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BIOLOGY 2230 / MICROBIOLOGY
Current Semester (ex: Fall 2014)
CRN#
Lecture: Meeting Times and Room Number
Lab: Meeting Times and Room Number

Professor: Name
Office:
Voice Mail:
E-mail:

Credit Hours: 4

Prerequisites: Exemption from or completion of ENGL 0810, READ 0810 and MATH 0810. Recommended prerequisite: BIOL 1110.

Catalog Description: This course is a study of micro-organisms, especially bacteria, with emphasis on cytology, morphology, physiology, genetics, medical aspects, and cultural techniques. Laboratory experiments are designed to familiarize the student with microbiological techniques, cultivation, isolation, identification of bacteria and other micro-organisms.

Required Texts:
(Text website www.mhhe.com)


Lab Requirements: A lab coat and safety goggles/glasses are required for the laboratory portion of this course. A separate syllabus will be provided for the laboratory portion of this course.

Supplemental Materials: (NOT REQUIRED) Leboffe and Pierce, Photographic Atlas for the Microbiology Laboratory, 2nd edition

Group for Whom the Class is Intended:
This course is intended for students pursuing degrees and programs in the allied health field of study.
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Program Learning Outcomes:
After completing the requirements of BIOL 2230, students will be able to:
1. Have an operational understanding of Microbiology, its related disciplines, its history, current status and future implications
2. Identify the 120+ most common global pathogens and the disease processes in humans
3. Competently work aseptically within a microbiology laboratory, possessing a working knowledge of all laboratory equipment, basic laboratory procedures, and safety protocols

Student Learning Outcomes:
By the end of the course, students will be able to:
1. Discuss major contributions of nineteenth and twentieth century scientists to the developing science of microbiology.
2. Describe two general patterns of cellular organization found in microorganisms.
3. Identify the metric units used in measuring microorganisms.
4. Differentiate between cyanobacteria (blue-green algae) and bacteria.
5. Differentiate between Eubacteria and Archaebacteria.
6. Explain why viruses cannot be classified as procaryotes and eucaryotes.
7. Describe several benefits derived from microbial populations on earth.
8. Describe five types of microscopes and one purpose for which each is used.
9. Differentiate between the magnifying power and resolving power of a microscope.
10. Compare advantages of wet mounts, hanging-drop wet mounts, and stained smears in making observations of microorganisms.
11. Explain the significance of gram reactivity and acid-fastness.
12. Describe the morphology and cytology of bacteria.
13. Describe the major differences and similarities between procaryotic and eucaryotic cells.
14. Describe the sequence of events occurring in the replication cycle of viruses.
15. Differentiate between an obligate and a facultative parasite.
16. Differentiate between a primary and an intermediate host.
17. Describe the structure of a monosaccharide, an amino acid, and a fatty acid.
18. List the major classes of carbohydrates, proteins, and lipids.
19. Describe both asexual and sexual reproductive capabilities found in bacteria.
20. Describe the role of adenosine triphosphate (ATP) molecules in storing energy.
21. Compare the energy sources of autotrophic and heterotrophic microorganisms.
22. Distinguish between respiring and fermentative microorganisms.
23. Explain the influence of pH, temperature, enzyme concentration on enzyme reactions.
24. Describe the major groups of enzyme systems.
25. Differentiate between energy-liberating and energy-requiring reactions.
26. Compare the efficiency of aerobic and anaerobic respiration.
27. Explain why pyruvic acid is a key intermediate in microbial metabolism.
28. Identify the phases of growth on a normal growth curve.
29. Describe the classification of bacteria based on the metabolic use or non-use of atmospheric oxygen.
30. Identify growth patterns of bacteria in broth and on agar slants.
31. Compare formation and germination of endospores.
32. Define the terms pathogen and nonpathogen.
Differentiate between natural and acquired immunity.
34. Differentiate between active and passive immunity.
35. Define titer, antigenicity, and immunogen.
36. Describe several possible responses of the human host to infection.
37. Explain the significance of the inflammatory process to the immune response.
38. Differentiate between a communicable and an infectious disease.
39. Define epidemic, pandemic, and endemic.
40. Differentiate between virulence and pathogenicity.
41. List the microbial factors that contribute to pathogenicity.
42. Contrast the properties of exotoxins and endotoxins.
43. List the host factors that provide for colonization or spread of microorganisms within the human host.
44. List the major portals of entry and exit for microorganisms.
45. Explain why the skin constitutes a primary line of defense against invading microorganisms.
46. Describe how microorganisms gain entrance through the skin.
47. Explain how the respiratory tract is adapted to resist infections.
48. Differentiate between upper and lower respiratory tract infections.
49. Describe a pulmonary infection caused by a rickettsia.
50. Describe a pulmonary infection caused by a chlamydia.
51. Compare the symptoms and time of onset of three types of bacterial food poisoning.
52. Distinguish between the key features associated with cell-mediated and antibody-mediated immune responses.
53. List the major protozoa that cause disease in humans.
54. Describe the major helminthic infections found in humans.
55. Discuss the transmission and prevention of rickettsial disease.
56. Discuss the transmission and prevention of trypanosomiasis.
57. Explain the role of rats, ticks, and lice in the transmission of febrile diseases caused by bacteria.
58. Differentiate between disinfection and sterilization.
59. List the physical agents commonly employed for disinfection or sterilization.
60. Contrast the efficiency of moist heat, dry heat, and steam under pressure as microbicidal agents.
61. List the target site for the major antimicrobial agents.
62. Explain why specimens for microbiological examination should be sent to the laboratory promptly.
63. Explain why labeling and recording the time of collection are important in processing specimens.
64. List several personnel factors which contribute to hospital-acquired infections.
65. Describe a procedure for hand washing which prevents the spread of microorganisms.
66. List the environmental factors which contribute to hospital-acquired infections.
67. Explain how antimicrobial therapy, immunosuppressive therapy, and immobilization predispose patients to infection.
68. Explain the criteria necessary to classify infections as nosocomial in origin.
69. Describe AIDS and review current standards for prevention used by health practitioners.
70. Describe the minimal information needed, as well as various tests used in the identification of bacteria via laboratory diagnosis.

**Student Objectives:**
Throughout the course, students will have the opportunity:
1. To attend all lectures and to attend and participate in all labs
2. To spend time outside class for independent study
3. To diligently study both text and notes
4. To seek outside help from the instructor as needed
5. To demonstrate a working knowledge of microbiology to be assessed by lecture and lab exams

**Attendance Policy:** Regular attendance is essential to successfully navigate the rigors of this course. Roll will be called at the beginning of class. If you are tardy for a class it is your responsibility to let the instructor know after class has ended.

**General Classroom Policies:**

- Courtesy to one another is expected at all times.
- Be on time, as lecture and lab begin on time.
- No food, drink, or children are permitted in classrooms or labs.
- Cell phones should be turned off or be set on vibrate prior to entering classroom.
- Prepared notes will NOT be provided to students. If you miss a day of class, please get a copy of the notes from a fellow student.
- Unless special permission has been given by student services, I do not allow students to tape either my lectures or my labs.
- **The text will be our definitive source on names, spelling, and terminology regardless of any other resources you may buy or that may be provided to you.**
- Exams will be corrected and returned to you within one week after the exam. I will **NOT** grade exams the same day, or in the presence of students. Do not call or come to my office for grades prior to the next regular class session after an exam.

**Exam policies:**

- **There will be six exams, four in lectures and two in labs.** Each exam is worth 100 points. Exam dates will be announced during scheduled lecture and lab meetings. Your laboratory instructor will provide a separate course outline.
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- There are NO MAKE-UP EXAMS IN LAB. If you miss a lab exam, you will receive a zero for that test.
- YOU MAY MAKE UP ONLY ONE LECTURE EXAM. You must make up the missed exam the week prior to final exams during my office hours. Any student missing a second or third exam will receive a zero for those exams.

**Major Assignments and Method for Calculating the Final Grade:**

**Points Breakdown:**

- 400 points (Four Lecture Exams)
- 200 points (Two Lab Exams)
- 100 points (Disease and Case Study Lab Report)
- 50 points (Oral Pathogen Lab Report)
- 750 points (400 from lecture & 350 from lab)

**Grading Policies:**

**Grading Scale:**

- A = 90% - 100% or 675 – 750 points
- B = 80% - 90% or 600 – 674 points
- C = 70% - 80% or 525 – 599 points
- D = 60% - 70% or 450 – 524 points

**Note:** If your average is 89.4, your grade will be a B.
If your average is 79.4, your grade will be a C.
If your average is 69.4, your grade will be a D.
If your average is 59.4, your grade will be a F.

**Course Policies:**

**Academic Misconduct Policy:**
Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. Based on their professional judgment, instructors have the authority to impose the following academic sanctions: (a) require the student to repeat the assignment for full or partial credit; (b) assign a zero, an F, or any other grade appropriate for the assignment or examination; (c) assign an F for the course. In addition, disciplinary sanctions may be imposed through the regular institutional procedures. For more information, see MSCC Policy 3:02:00:03.

**Classroom Misconduct Policy:**
The instructor has the primary responsibility for maintenance of academic integrity and controlling classroom behavior, and can order temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct that violates the general rules and regulations of the institution for each class session during which the conduct occurs. Extended or permanent exclusion from the classroom, beyond the
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session in which the conduct occurred, or further disciplinary action can be effected only through appropriate procedures of the institution.

Disruptive behavior in the classroom may be defined as, but not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupt the flow of instruction or prevent concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), text messaging, and the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.). For more information, see MSCC Policy 3:02:00:03.

Class Cancelation Policy:
If class is cancelled for any reason, you will be notified via our D2L page and will be told there how to prepare for the next class period. For these reasons, students are advised to take advantage of the Motlow Rave system in order to receive text messages when class is canceled. For more information, see https://www.getrave.com/login/mscc.”

Emergency Procedures Policy:
In case of a medical emergency we will immediately dial 9-911 and report the nature of the medical emergency to emergency response personnel. We will try to stay with the person(s) in need and maintain a calm atmosphere. We will talk to the person as much as possible until response personnel arrive on campus, and we will have someone go outside to meet emergency personnel and direct them to the appropriate location. In the event of an emergency (drill or actual), a signal will be sent. Based on that signal, students will follow the procedures below for that specific type of emergency:

**Loud warbling sound throughout Building (FIRE):**
Collect purses and coats and proceed immediately out of your room and exit through the closest emergency exit. Proceed to the Designated Assembly Area closing windows and doors as you exit. Remain there until the "All Clear" Signal is given by an Emergency Management Team member. (Instructors- Provide your Designated Assembly Area, and its location to students)

**Tornado Siren (SEVERE WEATHER):**
Proceed to the closest designated severe weather shelter on the 1st floor and proceed all the way into the shelter. Crouch down on the floor with your head between your knees facing away from the outside walls. Remain there until the "All Clear" Signal is given. (Instructors- Provide the recommended room number or hallway location to students)

**Air Horn (1 Long Blast) and Face to Face All Clear (INTRUDER/HOSTAGE):**
Ensure door is closed, locked and lights turned off. If your door will not lock, move some tables and chairs in front of the door quickly. Move immediately to
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The rear of the room away from the door and sit on the floor- out of sight if possible. Remain calm and quiet and do not respond to any inquiries at the door unless you have been given the "All Clear" and a member of law enforcement or your campus Emergency Management Team member makes face-to-face contact at your door.

**Classroom Locked-door Policy:**
In order to adhere to MSCC Emergency Preparedness Policy and to facilitate effective classroom management, the classroom door will remain closed and locked for the duration of the class period.

**Educational Technology:**

**Accessing Campus Computers or the MSCC Library from off Campus:**
Your Username format is your First Initial, Last Name and Month and Day Birthday in the Format of MMDD. Example: Marcia Smith born on April 11, 1992 - Username: msmith0411. Your Pin will be the numeric pin you created when you initially applied to Motlow College.

**Using D2L:**
For help with D2L including how to submit materials to a Dropbox, see this page: [http://www.mscc.edu/techtube.aspx](http://www.mscc.edu/techtube.aspx)

**Technical Support/Assistance:**
Students having problems logging into a course, timing out of a course, using course web site tools, or any other technical problems, should contact the MSCC Technology Help Desk at 931-393-1510 or toll free 1-800-654-4877, Ext. #1510 (or d2lhelp@mscc.edu)

**Disability Services/Accommodations:**
Motlow College is committed to meeting the needs of qualified students with disabilities by providing equal access to educational opportunities, programs, and activities in the most integrated setting appropriate. This commitment is consistent with the College’s obligations under Section 504 of the Rehabilitation Act of 1973 and the American with Disabilities Act of 1990 (ADA). Together, these laws prohibit discrimination against qualified persons with disabilities. To this end, the Director of Disability Services for Motlow College coordinates services and serves as an advocate and liaison for students with disabilities attending Motlow College. Contact the Director of Disability Services here: [http://www.mscc.edu/disability/index.aspx](http://www.mscc.edu/disability/index.aspx)

Students with disabilities who would need assistance in an emergency evacuation should self-disclose that need to the instructor no later than the second day of class or second group meeting.
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Confidentiality of Student Records:
The education records of current and former students at Motlow State Community College are maintained as confidential records pursuant to The Family Educational Rights and Privacy Act (FERPA) of 1974 as amended. For further information, see MSCC Policy No. 3:02:03:00.

Student Success:
Tutoring:
MSCC Instructors can guide students to specific resources regarding Tutoring in their discipline. In particular, students may find help with Math and Essay Writing via each campus’ Learning Support labs. Students should contact the labs on their campus to schedule appointments for help. For additional help, see the Student Success page: http://www.mscc.edu/student_success/index.aspx

Academic Advisement:
MSCC Instructors can guide students to specific resources regarding Advisement. For additional help, see the Academic Advisement page: http://www.mscc.edu/advisement/index.aspx

Tentative Class Schedule:

TENTATIVE LECTURE SCHEDULE

LECTURE TOPICS

- Main Themes of Microbiology     Chapter 1
- Chemistry of Biology       Chapter 2
- Tools of the Laboratory: Methods of Studying Microorganisms Chapter 3
- Survey of Prokaryotic Cells and Microorganisms Chapter 4
- Survey or Eukaryotic Cells and Microorganisms Chapter 5

EXAM I

- Microbial Nutrition, Ecology, and Growth             Chapter 7
- Intro to Microbial Metabolism: Chemical Compounds of Life Chapter 8
- Intro to Microbial Genetics / Genetic Engineering     Chapter 9 & 10

EXAM II
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- Miscellaneous Bacterial Agents of Disease Chapter 21
- Introduction to Viruses Chapter 6
- Physical and Chemical Agents for Microbial Control Chapter 11
- Drugs, Microbes, Hosts – The Elements of Chemotherapy Chapter 12

**EXAM III**

- Microbe-Human Interactions: Infections, Disease, & Epidemiology Chapter 13
- Intro to Host Defenses, Innate, Adaptive, and Specific Immunities Chapters 14 & 15
- Disorders in Immunity Chapter 16
- Pathogens of Medical Importance Chapters 18, 19, 20, 21, 22, & 23
- Environmental, Applied, and Industrial Microbiology Chapters 26 & 27

**EXAM IV**

**Miscellany:** Please check you Summer 2014 Schedule of Classes for information about dates for refunds, withdrawals, and other deadlines that may pertain.

ALWAYS SEE AN ADVISOR BEFORE REGISTERING FOR CLASSES. Any member of the faculty can and will act as your advisor.

*Please talk to me if you are experiencing difficulty or need help.*