

MICROBIOLOGY 20: General Microbiology (Section 0390)

Los Angeles Mission College

Spring, 2013

Lecture: TTh 8:00-9:25 AM in Center for Math & Sciences (CMS) Room 105

Laboratories: T 9:35 AM-12:45 PM in CMS 002

4.0 units (UC:CSU Transferable)

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or by appointment (CMS 002)

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Office hours: T 12:45-1:45 pm

(CMS 002 or 230)

PREREQUISITES - Successful completion of the following courses:

Required - *Biology 3 or 6, AND Chemistry 51, 65 or 101 (or the equivalent)*

Advisory (Recommended) – *English 28 (or the equivalent)*

COURSE DESCRIPTION - This course is an introduction to the fundamental principles of microbiology. The laboratory portion of the course covers microscopy and culturing techniques for studying and identifying microorganisms.

STUDENT LEARNING OUTCOMES

Microbiology 20 students will: (1) Demonstrate understanding of key concepts in the course by designing a brochure for an infectious disease or immune system disorder, and (2) Identify an unknown bacterium using lab skills learned in the course.

COURSE OBJECTIVES - Upon completion of this course a successful student will:

- Employ microbiology terminology correctly in the laboratory and workplace.
- Analyze the differences between prokaryotic and eukaryotic cells. List subcellular structures and organelles of prokaryotic and eukaryotic cells and their functions, draw the structure of prokaryotic and eukaryotic cells and label their parts.
- Compare and contrast eukaryotic organisms including fungi, algae, and multicellular parasites using the compound light microscope, and describe important features.
- Describe the underlying mechanisms of chemical reactions in microbes, including energy and material flow.
- Compare and contrast the effect of pH, temperature, radiation, O₂ concentration, osmotic pressure, and nutrients on microbial growth. Differentiate important events of the four growth stages of bacterial populations (lag, log, stationary, and decline).
- Describe the processes of DNA replication, mutations, transcription, and translation. Distinguish among mechanisms of genetic recombination in bacteria (transformation, transduction, and conjugation).
- Organize and name the major taxonomic categories of bacteria, fungi, viruses, algae, protozoa, and helminths.
- Demonstrate knowledge of the different features of prokaryotes, their different taxonomical groupings and to use reference sources for microbial identifications.

- Analyze the traits of important microbiological eukaryotes and their clinical and environmental relevance.
- Explain viral structure and the major steps in the life cycle of an animal virus. Describe the structure of a bacteriophage and distinguish between lytic and lysogenic life cycles.
- Examine and distinguish the stages of infectious disease (incubation, prodromal, illness, decline, and convalescence). Explain Koch's postulates for infectious diseases and exceptions to them.
- Distinguish between bacterial endotoxins and exotoxins and give examples of each. Describe microbial mechanisms to enter host, evade host defenses, and cause cellular damage.
- Explain the role of the nonspecific host defenses against microbial infection.
- Examine the features of IgA, IgD, IgM, IgG, and IgE immunoglobulins. Analyze specific host defenses against microbial infection, and distinguish between humoral and cell-mediated immunity. Discuss cells and cell fragments found in human blood and describe their functions in nonspecific and specific host responses.
- Distinguish among the major categories of immune disorders in humans, their signs and symptoms and the genetic and environmental factors that may play a role in the etiology of such diseases.
- Compare and contrast the major categories of antimicrobial drugs.
- Summarize the causes and characteristics of major human microbial diseases.

REQUIRED BOOKS AND MATERIALS

MICROBIOLOGY with Diseases by Body System. Robert W. Bauman, 3rd ed. 2012
Pearson-Benjamin Cummings: ISBN 978-0-321-71271-4 (textbook only)

Textbook/Master Microbiology bundle (bookstore only): ISBN 978-0-321-77839-0

MICROBIOLOGY Laboratory Theory & Application (LAMC Custom edition).
Michael Leboffe & Burton Pierce, 2012. Morton Publishing Company (ISBN 978-1-61731-141-3). **You may also use the brief 2nd edition (ISBN 978-0-89582-947-4).**

MATERIALS: Sharpie pen, colored pencil set, 12 Scantron 882-E forms, box of vinyl or latex gloves (optional), and digital camera (optional).

COURSE GRADE

There will be 1000 possible points for the entire course as shown below:

3 Lecture Exams	30% of Grade (300 points)
Final Exam (Cumulative)	20% of Grade (200 points)
5 Lecture Quizzes	5% of Grade (50 points)
Disease Brochure	5% of Grade (50 points)
Laboratory Exam	20% of Grade (200 points)
3 Lab Quizzes	6% of Grade (60 points)
Morphological Unknown	3% of Grade (30 points)
Biochemical Unknown	7% of Grade (70 points)
<u>Lab Participation</u>	<u>4% of Grade (40 points)</u>

1000 points total

Your Course Grade will be weighted as follows: 60% Lecture – 40% Laboratory.

LECTURE: The lowest lecture quiz (or a missed quiz) will be replaced with your average quiz score. Exams and quizzes will consist of multiple choice, short answer and essay questions. Multiple choice questions are to be answered on **Scantron** forms. **No make-up exams or quizzes will be given.** Missed quizzes or exam scores will be replaced by the average of the highest and lowest scores. Guidelines for the Disease Brochure will be detailed in a separate handout.

LAB: Students are expected to read each lab exercise **BEFORE** class. Lab participation scores will be based on preparation, attendance, completion of labs, lab safety, cleanup, teamwork, microscope care and usage, appropriate use of equipment and supplies, as well as participation in class and online activities. You will be assigned a microscope for the semester and will be responsible for its proper use and maintenance. We will routinely inspect microscopes before, during, and after you use them. ***Ten points will be deducted from the 40 point total for each unexcused absence from the laboratory and 5 points will be deducted each time your microscope is stored improperly (i.e. storing microscope with slides, oil, or in wrong position).*** You will be allowed to miss one laboratory without penalty. Additional absences will impact your grade. Lab quizzes are to be answered on a **Scantron 882-E** form.

<u>Grading Scale:</u>	900+ pts (90-100%)	A
	780-899 pts (78-89%)	B
	650-779 pts (65-77%)	C
	550-649 pts (55-64%)	D
	0-549 pts (below 55%)	F

ATTENDANCE POLICY

Attendance is required and roll will be taken. **You are responsible for any information, date changes, etc., presented in class, whether or not you are present.** Students missing more than 2 consecutive classes may be dropped by the instructor.

Students given add slips ***must*** complete the process by **Friday, February 15th**.

Students withdrawing from the class must do so by:

Monday, February 18th to drop classes with a refund and without a “W” on your transcript.

Friday, May 3rd to drop classes with a “W” (in person)

Sunday, May 5th to drop classes with a “W” (online)

NOTE: A new state policy in effect as of 2012 limits students to 3 attempts per course. Receiving a grade or “W” for a course counts as an attempt, regardless of when the course was taken. Withdrawal by Monday, February 18th (in person or online) will avoid a “W” and will not count as an attempt.

SPECIAL ACCOMMODATIONS

If you require special accommodations for a disability, religious holiday, etc., please inform your instructors within the first week of the course and we will accommodate you if at all possible. For accommodations due to disability, you must consult with the Disabled Student Programs and Services office after which we will abide by their recommendations.

IMPORTANT WEBSITES & ONLINE RESOURCES

<https://eweb3.laccd.edu/WebStudent/signon.asp>

District website where you can add/drop courses and view your grades

<http://www.masteringmicrobiology.com/>

-Textbook publisher's online supplemental study material, practice quizzes, etc.

<http://www.lamission.edu/~echeveac>

- Lecture instructor's website for downloading various lecture related materials

<http://www.lamission.edu/~parhamb> and/or <http://www.lamission.edu/~brownst>

- Lab instructor's website for downloading lab materials and handouts

<http://moodle.lamission.edu>

-Click on Spring 2013 and then on your Microbiology 20 class.

Facebook Discussion Group – LAMC Microbiology 20

You can use this group to communicate with your instructors and each other, as well as ask/answer questions about lecture, laboratory, and assignments. If you already have a Facebook account look for the group and submit a request to join. If you do not belong to Facebook you can go to www.Facebook.com to set up a free account.

RECOMMENDATIONS FOR SUCCESS

This is a demanding class covering a lot of information. Here are some suggestions:

- Do **NOT** fall behind in the course, keep up with the material on a weekly basis
- Each time you study, spend a few minutes reviewing previous lessons (this is the secret to long term memory)
- **Outline** the Powerpoint notes, this will help you to mentally organize the large amount of material you will be learning
- Use associations, acronyms to help you remember things
- Create flash cards and form study groups if you find that helpful
- **Know the key terms** (you can't answer questions correctly if you don't!)
- At a **minimum**, you should **learn** the course material **3 times** in order to retain it well for the exams and quizzes:
 - 1) **Comprehend** the class material during the lecture
 - 2) **Read** the corresponding material in the text while reviewing your notes
 - 3) **Review** your notes and key terms before the exams

*****If you don't do at least this much, you won't do well in this class*****

COLLEGE RESOURCES FOR MICROBIOLOGY STUDENTS

Admissions and Records: Students can register for classes, request transcripts, file petitions for graduation, and drop classes at this office. For more information call 818-833-3322 or visit: <http://www.lamission.edu/admissions/>

Assessment Center: Offers student assessments in English, English-as-a-Second-Language (ESL) and Mathematics. Please contact the Assessment Center at (818) 364-7613 for more information or visit <http://www.lamission.edu/assessment/>

Bookstore: For hours of operation, book availability, buybacks, and other information call 818-364-7767 or 7768 or visit <http://eagleslanding.lamission.edu/default.asp>

Counseling Department: For appointments and information call 818-364-7655 or visit <http://www.lamission.edu/counseling/>

Disabled Students Programs and Services (DSP&S): For appointments, eligibility and information call 818-364-7732 or visit <http://www.lamission.edu/dsps/>

Extended Opportunity Programs and Services (EOPS): For appointments, eligibility and information call 818-364-7645 or visit <http://www.lamission.edu/eops/>

Financial Aid: For information and applications call 818-364-7648 or visit <http://www.lamission.edu/financialaid/>

Library: For information on hours, resources, workshops, and other services contact 818-364-7106 or visit <http://www.lamission.edu/library/>

STEM Office: For information on free tutoring, resources and academic counseling for STEM (Science, Technology, Engineering, and Technology) students visit: <http://www.lamission.edu/stem>

Tutoring Services in Learning Center: Laboratories for Learning, Writing, Math & Science. Walk-in and appointment services offered. Call 818-364-7754 or visit www.lamission.edu/learningcenter/

TENTATIVE CLASS SCHEDULE-SPRING 2013

Dates are subject to change as needed

Week	Date	Tuesday (Lecture)	Date	Thursday (Lecture)
1	2/5	Introduction to Microbiology 20 Chapter 1: History of Microbiology	2/7	Chapter 1: History of Microbiology
2	2/12	Chapter 4: Microscopy, Staining & Microbial Classification Chapter 2: The Chemistry of Microbiology	2/14	Chapter 2: Chemistry of Microbiology Quiz 1: Chapters 1, 2 & 4
3	2/19	Chapter 3: Cell Structure & Function	2/21	Chapter 3: Cell Structure & Function
4	2/26	Chapter 11: Characterizing and Classifying Prokaryotes	2/28	Chapter 12: Characterizing and Classifying Eukaryotes: Protozoa, Helminths, and Vectors Quiz 2: Chapters 3 & 11
5	3/5	EXAM 1: Chapters 1-4 & 11	3/7	Chapter 12: Characterizing Eukaryotes Cont.: Fungi & Algae
6	3/12	Chapter 6: Microbial Nutrition & Growth	3/14	Chapter 9: Control of Microbial Growth in the Environment Quiz 3: Chapters 6, 11 & 12
7	3/19	Chapter 10: Control of Microbial Growth: Antimicrobial Drugs	3/21	Chapter 13: Characterizing and Classifying Viruses, Viroids, and Prions
8	3/26	Chapter 13: Characterizing and Classifying Viruses, Viroids, and Prions Chapter 17: Immunization	3/28	COLLEGE CLOSED NO CLASS
9	4/2	SPRING BREAK	4/4	SPRING BREAK
10	4/9	EXAM 2: Chapters 10, 12, 6 & 9	4/11	Chapter 5: Microbial Metabolism
11	4/16	Chapter 5: Microbial Metabolism Chapter 7: Microbial Genetics	4/18	Chapter 7: Microbial Genetics
12	4/23	Chapter 14: Principles of Disease	4/25	Chapter 14: Principles of Disease Quiz 4: Chapters 13, 17, 5 & 7
13	4/30	EXAM 3: Chapters 13, 14, 17, 5 & 7	5/2	Chapter 15: Innate Immunity
14	5/7	Chapter 16: Adaptive Immunity	5/9	Chapter 16: Adaptive Immunity
15	5/14	Chapter 18: Immune System Disorders Disease Brochure Due	5/16	Chapter 18: Immune Disorders <i>Quiz 5: Chapters 15 & 16</i>
16	5/21	Chapter 19-24: Selected Human Diseases LAB FINAL EXAM 9:35 AM-12:30 PM	5/23	Chapter 19-24: Selected Human Diseases Final Review-Last Class
17	5/28	LECTURE FINAL EXAM 7:30-9:30 AM		NO CLASS-FINALS WEEK

Lecture notes and handouts are available at: <http://www.lamission.edu/~echeveac>

LABORATORY SCHEDULE
MICROBIOLOGY 20
Spring 2013 (Tuesdays)

Dates are subject to change as needed

Week	Tuesday (0390)	LAB TOPIC (Exercise #)	GRADED ASSIGNMENT
1	Feb 5	Lab Orientation; Metric System Use and Care of the Microscope (3-1)	
2	Feb 12	Microbes in the Environment (2-1) Aseptic Technique (1-4) Motility Agar (5-24) Streak (1-5) & Spread Plate (1-6) Isolation	
3	Feb 19	Characterization of colonies (2-2), slant (2-3) and broth (2-4) cultures; Preparation of Smears and Simple Staining (3-4) Gram Stain (3-6)	
4	Feb 26	Acid Fast (3-7), Endospore (3-9), & Capsule (3-8, handout) Stains; Motility – Wet Mount & Hanging Drop (3-10)	
5	Mar 5	Morphological Unknown	
6	Mar 12	LAB QUIZ #1 Fungi, Protozoa & Helminths (3-3)	X
7	Mar 19	PCR amplification of DNA (handout) Standard Plate Counts (6-1) Effect of Temperature on Bacterial Growth (2-8) <i>**Morphological Unknown due**</i>	X
8	Mar 26	Control of Bacterial Growth – UV light (2-12) Chemical Disinfectants (handout) Antimicrobial Drug Testing – Kirby-Bauer Method (7-2); Mannitol Salt Agar (4-3)	
9	Apr 1-5	SPRING BREAK	
10	Apr 9	LAB QUIZ #2 Biochemical Unknown Oxidation-Fermentation (5-1), Phenol Red (5-2), & MR-VP (5-3) tests	X
11	Apr 16	Catalase (5-4), Oxidase (5-5), Citrate (5-7), Urease (5-12) & Starch Hydrolysis (5-11) tests	
12	Apr 23	Nitrate Reduction (5-6), Decarboxylase (5-8), Phenylalanine Deaminase (5-9), Gelatinase (5-14) & SIM agar (5-17) tests	
13	Apr 30	Enterotube II (9-5) Water Testing – PR Lactose (handout)	
14	May 7	Water Testing – EMB agar (4-5) Microbes in Food (handout)	
15	May 14	LAB QUIZ #3 <i>Review for Laboratory Exams</i> <i>**Biochemical Unknown due**</i>	X
16	May 21	LABORATORY OPEN BOOK EXAM LABORATORY PRACTICAL EXAM	X

LAB notes and handouts are available for download at:

<http://www.lamission.edu/~brownst> and/or <http://www.lamission.edu/~parhamb>

SCORE SHEET

LECTURE POINTS

Quiz #1	
Quiz #2	
Quiz #3	
Quiz #4	
Quiz #5	
Exam 1	
Exam 2	
Exam 3	
Final Exam	
Brochure	
Total points	

LAB POINTS

Quiz #1	
Quiz #2	
Quiz #3	
Unknown #1	
Unknown #2	
Open Exam	
Practical	
Lab part.	
Total points	

LECTURE: 600 possible points:

- Three Exams* – 100 points each = 300 points
- Final Exam (Cumulative)-200 points
- Five Quizzes*-50 points
- Disease brochure – 50 points

** Missed exam or quiz score will be replaced by average of highest and lowest scores*

LAB: 400 possible points:

- Open book exam – 100 points
- Practical exam – 100 points
- Three Quizzes – 20 points each
- Morphological unknown (#1) – 30 points
- Biochemical unknown (#2) – 70 points
- Lab participation* – 40 points

** Ten points will be deducted for each unexcused absence from the laboratory and 5 points will be deducted each time your microscope is stored improperly*

To keep track of your performance throughout the course, enter your scores in the chart above as you receive them. At any point you can add up your total points earned and divide by the total points possible at that stage of the course. Multiply this by 100% and then compare with the grade scale on page 3 of the syllabus to see how you are doing.

Code of Honor and Integrity

Los Angeles Mission College
Department of Life Sciences

Students at Los Angeles Mission College, because they are members of an academic community dedicated to the achievement of excellence and the pursuit of honor, are expected to meet high standards of personal, ethical, and moral conduct. These standards require personal integrity and a commitment to honesty without compromise. Without the ability to trust in these principles, an academic community and a civil society cannot exist. Los Angeles Mission College students and faculty are as committed to the development of students with honesty and integrity as they are to the academic and professional success of its students.

The **Code of Honor and Integrity** is an undertaking of the students, first and foremost, both individually and collectively, that they will:

1. Not give or receive dishonorable aid during exams, quizzes or assignments
2. Do their share and take an active part in seeing to it that fellow students, as well as themselves, uphold the spirit and letter of the Code of Honor and Integrity.

Some examples of conduct that are regarded as being in violation of the Honor Code include:

- Copying from another's examination or quiz, or allowing another to copy from one's own papers
- Using any unpermitted source of information, human or other, during an exam, quiz or assignment that influences the grade; this includes the use of technological devices
- Any student-to-student collaboration that is unpermitted
- **Plagiarism** (plagiarism is defined as the use, without giving reasonable and appropriate credit to, or acknowledging the author or source, of another person's original work)
- Representing as one's own work as the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid is not permitted

As a part of the effort to promote an environment of honesty and integrity during quizzes and examinations, the following guidelines will apply for any courses in the Department of Life Sciences:

1. Students will leave all books and all other non-essential items (e.g. paper, electronic devices) on the floor so that they are not useable nor block the sight line between professor and student. No electronic devices will be in reach.
2. Students will not communicate in any way that will dishonorably assist themselves or another student.

3. Students will leave the room during an exam only if permitted by the professor's policy. If permitted, only one student may leave the room at any time and be gone for only the average length of time needed for the stated purpose. Students will leave all purses, bags, books, phones, jackets, etc., in the classroom during the absence.
4. Students will promote the spirit and letter of the **Code of Honesty and Integrity** by dissuading fellow students from dishonest activity and, when such casual persuasion does not work, informing the professor of the possible dishonest activity, either anonymously, or otherwise.
5. Students will make every effort to avoid even the appearance of dishonesty or lack of integrity.

Violation of this policy will not be tolerated and violators will be subject to serious penalties. The success of the **Code of Honor and Integrity** is based upon the collective desire of students, faculty and the community to live in an environment that embraces respect for that which is right – both in the college and in society as a whole.

I acknowledge receipt of the Los Angeles Mission College Life Science Department's Code of Honesty and Integrity.

Student Name

Student Signature

Date