BIOL 2230: Microbiology (Hybrid)

Instructor:
Email:
(I prefer that you use the course-specific email within D2L instead of this one for communicating with me.)
Office Location:

Office Phone:    Fax:

Office Hours:

Credit Hours:  4    Contact Hours:  3    Lab Hours:  2

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.

Group for Whom the Class is Intended:

This course is intended for students pursuing degrees and programs in the allied health field of study.
Required Texts and Lab:


Lab: A separate lab syllabus and listing of required texts and materials will be provided by your lab instructor.

Supplemental Materials: none required

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 a 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.

33. 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 be exposed to all lecture materials 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

Hardware Requirements: Students need a reliable computer and dependable internet connection to successfully complete an online course. Make sure you run a “System Check” before you login to MSCC Online. Also make sure you have a “back up plan” in case you have technical issues during exam days. Here are the recommended general System Requirements for MSCC Online:

1. An internet connection—56k modem, cable or DSL

2. A web browser

3. CD drive
4. Sound card

5. Operating system—Windows XP or Windows 7; Mac OS X

6. Java Script and Cookies should be enabled

Software Requirements: Much online information for this course is in Microsoft Word and PowerPoint, so it is best if you have both of these types of software. If you do not, you should be able to view the information by downloading the free “Viewers” for each from http://www.mscc.edu/itts/links.aspx. The viewers don’t allow a user all of the features of the full software packages, but an individual can still obtain the content. Links to several Adobe software products are also on the same web page.

Assessment and Grading:

Testing Procedures: There will be 4 regular lecture non-comprehensive exams with the fourth and final exam given during Motlow’s scheduled Final Exam Period. Each exam will consist of primarily multiple-choice questions and will be timed. Students will be allowed a scheduled window of time during which to take each exam. Each exam must be completed before the time the exam closes, so DO NOT wait until the last minute to take an exam. Allow time to complete the exam before the deadline. You could have technical issues (due to weather, etc.), sickness, or any number of other problems. After an exam is over and graded, you will have the opportunity to review the exam several days afterwards.

Labs will be completed conventionally in an on-campus microbiology laboratory. One final score for the labs will be averaged and entered into the Gradebook in D2L.
Below are the lecture exam dates:

Module 1—Chapters 1-5

Chapter 1 – The Main Themes of Microbiology
Chapter 2 – The Chemistry of Biology
Chapter 3 – Tools of the Laboratory; Methods of Studying Microorganisms
Chapter 4 – A Survey of Prokaryotic Cells and Microorganisms
Chapter 5 – A Survey of Eukaryotic Cells and Microorganisms

Lecture Exam 1—dates for exam

Module 2—Chapters 6-9 & 11

Chapter 6 – An Introduction to Viruses
Chapter 7 – Microbial Nutrition, Ecology and Growth
Chapter 8 – An Intro to Microbial Metabolism: The Chemical Crossroads of Life
Chapter 9 – An Introduction to Microbial Genetics
Chapter 11 – Physical and Chemical agents for Microbial Control

Lecture Exam 2—dates for exam

Module 3—Chapters 13 & 17 - 20

Chapter 13 – Microbe-Human Interactions: Infection, Disease, and Epidemiology
Chapter 17 – Procedures for Identifying Pathogens and Diagnosing Infections

Chapter 18 – The Gram-Positive and Gram Negative Cocci of Medical Importance

Chapter 19 – The Gram-Positive Bacilli of Medical Importance

Chapter 20 – The Gram-Negative Bacilli of Medical Importance

Lecture Exam 3—dates for exam

Module 4—Chapters 22 - 26

Chapter 22 – The Fungi of Medical Importance

Chapter 23 – The Parasites of Medical Importance

Chapter 24 – Introduction to Viruses That Infect Humans: The DNA Viruses

Chapter 25 – The RNA Viruses That Infect Humans

Chapter 26 – Environmental Microbiology

Lecture Exam 4—dates for exam

Missed Exams: Failure to take an exam within the designated time period will result in a grade of zero for that exam. A student should not assume that he/she will be allowed to make up a missed exam! There are certain situations (examples---physician-documented illness or hospitalization, documented death of immediate family member) in which a student may be allowed to make up an exam, and generally only one exam can be made up per semester. The instructor MUST be notified within 48 hours of the ending time and date of the exam by phone, voice
mail, or email as to the circumstances surrounding the missed exam. The instructor will decide when/if a make-up exam is allowed.

Grading Procedure: The final course grade is determined as follows:

Lecture Exam Average—75%

Lab Exam Average—25 %

Grading Scale: A = 90-100%
B = 80-90%
C = 70-80%
D = 60-70%
F = below 60%

*Please do not request or expect extra credit or grade curves. Concentrate all efforts on learning the assigned material.

Assignments:

This course is subdivided into units or “modules.” Each module includes several related chapters in the text. For each module, students should read each chapter thoroughly, sometimes several times, and complete end of chapter reviews. At the end of each module, students will take a lecture exam.

The laboratory portion of the course will involve conventional weekly scheduled labs held at an on-campus location posted in the Motlow class schedule. Grades will be generated through completion of lab exams, assignments and activities.
Class Participation:

Active participation in the class is expected of all students. Students are expected to regularly login to the course (several times a week), check and respond to email, and read and reply to discussion postings. In addition, students should utilize the lab software and supplemental practice activities as often as possible. Course activity will be monitored.

Course Ground Rules

Academic Misconduct: It is expected that all work you complete for this course is your own. 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. The instructor has the authority to assign a zero for the examination or to assign an “F” for the course.

Guidelines for Communication

Email: Motlow online courses (MSCC Online or Desire2Learn or D2L) use an internal email that is separate from the regular Motlow email. An individual can only email to and from D2L when in D2L. PLEASE USE THE INTERNAL COURSE EMAIL (D2L EMAIL) WHEN POSSIBLE FOR THIS COURSE. Doing so helps keep online student emails separate from regular emails. However, students should check both email accounts regularly! During the Monday-Friday workweek, I will generally respond to an email within 48 hours. If emailed on a weekend, I will respond by Monday at noon. If I know I will be out of town and unable to respond for some reason, I will let the class know.

When using Email:

Always include a subject line.

Remember, without facial expressions some comments may be taken the wrong way.
Please be considerate of the feelings of others, and be careful in wording your emails.

Use standard fonts.

Do not send extremely large attachments without prior permission.

Use standard formatting unless necessary to complete an assignment or special communication.

Respect the privacy of other class members.

Discussion Posts: Students are encouraged to engage in course communication through use of the D2L Discussion Board. All students should post an “Introduction” during the first week of class in which they tell about themselves.

When using Discussion:

Review the discussion threads thoroughly before entering the discussion.

Try to maintain threads by using the “Reply” button rather than starting a new topic.

Do not make insulting or inflammatory statements to other members of the discussion group.

Be respectful of the ideas of others.

Be patient and read the comments of other group members thoroughly before responding.

Be positive and constructive in group discussions

Respond in a thoughtful and timely manner.
Library

The Clayton-Glass Library at Motlow College’s Moore County campus is available to all students enrolled at the college. In addition, students may use libraries at Fayetteville, McMinnville, and Smyrna locations. Links to library materials, e.g., electronic journals, databases, interlibrary loans, digital reserves, dictionaries, encyclopedias, maps, and library support services, are available at [http://www.mscc.edu/library/index.aspx](http://www.mscc.edu/library/index.aspx).

Students with Disabilities

If you have a documented disability, you can arrange for accommodations by contacting the Office of Disability Services at 931-393-1765 or by email at [mailto:shood@mscc.edu](mailto:shood@mscc.edu). Students needing academic accommodations are required to register with Disability Services and provide required disability-related documentation. Although you may request an accommodation at any time, it is recommended you do so at the beginning of the semester. The Office of Disability Services (Crouch 1042) is strongly committed to the needs of student with disabilities.

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.

Technical Support/Assistance

This is not a “how to” technology course. The instructor cannot assist you with technical or computer problems. In addition, it is the student’s responsibility to update software, hardware, etc. in order to succeed in an online course. For D2L problems, email HYPERLINK "mailto:D2LHelp@mscc.edu" D2LHelp@mscc.edu. For general technical problems not involving D2L, email HYPERLINK "mailto:helpdesk@mscc.edu" helpdesk@mscc.edu. You may also call the Technical Help Desk at 1-800-654-4877 (ext. 1510), 931-393-1510, or visit the website at HYPERLINK "http://www.mscc.edu/itts/support.aspx" http://www.mscc.edu/itts/support.aspx.

Using D2L:

For help with D2L including how to submit materials to a Dropbox, see this page: HYPERLINK "http://www.mscc.edu/techtube.aspx" http://www.mscc.edu/techtube.aspx

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.
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: HYPERLINK "http://www.mscc.edu/student_success/index.aspx"
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:

HYPERLINK "http://www.mscc.edu/advisement/index.aspx"
http://www.mscc.edu/advisement/index.aspx

Course Outline/Syllabus Changes

The instructor reserves the right to make changes as necessary to this syllabus. If changes are required during the term, the instructor will immediately notify students of such changes by email and/or discussion board.