

BIO 242E Applied Microbiology

Course description

This course is an introduction for students to basic concepts and unifying principles of Microbiology. The goal of this course is 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.

Required textbook

Microbiology: A Systems Approach. Marjorie Kelly Cowan, 3rd edition. 2012. McGraw-Hill Publishing.

Course 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.
6. Create and present case study outlines.

Course delivery and student evaluation

Prior to class. 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, discussion and presentation of case studies and problems. Homework assignments will include the discussion of case studies and problems on the Blackboard discussion forums and an online quiz per lesson 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.

Evaluation

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. All homework assignments will be due by the prescribed dates.

Incomplete or late homework may receive no credit.

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:

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%

Grading scale (per UPO student handbook)

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 policy

Attendance in both lecture and lab are necessary and expected. Exams missed due to an excused (medical) absence must be made up within a week of returning to classes. It is each student's responsibility to be informed of exam dates, paper due dates, required course activities, etc. before making any travel plans during the semester.

Miscellaneous

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.

Lecture schedule for BIO 242E Applied Microbiology

Week	Day of the week	Lecture #	Topic	Textbook chapter
1	Thursday	1	Main themes of Microbiology	1
2	Tuesday	2	Methods for studying microorganisms	3
	Thursday	3	The Bacteria and Archaea I The	4
3	Tuesday	4	Bacteria and Archaea II Eukaryotic	4
	Thursday	5	cells and microorganisms An	5
4	Tuesday	6	introduction to viruses	6
	Thursday	7	EXAM I	1 to 6
5	Tuesday	8	Microbial nutrition, ecology and growth	7
	Thursday	9	Microbial metabolism	8
6	Tuesday	10	Microbial genetics	9
	Thursday	11	Genetic engineering and recombinant DNA	10
7	Tuesday	12	EXAM II	7 to 10
	Thursday	13	Physical and chemical control of microbes	11
8	Tuesday	14	Elements of chemotherapy	12
	Thursday	15	Infection and disease. Host defenses I: non-specific defenses	13,14



9	Tuesday	16	Host defenses II: non-specific defenses/Host specific defenses III: specific immunity and immunization	14,15
	Thursday	17	EXAM III	12 to 15
10	Tuesday	18	Infectious diseases affecting the skin and eyes	18
	Thursday	19	Infectious diseases affecting nervous system	19
11	Tuesday	20	Infectious diseases affecting the cardiovascular and lymphatic systems	20
	Thursday	21	Infectious diseases affecting the respiratory system	21
12	Tuesday	22	Infectious diseases affecting the gastrointestinal tract	22
	Thursday	23	Infectious diseases affecting the genitourinary system	23
13	Tuesday	24	EXAM IV	18 to 23
	Thursday	25	Environmental Microbiology: applied microbiology and food and water safety	24, 25
14	Tuesday	26	Environmental Microbiology: applied microbiology and food and water safety	25

Lab schedule for BIO 242E Applied Microbiology

Week	Day of the week	Lab #	Topic
2	Thursday	1	Lab safety lecture
3	Thursday	2	Microbiological methods (I)
4	Thursday	3	Microbiological methods (II)
5	Thursday	4	Microbiological methods (III)
6	Thursday	5	Microbial growth and nutrition
7	Thursday	6	Microbial genetics (I)
8	Thursday	7	Microbial genetics (II)
9	Thursday	8	Microbial growth control
10	Thursday	9	Diagnosing infections
11	Thursday	10	Microorganism identification
12	Thursday	11	Water Microbiology
13	Thursday	12	LAB EXAM