MICROBIOLOGY 20 (3372 & 3373)

Los Angeles Mission College, Spring 2013
Lecture: TTh 5:15-6:40, CMS 105
Lab: T 6:50-10:00, CMS 002 ***(3252)***
Lab: Th 6:50-10:00, CMS 002 ***(3253)***

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TTh 3:40-5:10 (CMS 002)

PREREQUISITES - Successful completion of the following courses:

Required - ***Biology 3 or 6, AND Chemistry 51, 65 or 101 (or the equivalent)***
Advisory – ***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, O_2 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 helminthes.
- 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/Mastering Microbiology bundle (in 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)

MATERIALS: bound notebook (graph ruled), *Sharpie* pen, colored pencil set, **8** Scantron 815-E forms, **7** Scantron 882-E forms, **4** blue books (or Scantron 886-E), digital camera (optional)

COURSE GRADE

Your Course Grade will be weighted as follows: 60% Lecture – 40% Laboratory.
There will be 1000 possible points for the entire course as shown below:

8 Lecture Quizzes	**12% of Grade (120 points)**
4 Lecture Exams	**40% of Grade (400 points)**
Disease Assignment	**6% of Grade (80 points)**
Laboratory Exam	**14% of Grade (140 points)**
3 Lab Quizzes	**6% of Grade (60 points)**
Morphological Unknown	**3% of Grade (30 points)**
Biochemical Unknown	**7% of Grade (70 points)**
Lab Notebook	**5% of Grade (50 points)**
Lab Participation	**5% of Grade (50 points)**
	1000 points total

LECTURE: The lowest lecture 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. Short answer and essay questions are to be answered in Blue Books or on Scantron form 886-E. **There will be NO makeup exams or quizzes except in case of a *documented* emergency, and any makeups will be more challenging than the original**. Guidelines for the Disease Assignment will be detailed in a handout.

LAB: Students are expected to read each lab exercise ***BEFORE*** class. Completed lab notebooks are to be turned in to the instructor periodically as indicated in the schedule. Guidelines for Lab Notebooks and Bacterial Unknowns will be detailed in handouts. Lab participation scores will be based on preparation, attendance, completion of labs, lab safety, cleanup, teamwork, microscope care and usage, and appropriate use of equipment and supplies. You will be assigned a microscope for the semester and will be responsible for its proper use and maintenance. I will routinely inspect microscopes before, during, and after you use them. ***Participation points may be deducted for storing your microscope improperly (e.g. storing with slides, oil on the microscope, "arm in").*** You will be allowed to miss one laboratory without penalty, after which ***5 points will be deducted from your participation score for each additional unexcused absence from the laboratory.*** Lab quizzes can be answered on a single **Scantron 882-E** form which can be reused.

Grading Scale:		
	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. 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 avoid receiving a "W" and to receive a refund
Friday May 3rd (or *Sunday May 5th via internet) to receive a "W"

* The LACCD website is not always available on Sundays due to routine maintenance.

*NOTE: A new state policy in effect as of Summer 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 February 18th (avoiding a "W") will not count as an attempt.*

IMPORTANT WEBSITES

https://eweb3.laccd.edu/WebStudent/signon.asp
-this is the district website where you can add/drop courses and view your grades

http://www.lamission.edu/~brownst
- your instructor's website for downloading course notes and handouts

https://myetudes.org/portal
-here you can monitor your scores and overall standing in the course and engage in discussion forums with the instructor and fellow students

http://www.masteringmicrobiology.com/
-your textbook publisher's online supplemental study material, practice quizzes, etc.

COLLEGE RESOURCES FOR STUDENTS

Bookstore: For hours of operation, book availability, buybacks, and other information call 818-364-7767 or 7768 or visit http://www.lamissionbookstore.com/

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/

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/

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*****

SPECIAL ACCOMMODATIONS

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

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 the work of another as one's own work

- 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 severe 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.

LECTURE SCHEDULE

(tentative)

Week	Date	*LECTURE TOPIC (textbook chapter)
1	**Feb 5**	Introduction & History of Microbiology **(ch 1)** Review of Chemical Principles **(ch 2)**
	Feb 7	Eukaryotic, Prokaryotic Cell Structure & Function **(ch 3)**
2	**Feb 12**	Prokaryotic Cell Structure & Function (cont'd) **(ch 3)**
	Feb 14	***QUIZ:** Microscopy, Staining & Microbial Classification **(ch 4A)**
3	**Feb 19**	Characterizing & Classifying Prokaryotes **(ch 11)**
	Feb 21	Eukaryotic Microorganisms: Algae & Protozoa **(ch 12)**
4	**Feb 26**	***QUIZ:** Eukaryotic Microorganisms: Fungi & Helminths **(ch 12)**
	Feb 28	Microbial Metabolism **(ch 5)**
5	**Mar 5**	**EXAM #1 on chapters 1-4A, 11 & 12**
	Mar 7	Microbial Nutrition & Growth **(ch 6)**
6	**Mar 12**	***QUIZ:** DNA Replication & Gene Expression **(ch 7)**
	Mar 14	Gene Regulation, Mutations & Gene Transfer **(ch 7)**
7	**Mar 19**	Controlling Microbial Growth in the Environment **(ch 9)**
	Mar 21	***QUIZ:** Controlling Microbial Growth with Antimicrobial Drugs **(ch 10)**
8	**Mar 26**	**EXAM #2 on chapters 5-7, 9, 10**
	Mar 28	***Non-Instruction Day – NO CLASS***
--------	**Apr 1-5**	***Spring Break***
9	**Apr 9**	Recombinant DNA Technology **(ch 8)** & Methods of Identification **(ch 4B)**
	Apr 11	Overview of Viruses, Bacteriophages **(ch 13)**
10	**Apr 16**	Animal Viruses & Prions **(ch 13)**
	Apr 18	***QUIZ:** Innate Immunity **(ch 15)**
11	**Apr 23**	Adaptive Immunity: Overview & Antibody Structure **(ch 16)**
	Apr 25	Adaptive Immunity: Antigens, Antigen Presentation & T Cells **(ch 16)**
12	**Apr 30**	***QUIZ:** Adaptive Immunity: Humoral & Cell-Mediated Immune Resp. **(ch 16)**
	May 2	Immunization & Immune Testing **(ch 17)**
13	**May 7**	**EXAM #3 on chapters 4B, 8, 13, 15, 16**
	May 9	Immune Disorders **(ch 18)**
14	**May 14**	Principles of Disease: Disease Concepts & Onset of Disease **(ch 14)**
	May 16	***QUIZ:** Principles of Disease: Bacterial Toxins, Disease Transmission & Epidemiology **(ch 14)** *****Disease Brochure due*****
15	**May 21**	Selected Bacterial Pathogens **(ch 19-24)**
	May 23	Selected Viral & Eukaryotic Pathogens **(ch 19-24)**
16	**May 30**	**EXAM #4 on chapters 14, 17-24** (5:30-7:30 in CMS 105)

** Quizzes will be given from 5:15-5:30 after which we will review the answers. The 8th quiz will be given along with Exam 4 during finals week.*

NOTE: The lecture notes and various handouts are available in PDF format on the instructor's LAMC website http://www.lamission.edu/~brownst.

LABORATORY SCHEDULE

Week	Tuesday (3252)	LAB TOPIC (exercise #)	Thursday (3253)
1	**Feb 5**	*Lab Orientation; *Use and Care of the Microscope **(3-1)**; *Metric System	**Feb 7**
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	**Feb 14**
3	**Feb 19**	Characterization of colony **(2-2)**, slant **(2-3)** & broth **(2-4)** cultures; Preparation of Smears and Simple Staining **(3-4)**; Gram Stain **(3-6)** *****Turn in notebook*****	**Feb 21**
4	**Feb 26**	Acid Fast **(3-7)**, Endospore **(3-9)**, & Capsule **(3-8, handout)** Stains; Motility – Wet Mount & Hanging Drop **(3-10)**	**Feb 28**
5	**Mar 5**	**Morphological Unknown**	**Mar 7**
6	**Mar 12**	**LAB QUIZ #1:** Fungi, Protozoa & Helminths **(3-3)**	**Mar 14**
7	**Mar 19**	Standard Plate Counts **(6-1)**; Effect of Temperature on Bacterial Growth **(2-8)** *****Morphological Unknown due*****	--------
	--------	Effect of Temperature on Bacterial Growth **(2-8)**; Control of Bacterial Growth – UV light **(2-12)**; Standard Plate Counts **(6-1)**; Chemical Disinfectants **(handout)**; Antimicrobial Drug Testing – Kirby-Bauer Method **(7-2)**; Mannitol Salt Agar **(4-3)** *****Morphological Unknown due*****	**Mar 21**
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)** *****Turn in notebook*****	--------
	--------	***Non-Instruction Day – NO CLASS***	**Mar 28**
--------	**Apr 1-5**	***Spring Break***	--------
9	**Apr 9**	**LAB QUIZ #2: Biochemical Unknown** Oxidation-Fermentation **(5-1)**, Phenol Red **(5-2)**, & MR-VP **(5-3)** tests	**Apr 11**
10	**Apr 16**	Catalase **(5-4)**, Oxidase **(5-5)**, Citrate **(5-7)**, Urease **(5-12)** & Starch Hydrolysis **(5-11)** tests	**Apr 18**
11	**Apr 23**	Nitrate Reduction **(5-6)**, Decarboxylase **(5-8)**, Phe Deaminase **(5-9),** Gelatinase **(5-14)** & SIM agar **(5-18)** tests	**Apr 25**
12	**Apr 30**	Enterotube II **(9-5)**; Water Testing – PR Lactose **(handout)**	**May 2**
13	**May 7**	Water Testing – EMB agar **(4-5)**; Microbes in Food **(handout)**	**May 9**
14	**May 14**	**LAB QUIZ #3:** *review for Laboratory Exams* *****Biochemical Unknown due*****	**May 16**
15	**May 21**	**LABORATORY OPEN BOOK EXAM** & **LABORATORY PRACTICAL EXAM** *****Turn in notebook*****	**May 23**

** These exercises do **not** need to be entered into you notebook.*

NOTE: Many of the lab exercises are continued in the following lab session.

SCORE SHEET

LECTURE POINTS

Quiz #1	/15	**Exam 1**	/100
Quiz #2	/15	**Exam 2**	/100
Quiz #3	/15	**Exam 3**	/100
Quiz #4	/15	**Exam 4**	/100
Quiz #5	/15	**Disease Assign.**	/80
Quiz #6	/15		
Quiz #7	/15		
Quiz #8	/15		

LAB POINTS

Lab Quiz #1	/20
Lab Quiz #2	/20
Lab Quiz #3	/20
Unknown #1	/30
Unknown #2	/70
Open Book Exam	/70
Practical Exam	/70
Lab Notebook	/50
Lab Participation	/50

LECTURE possible points:

- Quizzes – 15 points each
- Exams – 100 points each
- Disease brochure – 80 points

LAB possible points:

- Open book exam – 70 points
- Practical exam – 70 points
- Lab Quizzes – 20 points each
- Morphological unknown (#1) – 30 points
- Biochemical unknown (#2) – 70 points
- Lab notebook – 50 points (25 points each for completeness and quality of notebook)
- Lab participation – 50 points

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.