MIC 206: MICROBIOLOGY LABORATORY–SUMMER A-2016
COURSE SYLLABUS

ARIZONA STATE UNIVERSITY
POLYTECHNIC CAMPUS

Instructor: Oya Yazgan, Ph.D.

Office: Wanner Hall 140M
Lab Location: Santan Hall (SANTN) 302
Office Hours: Tuesdays 11:00 - 12:00 pm
and by appointment
E-mail: Oya.Yazgan@asu.edu

Time: 45551—M T W Th F 9:00 – 10:30 AM
in SANTN 302

Required texts:
A Photographic Atlas for the Microbiology Lab by Leboffe

Course Description

This course includes the study of bacteria and other microorganisms, their biochemical properties, their role in disease, research, and the environment. MIC 206 addresses the principles and techniques used in handling, identifying and controlling microorganisms. Practical application for the health professions will be emphasized. MIC 206 is the companion lab course to both MIC 205 and MIC 220. This course must be paired with MIC 205 in order to secure SG general studies credit. Enrollment requirements: Pre/Co-requisite: MIC 205 or MIC 220 (with a C or better if completed).

This course is offered by the College of Letters and Sciences. For more information about the college, visit our website: https://cls.asu.edu/. If you have questions or concerns, please send your inquiry to cls@asu.edu.

Course Objectives

MIC 206 is an introductory microbiology lab course. Course objectives include, but are not limited to, developing and demonstrating an understanding of the following:

- *Use and care of the microscope*
- *Diagnostic staining techniques*
- *Biochemical tests used to identify microorganisms*
- *Differences between bacteria, protozoa, and fungi*
- *Microbial genetics and recombinant DNA techniques and implications*
- *Quantitative methods*
- *Parasitic protozoan infections*
- *Characteristics of common pathogens that contribute to their virulence*
- *Chemical, physical, and chemotherapeutic control of microorganisms*
- *Practical application of skills and techniques learned in class*

Required Texts and Materials

Text:

- *A Photographic Atlas for the Microbiology Laboratory*, 4th edition, by Michael J. Leboffe and Burton E. Pierce. You must have a hard copy and not an electronic copy.
- Printouts of electronic materials (procedures and data sheets) provided on Blackboard.

Materials:

- You are required to wear a **long lab coat** in class at all times; the coat should cover your entire upper leg while seated. You will need to purchase your own; the bookstore carries lab coats or you can buy used coats from many uniform shops. Cotton or a high cotton blend is recommended as a fire safety measure.
- You are required to wear **safety glasses or goggles** when actively working with microorganisms. The bookstore carries safety glasses, as does any local hardware store.

IMPORTANT! Lab coats and safety glasses must stay in the lab and cannot be used in other classes this semester. They must be autoclaved or decontaminated before you can take them from the lab at the end of the semester.

Attendance

It is imperative that you attend class consistently and **be on time** to succeed in this course. New exercises are built upon previous ones and if you miss labs you will very likely feel lost in this course. Attendance is mandatory and will be documented by a signature sheet. You are responsible for the content of all labs, even if you were absent due to an excused reason. You cannot earn points for exercises and/or activities that take place in lab periods where you were absent. You will get an "E" in this course (fail) if you miss more than three lab periods without prior approval from me so please do not skip any labs unnecessarily and keep your allowances for emergencies. Because we are dealing with live organisms that have short life cycles, **activities and in-class exercises cannot be made up** outside of class. If other courses, work, or home schedule will keep you from being in class every day, or will cause you to be late or have to leave early, you should not continue with this class. People who come in late distract me and everyone else in the room. In addition, I often address procedures and safety issues that you will miss if you are late, which puts a burden on your lab partners or me because we will have to repeat lab instructions for you. To deter late arrivals, I will collect your signatures **within the first five minutes** of each lab period. If your signature is not on the sheet at the start of the period, you will lose 10 pts that day (even if you arrive on time to complete any activities). Missed activities cannot be made up later in the lab period or on another day. Please inform me ahead of time if on a very rare occasion you will be late to class or will need to leave early due to circumstances beyond your control. It is your responsibility to remember to sign the attendance sheet at the beginning of each lab period.

Classroom Preparation

You must read the assigned laboratory material before coming to class. Learning is primarily your responsibility and a consequence of the preparation and time you are willing to give to this course. You should not attempt to take microbiology when you are overloaded with other courses, work, or family responsibilities. Microbiology is a very time-consuming class and requires dedicated study time to learn the many new terms and scientific names you will encounter, especially if you have not taken a college-level biology course before. You cannot "cram" microbiology. Your time management skills will play a major role in your success in this course.

It is important that you are able to access and use Blackboard. Tutorials are available at http://help.asu.edu if you have questions. You should frequently (daily) access the site for announcements, schedule updates, class assignments and quizzes, grades, etc. Go to www.asu.edu/myasu and login using your ASURITE ID and password. Click on MIC 206 under "My Courses" on the left side of the page. Please notify me if you have any difficulty accessing the site.

Classroom Etiquette

- **Visitors:** Visitors will not be allowed in the laboratory because of safety issues. Minors (under 18 years old) are not allowed in the laboratory at any time.
- **Food/drink:** Food and drinks are not allowed in the laboratory at any time.
- **Cell phones/beepers/computers/other electronic devices:** Cell phones MUST be turned off and put away in your backpack, purse, or pocket unless you are in an emergency situation. Please do not leave them on the counters. Cell phones are easily contaminated and are good fomites for spreading bacteria. Text messaging and use of phones are not allowed in class for this reason, even before the lab period begins. If you handle your cell phone within the lab space, you will have to give it to me so that I can decontaminate it. Take your gloves off and wash your hands before you use any lab computers. Personal laptops and tablets or equivalents may not be used during this lab due to safety concerns as well.
- **Personal conversations:** I expect your attention when I am explaining the laboratory procedures at the beginning of class. Please do not leave your seats during introductory lectures since it causes distraction. Once I am through explaining the lab procedures and safety issues, labs become very informal. We usually work in pairs or groups and share results, so discussion and collaboration is both welcome and necessary.
- Please be courteous to everyone. Disruptive, threatening, or violent behavior will not be tolerated.

Safety

You will be exposed to organisms in the laboratory that are capable of causing disease, therefore you will need to go through a safety training and agree in writing to follow the general lab operating and safety rules. You must wear a **long lab coat** and **fully covering pants and shoes** in the laboratory at all times; if you come into the lab without the proper attire you will be asked to leave and will be considered absent that day. Therefore, please be diligent about coming to lab with the required attire so you don't miss any labs unnecessarily. Keep long hair tied back to prevent it from falling into your work or from catching on fire in the Bunsen burners. If you follow directions and utilize techniques that you are taught, you reduce your risk. However, if you are immune-compromised (undergoing chemotherapy, taking corticosteroids, are pregnant, have leukemia, are HIV positive, etc.), your risk is greater than that of an average student. If you suspect that your immune system is not functioning at the normal adult level of immunity, consult your physician for advice as to whether you should take MIC 206 at this time. If you decide to stay in the course, please inform me.

Grading Criteria

You **earn** the grade you receive at the end of the semester based on the number of points you have acquired. However, I do reserve the right to incorporate a subjective evaluation. For example, excessive absences, carelessness in lab, failure to participate in group work, and cheating are examples of behavior that would warrant individual evaluation. Lab attendance is critical to your success. All lab periods have points associated with them in form of an activity or simply attendance, and you may lose all points for a lab if you do not clean up your lab area or your microscope properly before leaving.

Your course grade will be based on the number of points you earn. Please inform me in writing within a week of posting if there are any grade disputes. Grades are not curved so the success or failure of others will not affect your performance. Your grade will be calculated as follows:

Comprehensive Final Exam.…….....	180 pts	**A+**	98% - 100%
In-Labs/Attendance (29x15 pts-1 dropped).	420 pts	**A**	90% - 98%
Pre-labs (20x4 pts).....	80 pts	**B+**	88% - 90%
Post-Labs (5x40 pts)..…….....	200 pts	**B**	80% - 88%
Simulated Unknown…..……..	20 pts	**C+**	78% - 80%
Identification of Unknowns...……...……..	100 pts	**C**	70% - 78%
TOTAL……	**1000 pts**	**D**	60% - 70%
		E	0% - 60%

Graded Laboratory Activities

- **Comprehensive Final Exam:** The final laboratory exam is comprehensive and will cover concepts and techniques learned this semester. Exam questions will include short-answer and multiple-choice questions and will include a practical component.
- **Pre-Labs:** Quizzes for lab exercises will be available to take on Blackboard at least a day before your lab time and will become unavailable at the start time of your lab period, therefore, you need to complete them before you come to class. Due dates for these quizzes are posted on the lab schedule. It is your responsibility to be aware of when these due dates are. These quizzes are open-book and have only a few questions; they are intended to encourage you to read the laboratory assignments **before** you come to lab so that you will be prepared for the lab activities.
- **In-Labs:** You will have several In-Lab assessments; either at the beginning, middle or end of the lab period depending on the planned lab exercises that day. These activities will cover materials you learned in previous labs; have questions from the self-assessment or data sheets for the previous labs; or the introductory materials you read before coming to lab for that day's lab activities. The format will be variable; they may be: 1) open-book, asking you to replicate some of your results/drawings from previous lab periods; 2) open- or closed book, based on theoretical knowledge you gained so far; 3) open- or closed-book practical, repeating short procedures you learned in previous labs, or 4) group discussions. They may also be in any combination of these different formats. You will be notified of the format of most upcoming assessments. The intent of these activities is to bring your attention to the important concepts covered in the lab.

- **Post-Labs:** There will be five open-book online quizzes on the material covered in previous labs and the results you obtained from the exercises. Due dates for these quizzes are listed in the course schedule but are subject to change.
- **Simulated Unknown**: This is a two-step assignment. You will first be asked to develop a flowchart (a plan or scheme) to identify an unknown organism. When you submit the flowchart to me, I will give you a list of biochemical test results for a particular organism I will assign you. You will then use your flowchart to identify the unknown organism. This is a "simulated" unknown exercise – no bacteria or media are actually used and it is intended to prepare you for the actual 'Unknown' exercise.
- **Identification of Unknowns:** You will be given an unknown culture that contains a mixture of two bacteria: one Gram-positive and one Gram-negative. You will be asked to isolate the two organisms and identify each of them using stains and biochemical tests by following a flowchart that you will develop for this activity. This activity will allow you to practice most of the techniques and skills you learned since the beginning of the semester and is a favorite of many students. Further details will be provided in class.

Missed or Late Work/Exam

Make up exams or assignments are rarely given as they take many hours to set up, though I retain the right to handle each case on an individual basis based on the reason for your absence. You will need to **provide documentation** for the reason for your absence; all tests or assignments missed without a documented and approved reason will earn a zero. Only medical emergencies or major catastrophes are considered legitimate excuses for missing labs or assignments. Car problems, loss of day care arrangements, oversleeping, etc. will not be considered legitimate excuses, even though they are understandable and are sometimes unavoidable. Therefore you will have one lowest In-Lab/Attendance score dropped; meaning your first absence without a documented reason will not affect your grade. However, your absence will still count towards your three-absence allowance.

If I approve a make up for an activity or an assignment, it might contain entirely different questions and might be in an essay or oral format. In-class activities and quizzes cannot be made up unless I approve your reason in advance and the materials for the exercises are still available. Late paper assignments (not online quizzes) without my prior approval will be accepted for only half credit within two days past the deadline. Blackboard, computer or Internet failures do not constitute legitimate reasons for missing assignment deadlines. You should submit online assignments at least half a day before their due times to leave yourselves enough time to resolve any unforeseen complications and to avoid missing points. Always use a reliable Internet connection on a computer (not a cell phone/tablet, etc.) and Chrome or Firefox web browser to minimize problems when taking online quizzes.

Quiz/Exam Protocol:

The protocol below will be followed for class exams:

- No materials other than pencils/erasers and other specified items are allowed on your desk during testing.
- Cell phones, beepers, iPods, and other electronic devices must be turned off and placed out of sight. If a device goes off during an exam, you must bring the device to me in order to continue with the exam. If you answer it or read what is on the screen, then you may not be allowed to complete the exam.
- Arriving late for an exam may forfeit your right to take the exam. If you are allowed to take the exam, you will not be given extended time.
- Usually you will not be able to return to an exam once you leave the room. So, please eat, drink and visit the restroom before you come to class.

Disabilities/Special Needs

If you have special learning needs or a disability and require accommodations to obtain equal access in this course, please contact and register with the Disability Resource Center (DRC@asu.edu, 480-965-1234, or Sutton Hall Suite 201) as soon as possible so that necessary accommodations can be arranged.

Academic Dishonesty

Academic dishonesty will not be tolerated. If you are not sure what constitutes academic dishonesty, please visit the site https://provost.asu.edu/academicintegrity/defined to learn more and to review the policy. Cheating on an academic evaluation or assignment, plagiarizing, aiding academic integrity policy violations and inappropriately collaborating are all examples of academic dishonesty.

- If a student cheats on an exam or an assignment, the minimum penalty will be to fail that assessment, and might lead to a final course grade of XE (failure due to academic dishonesty).
- Plagiarism, or using another's words, ideas, materials or work without properly acknowledging and documenting the source, is not acceptable and will lead to failure of the assignment and/or course.
- All course materials are under copyright protection. You may not distribute, sell or buy notes or any other materials without the written consent of the instructor. You may, however make audio (not video) recordings during lectures as individualized study aids for this course. You may not sell, distribute or post these recordings.

As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These emotional health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. ASU Counseling Services provides counseling and crisis services for students who are experiencing a mental health concern. Any student may call or walk-in to any ASU counseling center for a same day or future appointment to discuss any personal concern. Here is the Web site: https://eoss.asu.edu/counseling. After office hours and 24/7 ASU's dedicated crisis line is available for crisis consultation by calling 480-921-1006.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at http://sexualviolenceprevention.asu.edu/faqs/students.

This syllabus serves as our contract for the semester. As a student, you have a right to know what is expected of you as the semester begins. As an instructor, I have a right to expect that you have read and understood the syllabus. The information in the syllabus, other than grade and absence policies, may be subject to change with reasonable advance notice.

Your continued enrollment in the class means that you accept the conditions and requirements of the course.

MIC 206: MICROBIOLOGY LABORATORY–SUMMER A 2016
TENTATIVE COURSE SCHEDULE

WEEK	DATE	LAB ACTIVITIES AND ATLAS READINGS	ASSIGNMENTS DUE (by lab start time)
1	May 16 MON	**Introduction to Class** **Lab Safety**	
	May 17 TUE	**Scientific Terminology** **Microbiological Media** **Aseptic Culturing Technique**	**Pre-Lab 1** **Post-Lab 1** **ADD/DROP DEADLINE – MAY 17**
	May 18 WED	**Growth Patterns in Liquid Media** (p 27) **Streak Plating** (pp 5-6)	**Pre-Lab 2**
	May 19 THU	**Colony Morphology** (pp 19-27)	**Pre-Lab 3**
	May 20 FRI	**Microscope Use and Care** (pp 31-36) **Smear Preparation**	**Pre-Lab 4**
2	May 23 MON	**Cellular Morphology** (pp 39-44) *Simple Positive Staining (pp 37-38)* *Negative Staining (p 38)*	**Pre-Lab 5**
	May 24 TUE	**Differential Staining Techniques** *Gram Stain (pp 45-48)* *Acid-Fast Stain (pp 49-50)*	**Pre-Lab 6**
	May 25 WED	**Structural Staining Techniques** *Capsule Stain (p 51)* *Endospore Stain (pp 51-53)*	**Pre-Lab 7**
	May 26 THU	Complete all exercises	**Post-Lab 2**
	May 27 FRI	**Bacterial Growth Curve** *Quantitation of Bacterial Growth (pp 217-220)*	**Pre-Lab 8**

WEEK	DATE	LAB ACTIVITIES AND ATLAS READINGS	ASSIGNMENTS DUE (by lab start time)
3	May 30 MON	**MEMORIAL DAY- NO LAB**	
	May 31 TUE	**Environmental Effects on Growth** *Oxygen (pp 28-30), Temperature, pH, Osmotic Pressure*	**Pre-Lab 9**
	Jun 1 WED	**Horizontal Gene Transfer in Bacteria**	**Pre-Lab 10**
	Jun 2 THU	**Chemical Control of Microorganisms** *Kirby-Bauer and E-Test (pp 223-225)*	**Pre-Lab 11**
	Jun 3 FRI	Complete all exercises	**WITHDRAWAL DEADLINE**
4	Jun 6 MON	**Introduction to Biochemical Testing**	**Post-Lab 3**
	Jun 7 TUE	**Selective and Differential Media** (Table p 6) *MacConkey (p 13) and Kligler's Iron Agar (pp 75-76)*	**Pre-Lab 12**
	Jun 8 WED	**Carbohydrate Metabolism** (pp 89-90) *Fermentation Broths (pp 71-73)* *MR-VP Test (pp 82, 98)*	**Pre-Lab 13**
	Jun 9 THU	**Exoenzymes** *Lipase (pp 77-78), DNase (pp 68-69), Amylase, Gelatinase (pp 73-74), Hemolysins (p 61)*	**Pre-Lab 14**
	Jun 10 FRI	**Simulated Unknown Staphylococci** *Mannitol Salt Agar (p 14), Catalase (pp 63-64), Coagulase (pp 65-66), Novobiocin Sensitivity (p 85)*	**Pre-Lab 15**

WEEK	DATE	LAB ACTIVITIES AND ATLAS READINGS	ASSIGNMENTS DUE (by lab start time)
5	Jun 13 MON	**Streptococci** *Optochin (p 87) and Bacitracin Sensitivity (pp 58-59), Bile Esculin Agar (p 60), Lancefield Group Test, Mitus-Salivarius Agar*	**Pre-Lab 16**
	Jun 14 TUE	**Mixed Unknowns** **Enterobacteriaceae** *Oxidase (pp 87-89), Urease (pp 96-97), IMViC Tests (pp 74-75, 82, 98, 64-65), Nitrate Reduction (pp 83-85)*	**Pre-Lab 17** **Flow Chart for Simulated Unknown**
	Jun 15 WED	Complete Biochemical Tests Make stock cultures of unknowns	**Post-Lab 4**
	Jun 16 THU	Make flow charts for both unknowns Work on Unknowns	**Identification of Simulated Unknown**
	Jun 17 FRI	**Fungi** (pp 178-192) Work on Unknowns	**Pre-Lab 18**
6	Jun 20 MON	Work on Unknowns **Protozoan Parasites** (pp 193-202)	**Pre-Lab 19**
	Jun 21 TUE	Work on Unknowns	
	Jun 22 WED	Observe fungal growth Work on Unknowns	**Pre-Lab 20**
	Jun 23 THU	Study Session Check out drawers and microscopes	**Post-Lab 5** **Identification of Mixed Unknowns**
	Jun 24 FRI	Pick up autoclaved lab coats **Comprehensive Final Exam**	

IMPORTANT: Exam dates and assignments listed in the course schedule are subject to change.