Please note that we will not "give" you a grade; we will merely report the grade that you earn. Your overall letter grade for the course will reflect the percentage of points that you accumulate. There is no curve. Canvas will show you a draft of your score to date, but remember that this is not your official grade.

| <u>Point distribution</u> | | <u>Percentage earned</u> | <u>Grade</u> |
|----------------------------|-----|--------------------------|--------------|
| 3 Lecture Midterm Exams | 300 | 97–100% | A+ |
| 10 Lecture Quizzes | 50 | 93–96% | A |
| 1 Lecture Final Exam | 150 | 90–92% | A– |
| 1 Vocabulary Quiz | 40 | 87–89% | B+ |
| 8 Lab Quizzes/Assignments | 40 | 83–86% | B |
| 4 Lab Mini-Practicals | 40 | 80–82% | B– |
| 2 Unknown Project Quizzes | 40 | 77–79% | C+ |
| 1 Unknown Bacteria Project | 40 | 70–76% | C |
| 1 Lab Practical | 100 | 60–69% | D |
| Total points possible | 800 | 0–59% | F |

Attendance and Make-up Policies: It is extremely difficult to earn a good grade in this class without attending every lecture and lab. Although there are no points directly associated with attendance, *consider every bit of lecture or lab that you miss to be a blow to your grade*. If you know in advance that you cannot take an exam when it is scheduled—and if it's a dire situation that can be documented in writing—Professor Fischer *might* be able to reschedule the exam. We do not guarantee that, though, and each case is considered independently. Quizzes will be unannounced and will be given in the first or last few minutes of lecture or lab. Those who arrive late or leave early will not be given extra time to complete them. *There are no make-up quizzes under any circumstances*—your two lowest lab and lecture quizzes will be dropped to accommodate missed quizzes.

Electronics:

- *No personal electronics of any kind are ever allowed in lab*, even just for charging at the back of the room.
- All electronic communication will be by Pipeline email. I do not communicate by Canvas, and I will not see Canvas messages that you may send. Professors are required to use Pipeline email, not any other email account.
- You must check your Pipeline email daily. Important and time-sensitive announcements that affect your grade may be sent to you any time. Remember that you may forward your Pipeline email to another email address.
- Treat email as the professional communication that it is: always address me in the beginning, sign off with your name at the end (do not rely on an auto-signature), and don't type as though you were texting a friend.

Academic Honesty: We honor your ideas and work, and we would not allow anyone to steal them. Similarly, you are expected to honor others' ideas and work without presenting them as your own. We take this very seriously. All instances of cheating, plagiarism, or any other form of academic dishonesty will be reported to our school's administration. Consequences range from receiving 0 points for the assignment or exam to expulsion from the college. If you're not sure what constitutes academic honesty for a particular situation, please ask us.

Other Student Responsibilities:

- It is your responsibility to keep track of all SBCC administrative deadlines (e.g. drop and withdraw dates, etc.).
- Students with an immune-compromising medical situation (e.g. pregnancy, illness, medical treatment) must provide a written note from a licensed health care professional authorizing their participation in this course.

Student Learning Outcomes:

- Explain the basic structure, physiology, metabolism, and chemistry of human-associated microorganisms.
- Compare the pathogenesis of microorganisms, including virulence mechanisms and the human immune response.
- Characterize infectious diseases, including both clinical and epidemiological manifestations.
- Using the scientific method and critical thinking, analyze data generated by laboratory experiments.

What is Learning? Bloom's Taxonomy is a commonly used classification of what actually constitutes learning. In it, learning objectives are listed from lowest- to highest-order processes. Questions addressing all of these will appear on quizzes and exams throughout this course. Note that memorization is the lowest level of learning. Although often necessary, memorization is rarely sufficient for learning and will not by itself earn anyone a good grade.

- Remembering—Memorize information.
- Understanding—Comprehend the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.
- Applying—Use a concept in a new situation or unprompted use of an abstraction. Apply what was learned in the classroom into novel situations in the work place.
- Analyzing—Separate material or concepts into component parts so that its organizational structure may be understood. Distinguish between facts and inferences.
- Evaluating—Make judgments about the value of ideas or materials.
- Creating—Build a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.

Letters of Recommendation: We are happy to write letters of recommendation for students we know. (If you haven't gotten to know us, a letter from me will not be very useful.) Here's what we need:

- The institution/program/contact person to which you're applying, including website and physical address.
- The due date and the form in which you need a letter (e.g. hard copy, electronic copy, online questionnaire, etc.).
- The semester you took this class and the grade you earned.
- Relevant additional information: What did you get out of this class? What related extracurricular activities have you been engaged in? What are your goals and what inspires you to pursue them?

Disclaimer: The syllabus and schedule accurately represent our intentions for this course, but they are subject to change. Changes may include the addition or alteration of assignments and thus a change in the point distribution used to determine your grade. We will advise the class of any changes in a timely manner. *Being absent from class and missing any such announcements is not an excuse for being unaware of those announcements.*

Lecture Schedule

| Lect # | Date | Topic |
|--------|--------|---|
| 1 | 28 Aug | Introduction, Overview and History of Microbiology |
| 2 | 30 Aug | Chemistry of Life |
| | 4 Sep | — Holiday, no class — |
| 3 | 6 Sep | Genetic Code, Gene Expression I Vocab Quiz |
| 4 | 11 Sep | Gene Expression II |
| 5 | 13 Sep | Taxonomy, Cell Structures I |
| 6 | 18 Sep | Cell Structures II |
| | 20 Sep | MID-TERM #1 (lectures 1–6) |
| 7 | 25 Sep | Viruses |
| 8 | 27 Sep | Viral Pathogens I |
| 9 | 2 Oct | Viral Pathogens II |
| 10 | 4 Oct | Viral Pathogens III |
| 11 | 9 Oct | Microbial Metabolism |
| 12 | 11 Oct | Growth and Reproduction I |
| 13 | 16 Oct | Growth and Reproduction II |
| | 18 Oct | MID-TERM #2 (lectures 7–13) |
| 14 | 23 Oct | Innate Immunity |
| 15 | 25 Oct | Adaptive Immunity I |
| 16 | 30 Oct | Adaptive Immunity II, Immunization |
| 17 | 1 Nov | Host–microbe Interactions: Mutualism |
| 18 | 6 Nov | Host–microbe Interactions: Virulence I |
| 19 | 8 Nov | Host–microbe Interactions: Virulence II |
| | 13 Nov | MID-TERM #3 (lectures 14–19) |
| 20 | 15 Nov | Prokaryotic Genetics |
| 21 | 20 Nov | Eukaryotic Pathogens I |
| 22 | 22 Nov | Eukaryotic Pathogens II |
| 23 | 27 Nov | Prokaryotic Pathogens I |
| 24 | 29 Nov | Prokaryotic Pathogens II |
| 25 | 4 Dec | Prokaryotic Pathogens III |
| 26 | 6 Dec | Epidemiology |
| | 13 Dec | FINAL EXAM (comprehensive!) 11:00 a.m.–1:00 p.m. |

Lab Schedule

| Week/Date | Mondays | Tuesdays and Wednesdays |
|-------------------------|---|---|
| Week 1 28 Aug–1 Sep | Lab Introduction and Safety Ch 2: Culturing, Aseptic Technique | Lab Introduction and Safety Ch 2: Culturing, Aseptic Technique |
| Week 2 4–8 Sep | — HOLIDAY — | Canvas: Virtual Field Trip El Estero Water Resource Center |
| Week 3 11–15 Sep | Ch 3: Staining Ch 4: Microscopy | Ch 3: Staining Ch 4: Microscopy |
| Week 4 18–22 Sep | Ch 5: Enumeration, Water Testing | Ch 5: Enumeration, Water Testing |
| Week 5 25–29 Sep | Ch 6: Bacteriophages | Ch 6: Bacteriophages |
| Week 6 2–6 Oct | Ch 7: Controlling Growth I | Ch 7: Controlling Growth I |
| Week 7 9–13 Oct | Ch 8: Controlling Growth II | Ch 8: Controlling Growth II |
| Week 8 16–20 Oct | Unknown Project Quiz 1 Culturing Practical Staining Practice | Unknown Project Quiz 1 Culturing Practical Staining Practice |
| Week 9 23–27 Oct | Ch 9: Unknown Project I <ul style="list-style-type: none"> • Diagnostic Media • Streak Isolation | Ch 9: Unknown Project I <ul style="list-style-type: none"> • Diagnostic Media • Streak Isolation |
| Week 10 30 Oct–3 Nov | Ch 9: Unknown Project II <ul style="list-style-type: none"> • Additional Media • Culture Characteristics | Ch 9: Unknown Project II <ul style="list-style-type: none"> • Additional Media • Culture Characteristics |
| Week 11 6–10 Nov | Ch 9: Unknown Project III <ul style="list-style-type: none"> • Additional Tests and Stains • Researching Candidates | Ch 9: Unknown Project III <ul style="list-style-type: none"> • Additional Tests and Stains • Researching Candidates |
| Week 12 13–17 Nov | Ch 10: Transformation Streak Isolations due Gram Stain Practical | Ch 10: Transformation Streak Isolations due Gram Stain Practical |
| Week 13 20–24 Nov | Ch 11: PCR I Unknown Project Quiz 2 Unknown Results Due | Ch 11: PCR I Unknown Project Quiz 2 Unknown Results Due |
| Week 14 27 Nov–1 Dec | Ch 11: PCR II Pipetting Practical | Ch 11: PCR II Pipetting Practical |
| Week 15 4–8 Dec | Comprehensive Lab Practical | Comprehensive Lab Practical |