Welcome to Biology 74—General Microbiology!
Spring 2016

All of the important things about this course are found in this syllabus. Please read it carefully and keep it handy for the duration of the course.

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Office Hours:	T 1:45 pm-3:45 pm W 11 am-12 noon F 1-3 pm	**Course Webpage**:	https://sjeccd.remote-learner.net/login/

Course Description: Biology 74 is an introduction to microbiology: bacteria, viruses and parasites, and their importance to humans and human health.

Prerequisites: Chemistry (one of these: 1A, 11A, 15, 30A, 32A, 65 or 89) with C or better; **and** Biology (one of these: A&P 3, Bio 1, 71 or 72) with C or better.

Meeting Times and Places: **Lecture** meets Tuesday and Thursday from 12:15 p.m. to 1:35 p.m. in room S-122.

- The Bio 74 **lab** meets Tuesday and Thursday in room S-132 from 8:30 a.m. to 11:35 a.m. OR from 1:55 p.m. to 5:00 p.m.
- Attendance in both lecture and lab is critical to the class, to your understanding of the material, and to your overall grade. Attendance will be monitored. **Please come to class!**

Required Texts and Materials:

- **Textbook**: Bauman. Microbiology with Diseases by Taxonomy, 4rd edition. Pearson/Benjamin Cummings, 2014.
- **Lab Manual**: Leboffe and Pierce. Microbiology: Laboratory Theory and Application, 4th edition. Morton Publishing, 2015.
- Stryker. **Lab Supplement for Biology 74**. (Available in the bookstore.)
- Scantron sheets (882), several #2 pencils, and a good eraser.
- **Medical gloves** (latex, nitrile, vinyl, or similar). These can be purchased at any drug store or Costco.
- Lab coat. One will be provided for you, but you are welcome to bring your own personal coat. It will need to be sterilized before you take it home with you.
- Safety glasses. These are also provided for you, but are shared between classes. To minimize risk of cross-contamination, please disinfect the glasses before use, or bring your own.

Other Materials, optional but helpful:

- Study Guide for Bauman, Microbiology with Diseases by Taxonomy, 4th edition. Pearson/Benjamin Cummings, 2014.

Learner Outcomes

What is a Learner Outcome?

A learner outcome describes what you are expected to be able to do upon completion of this course. Learner outcomes emphasize that learning is an active process, and you are expected to be an **active learner** in this course.

At the end of this course, the successful student will be able to:

1. Describe the biochemical basis of microbial life, and analyze laboratory experiments using biochemical concepts.
2. Categorize the diversity found within the microbial world and relationships between different microbes and their hosts, and describe the impacts of microbes in the environment.
3. Describe epidemiology and the disease process, and how the innate and adaptive immune systems provide protection against infection.
4. Describe the relationship between microbial growth and control of microbial growth, and apply this understanding to the prevention and control of infectious diseases, and human welfare.
5. Demonstrate proficiency with laboratory equipment, conduct laboratory experiments in a safe manner using aseptic technique, and interpret results and draw scientific conclusions from those results.

These learning outcomes are part of the contract to which you agree when you take this course. In other words, by continuing in this course, you agree that you will work to achieve these outcomes, and understand that if you do not, you may not pass this class. If you do not agree to the outcomes as they are written, please contact me as soon as possible.

What does it mean to be an **active learner**? Being an active learner means:

- You choose to learn the material in this class. You are not forced to be here; you are choosing to take this class, and are paying for it with your time and money. Get your money's worth!

- You read the assigned chapters and study the vocabulary terms before lecture, preparing yourself as well as you can for class. When you are familiar with the material before class begins, class will be easier for you.

- You understand that I am another resource to help you learn this material. Prepare questions for class, come to my office hours when you need extra help, and listen to my advice on how to succeed in my class. There is a lot to learn in this class, but when you take this class seriously, you will succeed.

- You do more than memorize information in this class. Memorization of vocabulary terms is important, but is not enough for your success. Please note the levels of Bloom's taxonomy, below.

Bloom's Taxonomy of Educational Objectives

Level	Cognitive Behaviors
1. Knowledge	To know specific facts, terms, concepts, principles, or theories
2. Comprehension	To understand, interpret, compare & contrast, explain
3. Application	To apply knowledge to new situations, to solve problems
4. Analysis	To identify the organizational structure of something; to identify parts, relationships, and organizing principles

Memorizing information is level 1. In order to pass this class, you are expected to be able to think critically at levels 3 and 4. This often means answering questions you have never seen before, using concepts you have learned. When you understand the material at a deep level, and can apply it to new situations, then you will find that you will earn the grade you think you deserve.

My responsibility as an instructor:

- My responsibility is to help you learn the material. Notice that I do not say to "teach" you the material—learning is an active process, and is your responsibility (see above).

- It is my responsibility to be "transparent" about my policies and your grades. I don't want to trick you or surprise you; this syllabus and the attached schedule tell you what you need to do to pass this class. I will also do my best to keep you up-to-date with my evaluation (grades) of your performance. You can, and should, keep up with your grades on Moodle.

"It is the teacher's job to open the door, but you, the student, must enter by yourself."

Being an active learner also means getting help when necessary. Here are some of the resources available to you:

My Office Hours. These are listed on the front of the syllabus. I am also available by appointment at other times, either on Moodle or in person. If it is more convenient for you, you can communicate with me using Moodle chat—set up an appointment first.

Tutoring Center. The tutoring center is in the library in room L-105.

Disability Support Program. If you think you may have a condition that hinders your academic performance, then the DSP is available for you. Conditions that are considered disabilities can include test anxiety and dyslexia, among other things. For more information or to request services, visit the DSP office in room SC-106 or call (408) 288-3746 [Voice] or (408) 294-3447 [TTY]. The office is open Monday through Thursday 9:00 a.m. to 6:00 p.m. and Friday 8:00 a.m. to 3:30 p.m.

Your fellow students. You have an advantage in this class, because you spend a great deal of time in lab getting to know each other. Make use of these connections, because they will be very useful now and in the long term.

District Policies on equal access and students' rights:

- The Americans with Disabilities Act (ADA) is a civil rights statute that prohibits discrimination against people with disabilities. Students with disabilities have rights that can be found in Chapter 5, page 36 of the College Catalog.

- SJCC is committed to providing a safe, positive learning environment where students can pursue their educational goals. The Standards of Student Conduct can be found in Chapter 5, page 39 of the College Catalog.

- SJCC is committed to maintaining an environment free of sexual harassment or discrimination based on race, religious creed, color, national origin, ancestry, disability, medical condition, marital status, political beliefs, organizational affiliation, sexual orientation, gender or age. Information on this can be found in chapter 5, page 38 of the College Catalog.

The SJCC College Catalog can be found online at http://www.sjcc.edu/current-students/college-catalog.

My policies:

1. **Grading Policy**. Your grade will be based on the following points:

Highest 2 midterm exams, 100 points each =	200	points
Half of lowest midterm score, 50 points =	50	points
One comprehensive final exam =	150	points
Group poster project =	30	points
Group presentations on disease =	30	points
Online Homework = (approximately)	60	points
Other = (approximately)	20	points
Lab scores		
4 Lab quizzes , 15 points each =	60	points
2 Practical exams, 100 points each =	200	points
Morphological unknown project =	30	points
Metabolic unknown project =	50	points
Attendance/Participation =	25	points
Other labwork = (approximately)	35	points
Total Points = (approximately)	940	points

- The grading scale for this class is:

90%-100%	A
80%-89.9%	B
70%-79.9%	C
60%-69.9%	D
below 60%	F

***** Grades will not be curved for this class unless absolutely necessary.

2. **Online Homework**. There will be small assignments based on the reading required for most lectures. These can be found on Moodle. These are crosswords and short quizzes, designed to help you learn vocabulary.
- There is a vocabulary list on Moodle to help you prepare for each class. Learn the vocabulary! This vocab list is the basis for the homework assignments.
- If online access is a problem for you, please let me know immediately so that you don't fall behind!

3. **Exam policy**. In order to be fair to everyone, my exam schedule is given to you at the beginning of the course, and we will stick with it.
- You must take all exams, including lab exams. If you miss an exam, a makeup will be administered only under the following circumstances:
  - You or a family member have a medical emergency, and can verify this with a doctor's note.
  - You notify me at least two weeks in advance about a scheduling conflict.
- Please use the restroom before the exam begins. If you know in advance that you will need to use the restroom during the test, please let me know.
- Cell phones must be OFF during an exam. If your cell phone rings or buzzes during an exam, you will lose 5 points for each occurrence.

4. **Attendance Policy**. Yes, you do need to come to class, and be prepared.
   - Attendance in lab is required. Students missing more than two consecutive labs or more than three labs during the semester will be dropped.

5. **Lateness Policy**. Please come to class on time.
   - If you come late to a quiz or an exam, you will be asked to turn in your paper at the same time as everyone else. You will not get more time.
   - Consistent late arrival will result in a lowered grade.

6. **Honesty Policy**. As in any college course, cheating is not allowed, since this is unfair to responsible students, and does not allow your grades to reflect your true performance for this course.
   - Any student caught cheating will receive a failing grade for the assignment/exam.
   - Any student caught cheating more than once will receive a failing grade for the course.
   - Any offense of cheating may be reported to Student Affairs, and disciplinary action may be taken.
   - Cheating includes:
     - using unauthorized resources (e.g. cheat sheets or mobile devices) during an exam
     - copying off of someone's paper
     - **plagiarism** (using the published work of another person without properly referencing it).
       This is a common form of cheating, and I won't tolerate it!
       Some well-meaning students plagiarize materials without realizing it, but it still counts as cheating. Talk to me or a librarian to understand how to avoid it.

7. **Late Assignment Policy**.
   - If you miss class, you are responsible for finding out about any assignments you missed. Lab experiments usually cannot be made up due to the nature of the work. Other work can be made up with advance notice.
   - Late assignments lose 10% of the possible points. I accept no assignments more than one class period late, unless I have given you approval in advance. This means that an assignment due on a Tuesday will be accepted as late on the following Thursday, but will not be accepted at all after that.
   - Any take-home portion of an exam will not be accepted after the due date.

How to Succeed in Micro (and beyond!):

1. ***Study actively***. I cannot emphasize this enough. Simply reading over your notes or book will not prepare you for a test. You must prepare yourself and your brain for the process of thinking and synthesizing answers under pressure. Examples:
   - Instead of just reading your notes, re-write your notes from memory, starting with the major concepts and working your way down to details.
   - Create test questions that you can use with your friends. Use them to test each other. This is a fantastic technique to integrate new information!
   - Take the practice tests under real test-like situations, without your notes. Stick to the time limits.
2. **Attend class and participate**.
3. **Actively read** the textbook. Reading comprehension may be the most important skill you learn this semester, so practice! It helps to read the book both before and after lecture. See how well you can summarize what you've read when you're done.
4. **Learn** the scientific **vocabulary**. Vocabulary lists and homework assignments will help greatly when finished before class.
5. **Ask questions**. I want you to succeed and I am an excellent resource for helping you understand the material.
6. **Study daily**. It is very important to keep up; we move fast!
7. Use study guides, the Internet or anything else that helps you get it.
8. **Study with other people** and quiz each other.
9. **Get help early**, from me or from tutors. The longer you wait to get the help you need, the harder it will be for you to catch up. This class builds on itself, so if you fall behind in the beginning, the end is much harder. It is very rare for someone to pass the class if they have a failing grade at the halfway point.
10. **Do more** than simply memorize facts. Conceptual learning is deeper, longer lasting, and easier in the long run.
11. Be comfortable with **chemistry**. It is a prerequisite for this course with good reason. You will need to be especially familiar with:
    - The metric system
    - Ionic, covalent and hydrogen bonds
    - Hydrophilic and hydrophobic molecules
    - Types of chemical reactions, including oxidation/reduction reactions
    - Transfer of energy during chemical reactions

Moodle

This class uses an online course management system known as Moodle. There are many great resources available on Moodle, including:

- Copies of the PowerPoint lectures
- Vocabulary lists
- Study guides
- Practice exams
- Homework
- Your up-to-date grades

In order to log in to Moodle, you need a username and password. If you have logged in to Moodle previously, you should already know your username and password. If you have not, then please follow these directions:

1. Go to **https://sjeccd.remote-learner.net/login/**

2. Enter your username. Your username is: the first two (2) letters of your first name, the first two (2) letters of your last name, and the last four (4) numbers of your student ID number. This will give you a unique eight character username.

   All letters must be in **lowercase**.

   For example: John Smith, student ID: 123456. His username is **josm3456.**

3. Enter your password. The first time you use Moodle, your password should be **Changeme1**

4. You should see the courses in which you are enrolled. Clicking on the course name will take you to that course.

5. For the first time, you should **make sure your email address is correct**:
   - Click on your name in the upper right corner.
   - Click on “Edit Profile”.
   - Enter or correct your email address.
   - Adjust the “Email display” setting as you desire.
   - Scroll to the bottom of the page, and click “Update Profile”.

Laboratory Safety:
You have all learned general laboratory safety for the Chemistry and Biology labs. All of those rules still apply to a Microbiology laboratory, but there are also special safety requirements for working with live organisms.

General Laboratory Safety

There are dangers associated with working in a laboratory. In order to be safe in the lab, we must:

1. **Follow all safety guidelines** mentioned by the instructor or the lab manual.

2. **Never eat, drink, smoke, chew gum, or apply makeup** in the lab.

3. **Leave food and drink** in your bags. No food or drink—even water—in the lab for any reason.

4. **Never mouth pipet** any liquid, for any reason.

5. **Be aware** of the open flames in use in this class.

6. **Tie back long hair**.

7. **Wear appropriate clothing**. This includes:
    a. Full shoes. No sandals or open shoes will be allowed.
    b. Clothes and lab coats with tight sleeves. Loose sleeves or other dangling parts can catch on fire or knock things over.

8. **Properly dispose of broken glassware**. There are special containers for broken glassware. Please respect those who remove our garbage!

9. **Report** broken glassware and any injuries to your instructor immediately.

10. **Familiarize yourself with the lab.** Know the location and the operation of the eyewash, emergency shower, fire extinguisher(s) and fire blanket.

11. In the case of a **fire** or fire alarm, **turn off the gas if possible** and **evacuate** the room immediately. Please meet in the Staff parking lot outside the lab.

12. In the case of an **earthquake**, **turn off the gas if possible** and **get under** your lab desk. Please meet in the Staff parking lot outside the lab after the initial quake has passed.

Biosafety in the Lab

The Biology 74 laboratory is a Biosafety Level 2 (BSL-2) environment. This means that:

1. We are using microbes that are known to cause disease, especially in those with a compromised immune system.
2. We are using unidentified clinical samples that may be able to cause disease.

In order to be safe in a BSL-2 environment, we must:

1. **Wear lab coats** at all times in the lab. The lab coats must not leave the laboratory, even when you use the restroom. If you bring your own lab coat, it must be autoclaved before you can take it with you,.

2. **Wear safety glasses** any time we handle liquid cultures. Because someone else in the lab may be working with liquid cultures even when we are not, safety glasses must be worn any time liquid cultures are in use.

3. **Wear gloves**, and remove them or change them after handling bacteria. You should be prepared to use 3-4 pairs of gloves every lab period.

4. **Use aseptic techniques** when working with microbes. These techniques will be described during the semester, but include:
    a. Disinfecting your work area before and after working with microbes.
    b. Preventing release of microbes into the environment or air.
    c. Immediately cleaning up spills using disinfectant.
    d. Disposing of all contaminated items (including all gloves) into the red Biohazard Waste bags.
    e. Disposing of contaminated broken glassware in the specially marked container.

5. **Wash hands with soap and water** before and after working in the lab. Water-free hand sanitizers are not effective replacements to hand washing.

6. **Report** any spilled cultures to the instructor immediately. Do not let anyone walk through a spilled culture.

7. **Avoid using BSL-2 organisms** if any of the following conditions are present or suspected:
    a. Pregnancy
    b. Diabetes
    c. HIV infection
    d. Treatment with chemotherapy
    e. Treatment with antibiotics
    f. Other immune deficiencies

    Please **inform** your instructor as soon as possible if any of these conditions are true for you, or if they become true at any point in the semester.

Biology 74 **Spring 2016 Lecture Schedule**

Week	Date	Lecture	Topic	Assigned Readings
1	2/2	1	Introduction and History of Microbiology	Chapter 1
	2/4	2	Chemistry of Biology	Chapter 2
2	2/9	3	Chemistry and Introduction to Cells	39-41, 55-59, 63-71
	2/11	4	Cells-Prokaryotic and Eukaryotic	Chapter 3
	2/11	**Last day to drop classes and receive a refund**		
3	2/16	**Last day to drop classes without receiving a "W"**		
	2/16	5	Taxonomy and the Prokaryotes	112-120; Chapter 11; see Vocabulary List for selected organisms
	2/18	6	Eukaryotic Microbes	Chapter 12, 668-682; see Vocab list for selected organisms
4	2/23	7	Cellular Metabolism	124-133
	2/25	8	Cellular Metabolism	164-167, 133-146
5	3/1	9	Cellular Metabolism	133-147
	3/3	**Midterm 1; lectures 1-9**		
6	3/8	10	DNA Replication and Microbial Growth	Chapter 6; 193-202, 225-226 (Transformation)
	3/10	11	Gene Expression	203-213
7	3/15	12	Gene Expression and Regulation	203-222
	3/17	13	Viruses	Chapter 13
8	3/29	14	Control of Microbial Growth	Chapter 9
	3/31	15	Control of Microbial Growth	Chapter 10; 226-229 (Conjugation)
9	4/5	16	Catch up and Review	
	4/7	**Midterm 2; lectures 10-16**		
10	4/12	17	Symbiosis	406-409, 298 (box), 327 (*Lactobacillus*), 553 (*C. difficile*), 642-643, 284 (box), 552 (box)
	4/14	18	How organisms cause disease	411-422
11	4/19	19	How organisms cause disease	411-422, 540 (Toxins), 553-556
	4/21	20	Disease transmission and Epidemiology	410-411; 422-433; 589 (box) Semmelweis.pdf (on Moodle)
12	4/26	21	Innate Immunity	Chapter 15
	4/28	22	Adaptive Immunity	Chapter 16
	4/28	**Last day to drop classes with a "W"**		
13	5/3	23	Adaptive Immunity	Chapter 16
	5/5	24	Bacterial Diseases—presentations	Chapters 19-21 (selected pages)
14	5/10	25	Catch up and Review	
	5/12	**Midterm 3; lectures 17-24**		
15	5/17	26	Diseases—fungi, protists, helminths	632-635, 639-640, 642-644, 648-649 (Dermatophytoses), 662-667, 668-672, 674-682
	5/19	27	Viral Diseases—presentations	Chapters 24-25 (selected pages)
16	5/24	28	AIDS and emerging diseases	21 (box), 532-533, 728-735, 399-401
	5/26	**Final Exam; lectures 1-27**		

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General Microbiology
Spring 2016 Lab Schedule

Lab meets Tuesdays AND Thursdays in room S132

Week	Lab	Date	Topics	Lab Manual:	Textbook:
1	**1**	2/2	Orientation to lab, Safety	pages 1-7	
	2	2/4	Microscopy, wet mounts	Sec 3 (ex. 1, 3, 4, 11)	95-106
2	**3**	2/9	Simple and Negative stains	Sec 3 (5, 6), pgs 29-34, 181-184	106-109
			Notes: Check lab supplement for procedure changes		
	4	2/11	Gram stain	Sec 3 (7)	106-110
3	**5**	2/16	Acid fast & structural stains	Sec 3 (8-10)	110-111
			Note: Check lab supplement for procedure changes		
	6	2/18	Motility and staining practice	Sec 3 (5-11)	106-111
			Cell model presentations		
4	**7**	2/23	**Morphological unknown practical**		120-121
			Prepare dichotomous key before coming to class		
	8	2/25	**Lab quiz 1;** Culturing; Microbes of the environment	Sec 1 (3), Sec 2 (1-4, 6)	165-175; 177-178
5	**9**	3/1	Isolation/Special media, Begin Metabolic unknown	Sec 1 (4), Sec 4 (1), handout	176-179
	10	3/3	Metabolic unknown staining	Sec 3 (5-11)	106-111
			Note: use your unknown culture for all tests		
6	**11**	3/8	Carbohydrate metabolism	Sec 5 (2-4, 9, 13)	133-147; 179
			Note: use your unknown culture for all tests		
	12	3/10	Protein metabolism	Sec 5 (17, 18, 23), Appendix D	148-149
			Note: use your unknown culture for all tests		
7	**13**	3/15	Amino acid metabolism	Sec 5 (11, 12, 20)	148-149
			Note: use your unknown culture for all tests		
	14	3/17	**Lab quiz 2;** Respiration I	Sec 5 (6-8)	139-143; 167-168
			Note: use your unknown culture for all tests		
	3/21-3/25		**Spring Break—no classes this week.**		
8	**15**	3/29	Respiration II; exam review	Sec 5 (6-8)	
	16	3/31	**LAB PRACTICAL EXAM 1**	**Weeks 1-8**	

Biology 74
Spring 2016 Lab Schedule

Week	Lab	Date	Topics	Lab Manual:	Textbook:
9	**17**	4/5	Microbial Growth pH, osmotic concentration, oxygen requirements	Sec 2 (7-11), Sec 6 (4), pg 91 (box), Appendix C, E	167-168; 171-173; 180; 182-190
			Note: Directions in lab supplement		
	18	4/7	Physical Control of growth (UV and heat)	Sec 2 (12-13), 10 (5)	263-266; 270
			Note: Directions in lab supplement		
10	**19**	4/12	Chemical Control of growth	Sec 2 (14); Sec 7 (3), Sec 1 (5)	271-278; 283-284; 293
			Note: Directions in lab supplement		
	20	4/14	Microbial Genetics	Sec 10 (3)	218-224
			Notes: Directions in handout		
11	**21**	4/19	Fungi; **Unknown report due**	Sec 12 (1)	353-363
			Drawings **due** by end of lab		
	22	4/21	Protozoa	Sec 3 (4), Sec 12 (3)	345-353
			Drawings **due** by end of lab		
12	**23**	4/26	**Lab quiz 3;** Helminths	Sec 12 (4)	368; 667-676
			Drawings **due** by end of lab		
	24	4/28	Bacteria of Skin & Throat; Eukaryote slide review	Sec 4 (4), Sec 5 (25), Appendix B	534-544; 179; 181
13	**25**	5/3	Bacteria of Mouth and GI Tract	Sec 4 (5-6), Sec 6 (1), Sec 7 (1)	574-579; 544-545
	26	5/5	Bacteria of the Urogenital Tract	Sec 5 (21, 27), Sec 6 (2)	577-578; 579-580
14	**27**	5/10	Microbes in Water Working as tables, **bring a sample of water!**	Sec 8 (12, 13)	758; 760; 185-186; 188
	28	5/12	Microbes and Food	Sec 6 (1), Sec 9 (2)	746-753; 185-186
15	**29**	5/17	**Lab quiz 4;** Immunology		
	30	5/19	Finish up labs, clean up		
16	**31**	5/24	**LAB PRACTICAL EXAM 2**	**Weeks 9-15**	
		5/26	Lecture Final Exam		