

BIO 242E Applied Microbiology

Professor: Fernando Govantes
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Office Hours: Tuesdays and Thursdays, 12:30 to 1:30 PM (by E-mail appointment)

Course Information:

Fall 2018

Lectures: Tuesdays and Thursdays.
10:30-11:50. Room TBA

Labs: Thursdays, 3:30-6:30 PM. Bdg. 23, labs 2.03 and 2.04

Course Description

This course is an introduction for students to basic concepts and unifying principles of Microbiology, with strong emphasis on the roles of microbes as disease-causing agents. It provides general information on the biology of microorganisms, and the most relevant clinical aspects of infectious diseases, and the impact of microbes on the environment.

Course Goals and Methodology

The goals of this course are to provide the student with an understanding of basic bacterial laboratory techniques and the general concepts in Microbiology, as well as inform about the general practices used to identify and treat the most common infectious agents. The course is oriented towards the clinical aspects of Microbiology, but does introduce significant discoveries to convey important topics. The labs are designed to familiarize students with aseptic methods of microbiological techniques and with their applications in clinical and environmental Microbiology.

The course is structured in lecture and lab sessions. Prior to each session, students are expected to have read the textbook chapters and lab protocols before the corresponding lectures and labs. Powerpoint presentations, lab protocols and other course materials will be posted on Blackboard at least one day prior to the lectures and labs.

Lecture sessions will include lecturing and discussion. Homework assignments will include online quizzes for the contents of the lectures to be posted on Blackboard.

Lab sessions will include the discussion of the results from the previous session, presentation of the experimental procedures and experimental work. General lab safety rules must be kept at all times. A quiz per 2-3 lab sessions will be posted on Blackboard.

Learning Objectives

Upon successful completion of the course students will be able to:

1. Define basic structure/function of microorganisms, with emphasis on their relationships to human disease and treatment of such disease.
2. Identify bacterial/fungal toxic and invasive factors and their relationship to disease.
3. Describe the clinical manifestations associated with common bacterial, viral, fungal, and parasitic diseases.
4. Classify the mechanisms of antibiotic (antibacterial/antifungal) and antiviral activity,

- as well as resistance strategies employed by target microorganisms.
5. Successfully use basic bacteriological skills in a laboratory or clinical setting.

Required Texts

Textbook purchase is not necessary, but I highly recommend the following textbook:

Microbiology: A Systems Approach. Marjorie Kelly Cowan, 5th edition. 2017. McGraw-Hill Publishing.

Other useful Microbiology manuals:

Prescott's Microbiology. Joanne Willey, Linda Sherwood, Christopher J. Woolverton. 10th edition. 2016. McGraw-Hill Publishing.

Brock Biology of Microorganisms. Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, David A. Stahl, Thomas Brock (Author). 14th edition. Pearson.

General Course Policies

Use of cell phones, pagers, MP3 players, headphones, texting, etc. is prohibited during class time. Please turn all of these devices to vibrate or off upon entering the classroom. If emergency communications are required, please excuse yourself from lecture/lab. Eating or drinking is strictly forbidden during lecture and lab sessions.

Course Requirements and Grading

Four in-class exams (the lowest score of the four is dropped) will be held during the semester, and a final cumulative exam will be held on the final week of the program. A final lab exam will be held on the last lab session.

Lecture and lab quizzes will be graded automatically and the highest grade of two attempts will count towards the students' grade.

Participation will be evaluated on the basis of the students' contribution to in class and online discussion of the proposed topics and case studies

Grading will be as follows:

Each in-class exam	15% (drop lowest score)
Final exam (cumulative)	20%
Lecture quizzes	10%
Active participation in classroom and online discussions	10%
Laboratory quizzes	5%
Laboratory exam (cumulative)	10%
Total	100%

Grade conversion scale:

Spanish grade	10	9.5-9.9	9.0-9.4	8.5-8.9	8.0-8.4	7.5-7.9	7.0-7.4	6.5-6.9	6.0-6.4	5.5-5.9	5.0-5.4	0.0-4.9
U.S. grade	A+	A	A-	B+	B	B	B-	C+	C	C	C-	F

Attendance and Punctuality

Attendance and punctuality are required. Arriving late to class is disruptive to both the professor and your classmates. Please be punctual, as your professor will count your late arrival as half of an absence. Under no circumstances may a student miss more than 6 classes (or 9 for classes that meet daily), even with a medical excuse. An excused absence is one that is accompanied by a doctor's note: signed, stamped and dated - travelling or missing a flight/train/bus/ferry, etc. is not an excuse. The note should be shown to your professor and must be handed in to the staff at the International Center office within one week of returning to class. After 3 unexcused absences your final grade will be lowered by $\frac{1}{2}$ a point (Spanish grade) for each day missed (starting with the 4th absence). If you have 6 unexcused absences, you will automatically fail the class. It is each student's responsibility to be informed of exam dates, paper due dates, required excursions, etc. before planning any absences (e.g. relatives visiting, traveling, etc.) during the semester.

Academic Honesty

Academic integrity is a guiding principle for all academic activity at Pablo de Olavide University. Cheating on exams and plagiarism (which includes copying from the Internet) are clear violations of academic honesty. A student is guilty of plagiarism when he or she presents another person's intellectual property as his or her own. The penalty for plagiarism and cheating is a failing grade for the assignment/exam and a failing grade for the course. Avoid plagiarism by citing sources properly, using footnotes and a bibliography, and not cutting and pasting information from various websites when writing assignments.

Learning accommodations

If you require special accommodations, you must stop by the International Center to speak to Rubén (the Faculty coordinator) to either turn in your documentation or to confirm that our office has received it. The deadline is September 28th. Rubén will explain the options available to you.

Behavior Policy

Students are expected to show integrity and act in a professional and respectful manner at all times. A student's attitude in class may influence his/her participation grade. The professor has a right to ask a student to leave the classroom if the student is unruly or appears intoxicated. If a student is asked to leave the classroom, that day will count as an absence regardless of how long the student has been in class.

Course contents

Content units (lectures)

1. Main themes of Microbiology
2. Methods for studying microorganisms
3. The Bacteria and Archaea
4. Eukaryotic cells and microorganisms
5. An introduction to the viruses

6. Microbial nutrition, ecology and growth
7. Microbial metabolism
8. Microbial genetics
9. Physical and chemical control of microbes
10. Elements of chemotherapy
11. Microbe-human interactions
12. Host defenses I: non-specific defenses
13. Host defenses II: specific immunity and immunization
14. Infectious diseases affecting the skin and eyes
15. Infectious diseases affecting nervous system
16. Infectious diseases affecting the cardiovascular and lymphatic systems
17. Infectious diseases affecting the respiratory system
18. Infectious diseases affecting the gastrointestinal tract
19. Infectious diseases affecting the genitourinary system

Content units (labs)

1. Hygiene and safety in the Microbiology lab
2. Microbiological methods (I)
3. Microbiological methods (II)
4. Microbiological methods (III)
5. Measuring microbial growth
6. Microbial genetics (I)
7. Microbial genetics (II)
8. Testing antimicrobial susceptibility
9. Identification of microorganisms

Class Schedule

Lecture sessions

Week	Day of the week	Date	Unit #	Topic	Textbook chapter
1	Thursday	13-sep	1	Main themes of Microbiology	1
	Friday	14-sep	2	Methods for studying microorganisms	3
2	Tuesday	18-sep	3	The Bacteria and Archaea (I)	4
	Thursday	20-sep	3	The Bacteria and Archaea (II)	4
	Friday	21-sep	4	Eukaryotic cells and microorganisms	5
3	Tuesday	25-sep	1 to 4	EXAM I	1 to 5
	Thursday	27-sep	5	An introduction to the viruses	6
4	Tuesday	02-oct	6	Microbial nutrition, ecology and growth	7
	Thursday	04-oct	7	Microbial metabolism (I)	8
5	Tuesday	09-oct	7	Microbial metabolism (II)	8
	Thursday	11-oct	8	Microbial genetics	9
6	Tuesday	16-oct	5 to 8	EXAM II	6 to 9
	Thursday	18-oct	9	Physical and chemical control of microbes	11
7	Tuesday	23-oct	10	Elements of chemotherapy	12
	Thursday	25-oct	11	Microbe-human interactions	13
8	Tuesday	30-oct	12	Host defenses I: non-specific defenses	14
	Thursday	01-nov	-	Holiday. No lecture	-
9	Tuesday	06-nov	13	Host defenses II: specific immunity and immunization	15
	Thursday	08-nov	9 to 13	EXAM III	11 to 15
10	Tuesday	13-nov	14	Infectious diseases affecting the skin and	18

				eyes	
	Thursday	15-nov	15	Infectious diseases affecting nervous system	19
11	Tuesday	20-nov	16	Infectious diseases affecting the cardiovascular and lymphatic systems	20
	Thursday	22-nov	17	Infectious diseases affecting the respiratory system	21
12	Tuesday	27-nov	18	Infectious diseases affecting the gastrointestinal tract	22
	Thursday	29-nov	19	Infectious diseases affecting the genitourinary system	23
13	Tuesday	04-dic	14 to 19	EXAM IV	18 to 23
	Thursday	06-dic	-	Holiday. No lecture	-
14	Tuesday	11-dic	26	Final review session	-

Lab sessions

Week	Day of the week	Date	Unit #	Topic
1	Friday	14-sep	1	Hygiene and safety in the Microbiology lab
2	Thursday	20-sep	2	Microbiological methods (I)
2	Friday	21-sep	3	Microbiological methods (II)
3	Thursday	27-sep	4	Microbiological methods (III)
4	Thursday	04-oct	5	Measuring microbial growth (I)
5	Thursday	11-oct	1-5	Measuring microbial growth (II) + mock exam (1-5)
6	Thursday	18-oct	6	Microbial genetics (I)
7	Thursday	25-oct	6	Microbial genetics (II)
8	Thursday	01-nov	-	Holiday-No lab session
9	Thursday	08-nov	7	Testing antimicrobial susceptibility
10	Thursday	15-nov	8	Identification of microorganisms (I)
11	Thursday	22-nov	9	Identification of microorganisms (II) + mock exam (6-9)
12	Thursday	29-nov	1-9	LAB EXAM

Holidays

Friday, October 12: Día de la Hispanidad

Wednesday, October 31: "Puente". No classes will be held.

Thursday, November 1: All Saint's Day. No classes will be held.

Thursday, December 6: Día de la Constitución Española. No classes will be held.