**Microbiology (MCB2010C)**

**Valencia College (West Campus)**

**Semester: Fall 2019**

**Professor:** Sagarika Sahu

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**Phone Number:** 407-376-1162

**Office Hours:** By appointment only

**COURSE:** Microbiology (MCB2010C)

**CRN:** 16977

**Credit:** 4

**Prerequisite(s) and Co-requisite(s):** Minimum grade of C in BSC1010C or BSC2093C

**Meeting places and times:**

Lecture:

Location-West Campus AHS Room 210

Day - Monday

Time 5:30 PM - 8:15 PM

**Laboratory:**

Location-West Campus Building AHS Room 320

Day - Wednesday

Time- 5:30 PM - 8:15 PM

**COURSE DESCRIPTION:**

This lecture/lab course is designed for Health Sciences majors. Survey of microbial forms with emphasis on bacteria and viruses: morphology, physiology, genetic mechanisms and control of microorganisms. Pathogenic processes and microbes discussed in detail.

**COURSE OBJECTIVES**:

*Major Topics/ Concepts/ Skills/ Issues:*

•Epidemiology

•History of Microbiology

•Mechanisms of Pathogenicity

•Review of Biochemistry

•Immunology

•Survey of Microorganisms

•Infectious Disease - A Body Systems Approach

•Aseptic Technique

•Prokaryotic and Eukaryotic Morphology

•Microscopy

•Virology

•Review of Microbial Metabolism

•Bacterial Isolation and Identification

•Microbial Growth and Control of Microbial Growth

•Chemotherapy and Drug Resistance

•Microbial Genetics and Genetic Engineering

*Learning Outcomes:*

•identify emerging infectious diseases and to list the reasons for the emergence of such disease.

•describe the causality of pathogen dissemination in terms of pathogenic reservoirs, transmission of infectious agents, nosocomial pathogens and the application of body fluid precautions.

•identify major microbiological breakthroughs made by leading historical microbiologists.

•contrast different ways pathogens cause infection and disease.

•distinguish the three lines of defense inherent in the immune system and how each functions.

•relate the principles of specific immunity to the applied practice of vaccination and herd immunity.

•explain the consequences of disorders in immunity.

•identify the macromolecules needed for living microorganisms to survive and explain how these macromolecules function in living microorganisms.

•describe the acquisition of normal host flora and the role it plays in host defense.

•demonstrate an understanding of common human infectious diseases.

•connect individual human infectious diseases to the organ systems they affect.

•indicate phenotypic, genotypic, and immunological methods that may be used to identify the causal agents of infectious diseases.

•effectively integrate aseptic technique into the lab exercises.

•recognize the characteristics that define the levels of classification using taxonomic categories.

•distinguish between common eukaryotic microorganisms based on microscopic characteristics.

•evaluate the use of classification schemes for medically important bacteria based on the shape and arrangement of bacterial cells; the presence or absence of external structures; production of endospores; aerotolerance.

•distinguish between prokaryotic and eukaryotic cells.

•identify and describe the function of major organelles in eukaryotic cells.

•explain the concepts underlying how a compound microscope works and develop proficiency in the independent use of the compound light microscope.

•prepare microbial smears and stains and assess the results using light microscopy.

•describe how an image is created using an electron microscope and recognize the differences in the images created by transmission and scanning electron microscopes.

•discuss viral structure and how viruses multiply and spread.

•describe how viruses can be controlled.

•propose the identification of unknown microbes based on their evaluations of Gram stains, selective/differential media, and biochemical tests.

•demonstrate how a culture and sensitivity test is performed.

•describe the importance and purpose of aerobic cellular respiration, anaerobic respiration, and fermentation.

•explain the reason why different types of microbiological media are used.

•demonstrate that different organisms require different environmental growth conditions.

•distinguish sterilant, disinfectants, antiseptics, and sanitizers.

•select the microbial control method appropriate for particular materials and situations.

•explain the types of chemicals that are used to control bacterial growth.

•explain how various physical methods exist to limit microbial growth.

•identify methods that can be used for sterilization.

•differentiate and categorize how various antimicrobial drugs kill bacteria.

•explain the concept of selective toxicity and generalize what makes an ideal chemotherapeutic agent.

•question current practices in antimicrobial drug use and recognize steps that should be taken to help reduce the rise in drug resistant strains of bacteria.

•construct a model of DNA and explain how the molecule replicates and is used to produce proteins.

•demonstrate a basic understanding of how and why genetic engineering is performed.

•describe how mutations arise in bacteria.

•illustrate the mechanisms that allow bacteria to acquire new genes.

•relate the acquisition of new genes in bacteria to antibiotic resistance and virulence.

**EDUCATIONAL MATERIALS:**

1). Marjorie Kelly Cowan; Microbiology: A Systems Approach. Fifth Edition, McGraw Hill; ISBN: 9781308344997

Publishers connect will not be used in class actively.

2). Michael J. Leboffe and Burton E. Pierce; Microbiology: Laboratory Theory and Application. Third Edition (Brief); Morton Publishing; ISBN: 9781617314773.

3). Canvas access., black sharpie required for lab.

**Valencia College Core Competencies:**

The faculty of Valencia College has identified four core competencies that define the learning outcomes for a successful Valencia graduate. These competencies are at the heart of the Valencia experience and provide the context for learning and assessment at Valencia College. You will be given opportunities to develop and practice these competencies in this class. The four competencies are:

* **Think**- think clearly, and creatively, analyze, synthesize, integrate and evaluate in the many domains of human inquiry
* **Value**- make reasoned judgments and responsible commitments
* **Communicate**- communicate with different audiences using varied means
* **Act**- act purposefully, effectively and responsibly

**ASSESSMENT METHODS AND EVALUATION:**

-**Lecture**- There will be a total of 4 lecture exams, each is 75 points.. You have to come on exam days with your own Scantrons (Form No. 882-E; Green color) and a #2 pencil. Instructor will NOT provide Scantrons or a pencil to the student on exam day. The lecture exams are closed book and notes, and no computer or phone use during the lecture exams. **Missing an exam will result in a 20% reduction in the exam grade. The only way to avoid the 20% reduction in the exam grade is to provide the instructor with a WRITTEN VALID EXCUSE (SEE BELOW) for not attending on the day that the exam is administered. If you are late to the exam, extra time will not be provided for you to finish the exam.**

-**Lab**- Each lab will be worth 10 points. The lab component will also have Four quizzes and a final exam. Lab attendance is mandatory. You are expected to come in on time and leave only when the instructor dismisses class. The instructor may prevent you from participating due to late arrival. Early departure will result in a zero for that lab. -Lab participation is expected. The instructor will be monitoring your progress throughout the lab. Lack of participation during the lab, including late arrival or early departure and not being prepared to perform the lab, will result in the reduction of your lab grade. Not having closed-toe shoes, not having your lab report and black sharpie will result in the reduction of your lab grade.

Labs can’t be made up regardless of excuse. You must attend lab and participate in the lab along with your group members to be able to be graded for the lab on that day including the Post-Lab Exercise grade for that week. Your absence will result in a zero for the lab component on that day.

**GRADE SCALE:**

90-100%=A; 80.0-89.99%=B 70.0-79.99%=C 60.0-69.99%=D Below 59.99%=F

**-You must take the final exam.** The student will receive an automatic “F” in the course if he/she does not take the final exam.

-Grades will not be given out over the phone, or by email, by the instructor or the Department secretaries. Grades will be made available to students as soon as possible after the exam in a manner that preserves student privacy.

**CLASSROOM POLICIES AND ATTENDANCE:**

1. Regularity in classroom attendance and punctuality is vital to academic success. A student who does not maintain regular attendance and who falls behind in his/her work will most certainly have a difficult time succeeding in this class.

The Professor **WILL NOT** drop any student at any time for any reason. It is the student’s responsibility to withdraw himself or herself from the class prior to the withdraw deadline. The professor will still maintain a record of lecture and lab attendance.

2. **Withdrawal (Deadline for Fall 2018 is on 1st November , 2019, no later than 11:59 PM):** Per Valencia Policy 4-07 (Academic Progress, Course Attendance and Grades, and Withdrawals), a student who withdraws from class before the established deadline for a particular term will receive a grade of “W. A student is not permitted to withdraw after the withdrawal deadline. A student who is withdrawn by faculty for violation of the class attendance policy will receive a grade of “W”. Any student who withdraws or is withdrawn from a class during a third or subsequent attempt in the same course will be assigned a grade of “F”. For a complete policy and procedure overview please refer to the Policy Manual link given below.

-Students should consult with a financial aid advisor or counselor before withdrawing from a course; there may be financial implications to the student which he or she must know about to make an informed decision before withdrawing from a course. Students with some scholarships who withdraw or are withdrawn from a class must pay the college for the cost of the class. Other scholarship sponsors may also require repayment. For a complete policy and procedure overview please refer to the Policy Manual link given below.

Valencia wants all students to be successful in their classes. In this class section, use the “Thinking of Withdrawing” located below “My Grades” in Blackboard to help you avoid needing to withdraw. Go to <https://youtu.be/fFlkAOh4pu4> to learn more!

 **\*Drop/Refund Deadline: 3rd September , 2019 no later than 11:59 PM.**

3. **Make-up Policy and definition of Valid Excuse:** It is the student’s responsibility to immediately notify the Professor by email regarding the reason for missing class\lab. The student will be **required to show documentation** from an appropriate authority (doctor, police, judge, etc.) justifying the reason behind missing class\lab. These documents must clearly show the date\time, name of responsible authority, reason for being absent, and the contact information for the responsible authority. The student should be aware that make-up work, if offered, is at the sole discretion of the Professor, regardless of the reason behind missing class\lab (excused or unexcused).

\*\*Without a valid excuse the following deductions will be applied:

-Missing a lecture exam: If your absence results in you missing a lecture exam, your exam grade will be deducted by 20%.

-Missing a lab exam: If your absence results in you missing a lab exam, your exam grade will be deducted by 20%.

-Missing a lecture quiz: If your absence results in you missing a lecture quiz, your quiz grade will be deducted by 20%.

4. **Academic Honesty:** Each student is required to follow Valencia policy regarding academic honesty. All work submitted by students is expected to be the result of the student’s individual thoughts, research, and self-expression unless the assignment specifically states “group project.” Any act of academic dishonesty will be handled in accordance with Valencia policy as set forth in the Student Handbook and Catalog.

**NOTE: All turned in class or lab work (assignments, homework, projects, exercises, etc.) are expected to be the product of the student’s own effort. All answers given to exams/quizzes administered during lecture/lab are also expected to be the student’s own effort. Evidence of cheating/plagiarism will be considered a form of academic dishonesty. A student showing evidence of dishonesty in any form will receive a failing grade for that single event. A subsequent event of dishonesty will result in a failing grade in the class among other potential consequences.**

**No hats, caps, and sunglasses will be worn during any examination. Headphones of any kind are not allowed during examination. All cell phones must be turned off and placed in front of you on your desk during the examination. Your exam will be reduced in grade if your phone goes off and disturbs the other students during the exam. No drinking or eating will be allowed during examination. You must come to each exam prepared to stay in the examination room or lab until you are done with the exam. If you want to drink, eat, or use the bathroom do so before you start of the exam. You will not be allowed to leave the room during the exam. If you do, your exam will be collected and graded as is. Your bag/books will be placed on the ground during the examination. If you come in late during the exam you must sit all the way in the back of the room, even if you normally sit in the front. If you do come in late for the exam, you will not be given additional time to finish the exam, regardless of excuse.**

**STUDENT ASSISTANCE PROGRAM:** Valencia College is interested in making sure all our students have a rewarding and successful college experience. To that purpose, Valencia students can get immediate help with issues dealing with stress, anxiety, depression, adjustment difficulties, substance abuse, time management as well as relationship problems dealing with school, home or work. BayCare Behavioral Health Student Assistance Program (SAP) services are free to all Valencia students and available 24 hours a day by calling (800) 878-5470. Free face-to-face counseling is also available.

**STUDENTS WITH DISABILITIES INFORMATION:** "Students with disabilities who qualify for academic accommodations must provide a Notification to Instructor (NTI) form from the Office for Students with Disabilities (OSD) and discuss specific needs with the professor, preferably during the first two weeks of class; accommodations will not be applied retroactively. The Office for Students with Disabilities determines accommodations based on appropriate documentation of disabilities." (<http://valenciacollege.edu/osd/default.cfm>).

**PREGNANT STUDENTS:** The laboratory environment often times will involve the use of and/or exposure to chemicals or other hazardous substances/equipment. If you are pregnant or plan on becoming pregnant during this course and are concerned about your exposure to these chemicals or hazardous substances or equipment, please see your instructor to discuss possible alternative arrangements. Students are also invited to contact Mr. Ryan Kane, Title IX Coordinator/Equal Opportunity Officer, 407-582-3421, rkane8@valenciacollege.edu, regarding requests for alternative arrangements relating to pregnancy.

**SPECIAL RULES:** **No cell phone use will be tolerated at any time. All cell phones must be TURNED OFF and STORED (phones can’t be visible at any time during class or lab).** You can check your phones during class breaks, then you have to turn them back off and store them away. If your phone disturbs the class, the instructor may ask you to leave the class for the day. Use of laptops is permitted, but only for class related use. You may only use audio recording equipment if you need to. You must agree that the audio recording will be used for the sole purpose of studying. **You can’t videotape or take pictures at any time.** You must not be disruptive to others. No eating or drinking in the lecture or lab. Instructor reserves the right to remove a student from class as a result of prohibited or unlawful acts. Students who violate classroom or Valencia rules will potentially face disciplinary actions up to and including expulsion from Valencia.

**KEY TO SUCCESS:** “Learning is an action verb!! Most students need to do more than just sit through lectures and reread their notes. Spend 1-2 hour blocks of time every day actively writing or discussing concepts to make them a part of your memory. Use the words you learn often, they will sink in better☺.

-Here are some study and classroom management tips that have assisted former students:

* Attend every class and lab.
* Do not be tardy.
* Preview the chapter prior to lecture.
* Preview the labs prior to coming to lab.
* Make a list of all the biology terms and their definitions (use flash cards).
* Make a list of other English words that you may not be familiar with and their definitions (use flash cards).
* Rewrite your notes soon after the lecture.
* If you record the lectures, replay to refresh your memory when you rewrite your notes.
* Create flash cards with questions you make up from the lecture and lab with answers on the back.
* Make your own summary of each chapter (this becomes your study guide).
* Use mnemonic devises and other games to remember concepts; go to Google images, YouTube and Khan Academy for additional pictures and videos to clarify concepts.
* Become a member of a study group and meet with your study group on a regular basis. You have to be adequately prepared when you are studying in a group setting. You should help each other learn the material and not hold each other back. So if you come to your study group as prepared as possible, most likely you will help one of your study group members understand something and that person will help you understand some other concept that you may be having trouble with. If no one comes to a study group prepared, then it will be a waste of time for all the members involved.
* Make lists of confusing topics from your studying and ask questions.
* Take advantage of the professor's office hours.
* Tutoring services are available in bldg. 7-240 (extension 1633).
* Do all the assigned homework.
* Take advantage of all the extra credit opportunities.

**SECURITY STATEMENT:** We want to reassure you that our security officers are here around the clock to ensure the safety and security of the campus community. It’s important to remain alert and aware of your surroundings, especially during the early morning or evening hours. Remember that you can always call security for an escort if you feel uncomfortable walking alone on campus. White security phones can also be found in many of our buildings; simply pick up the phone and security will answer. Finally, report any suspicious persons to Campus Security or by using the yellow emergency call boxes located on light poles in the parking lots and along walkways. Also, please find and record on your cell phone the most up to date Campus Security phone numbers.

**DISCLAIMER:** “The course outline and syllabus are subject to change as needed; changes will be announced in class and by email in a timely manner, when necessary.”

**CONSENT:** By continuing in this course the student accepts the professor’s policies and procedures to conduct class and lab, accepts the grading procedure, accepts all other things outlined in this syllabus, and accepts amendments.

*Valencia College is committed to providing each student a quality educational experience. Faculty members have set high standards of instruction for themselves and for you. If you have a problem in a class, your first step is to talk to your instructor. If you are still dissatisfied, you may talk with the academic dean of the division for your class. We will work together to resolve any issues that arise.”*

**LECTURE SCHEDULE – WEDNESDAY AHS ROOM 213 & LAB SCHEDULE – MONDAY AHS LAB 320**

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| --- | --- | --- | --- |
| Aug 28 | Chapter 1  | Aug 26 | Lab Safety and GuidelinesExercises 1-1, 1-3, 2-1, 3-1, 3-3 |
| Sept 4 | Chapter 2  | Sept 2 | **No labs Labor day holiday** |
| Sept 11 | Chapter 3 | Sept 9 | Analysis of prior week’s experiment (25 pts)Exercises 1-2, 1-4, 1-5, 2-11, 3-1, 3-3 |
| Sept 18 | Group HW assignment 1 (25 pts)Exam 1 ( on chapter 1,2,3 - 75 points) | Sept 16 | Lab Quiz 1 (25 pts)Analysis of prior week’s experiment (25 pts)Exercises 3-4, 3-5, 3-10 |
| Sept 25 | Chapter 4 and Chapter 5 | Sept 23 | Exercises 3-6, 3-7, 3-9, 4-1 to 4-6 |
| Oct 2 | Chapter 6CLASS PRESENTATION 1 | Sept 30 | Lab Quiz 2 (35 pts)Analysis of prior week’s experiments (25 pts)Exercises 2-6, 2-8, 5-10 to 5-13, 5-16 |
| Oct 9 | Group HW assignment 2 (25 pts)Exam 2 (based on chapter 4,5,6 – 75 points) | Oct 7 | Lab Quiz 3 (25 pts)Analysis of prior week’s experiments (25 pts)Exercises 5-4, 5-5, 5-6, 5-9, 5-19, 5-23 |
| Oct 16 | Chapter 7 CLASS PRESENTATION 2  | Oct 14 | NO labsComplete chart for next week |
| Oct 23 | Chapter 9 CLASS PRESENTATION 3 | Oct 21 | Analysis of prior week’s experiments (25 pts)Exercises 5-2, 5-3, 5-7, 5-8, 5-14, 5-15, 5-18, 9-1, 7-2 |
| Oct 30 | Homework assignment 3 (25 pts)Exam 3 (based on chapter 7 and 9 - 75 pts) | Oct 28 | Lab Quiz 4 (30 pts)Analysis of prior lab’s experiments (25 pts) |
| Nov 6 | Chapter 11 and 12CLASS PRESENTATION 4 | Nov 4 | Exercises 2-12, 8-2, 8-3 |
| Nov 13 | Chapter 13CLASS PRESENTATION 5 | Nov 11 | **No labs Veterans day holiday** |
| Nov 20 | Chapter 14CLASS PRESENTATION 6 | Nov 18 | Analysis of prior week’s experiments (5 pts)Exercise 6-4 Exercises 8-6, 7-4 |
|  | **Thanksgiving holiday Nov 27th to Dec 1st**  |  |  |
| Dec 4 | Chapters 15CLASS PRESENTATION 7 | Dec 2 | Final Lab Exam (75 pts) |
| Dec 11 | Homework assignment 4 (25 pts)Homework assignment 5 (25 pts)Exam 4 : Final exam ( based on chapters 11 to 15 ) 100 points | Dec 9 | No lab |