BIOL 2420 - Microbiology for Non-Science Majors Lecture Section 101 (MW) Course Syllabus

Description

This course covers basic microbiology and immunology and is primarily directed at pre-nursing, pre-allied health, and non-science majors. It provides an introduction to historical concepts of the nature of microorganisms, microbial diversity, the importance of microorganisms and acellular agents in the biosphere, and their roles in human and animal diseases. Major topics include bacterial structure as well as growth, physiology, genetics, and biochemistry of microorganisms. Emphasis is on medical microbiology, infectious diseases, and public health. The lab covers basics of culture and identification of bacteria and microbial ecology and covers basics of microbiology. Recommended: A four-hour chemistry or biology course; TSI Reading complete

Credits 4
Lecture Hours 3
Lab Hours 3
Extended Hours 0
Contact Hours 96
State Approval Code 26.0503.51 03
Instructor Name Christina Parrott
Semester/Year Fall 2024

Meeting Time and Location

BIOL 2420 Microbiology Lecture

Professor: Mrs. Christina Parrott
Course: BIOL-2420.101
Meets: Mon/Wed 10:45 am -12:05 pm
Room: HNS 1200
Semester: Fall 2024

Alternate Operations During Campus Closure

In the event of an emergency or announced campus closure due to a natural disaster or pandemic, it may be necessary for Panola College to move to altered operations. During this time, Panola College may opt to continue delivery of instruction through methods that include, but are not limited to: online learning management system (CANVAS), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor Panola College's website (www.panola.edu) for instructions about continuing courses remotely, CANVAS for each class for course-specific communication, and Panola College email for important general information.

Student Basic Needs

Unexpected circumstances may arise, but Panola College offers various resources to support students. If you need mental health services or are facing challenges with transportation, affording class materials and supplies, or accessing food regularly—issues that may impact your class performance—please visit panola.edu/resources.

Class Attendance

Regular and punctual attendance of classes and laboratories is required of all students. When a student has been ill or absent from class for approved extracurricular activities, he or she should be allowed, as far as possible, to make up for the missed work. If a student has not actively participated by the census date, they will be dropped by the instructor for non-attendance. This policy applies to courses that are in-person, online, hybrid, and hyflex.

Attendance in online courses is determined by submission of an assignment or participation in an activity. According to federal guidelines, simply logging into a distance learning course without participating in an academic assignment does not constitute attendance. Distance learning is defined as when a majority (more than 50%) of instruction occurs when the instructor and students are in separate physical locations. Students must engage in an academic activity prior to the course census date.

When an instructor feels that a student has been absent to such a degree as to invalidate the learning experience, the instructor may recommend to the Vice President of Instruction that the student be withdrawn from the course. Instructors may seek to withdraw students for non-attendance after they have accumulated the following number of absences:

Fall or spring semesters:

3 or more class meeting times per week - 5 absences

2 class meeting times per week - 3 absences

1 class meeting per week - 2 absences

The student is responsible for seeing that he or she has been officially withdrawn from a class. A student who stops attendance in a class without officially withdrawing from that class will be given a failing grade; consequently, the student must follow official withdrawal procedures in the Admissions/Records Office.

Please note: Health Science and Cosmetology courses may require more stringent attendance policies based on their accreditation agencies. Please see the addendum and/or program handbook for further information concerning attendance.

Pregnant/Parenting Policy

Panola College welcomes pregnant and parenting students as a part of the student body. This institution is committed to providing support and adaptations for a successful educational experience for pregnant and parenting students. Students experiencing a need for accommodations related to pregnancy or parenting will find a Pregnancy and Parenting Accommodations Request form in the Student Handbook or may request the form from the course instructor.

Artificial Intelligence (AI) Course Policy

No use of Generative AI permitted.

This option assumes that all work submitted by students will be generated by the students themselves, whether they are working individually or in groups. Students should not have another person or entity do the writing of any portion of an assignment, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Panola College's standards of academic integrity.

Instructional Goals and Purposes

The purpose of this course is to familiarize the student with the concepts, principles and theories of science and provide an opportunity to experience and appreciate the processes and methodology of science.

Learning Outcomes

Lecture:

After studying all materials and resources presented in the course, the student will be able to:

1. Describe distinctive characteristics and diverse growth requirements of prokaryotic organisms compared to eukaryotic organisms.
2. Provide examples of the impact of microorganisms on agriculture, environment, ecosystem, energy, and human health, including biofilms.

3. Distinguish between mechanisms of physical and chemical agents to control microbial populations.
4. Explain the unique characteristics of bacterial metabolism and bacterial genetics.
5. Describe evidence for the evolution of cells, organelles, and major metabolic pathways from early prokaryotes and how phylogenetic trees reflect evolutionary relationships.
6. Compare characteristics and replication of acellular infectious agents (viruses and prions) with characteristics and reproduction of cellular infectious agents (prokaryotes and eukaryotes).
7. Describe functions of host defenses and the immune system in combating infectious diseases and explain how immunizations protect against specific diseases.
8. Explain transmission and virulence mechanisms of cellular and acellular infectious agents.

Laboratory:

After studying all materials and resources presented in the course, the student will be able to:

1. Use and comply with laboratory safety rules, procedures, and universal precautions.
2. Demonstrate proficient use of a compound light microscope.
3. Describe and prepare widely used stains and wet mounts, and discuss their significance in identification of microorganisms.
4. Perform basic microbiology procedures using aseptic techniques for transfer, isolation and observation of commonly encountered, clinically significant bacteria.
5. Use different types of bacterial culture media to grow, isolate, and identify microorganisms.
6. Perform basic bacterial identification procedures using biochemical tests.
7. Estimate the number of microorganisms in a sample using methods such as direct counts, viable plate counts, or spectrophotometric measurements.
8. Demonstrate basic identification protocols based on microscopic morphology of some common fungi and parasites.

Course Content

A general description of lecture/discussion topics included in this course are listed in the Learning Outcomes section of this syllabus.

Students in all sections of this course will learn the following content:

Upon the successful completion of this course, the student should have an understanding of the following specific course objectives:

1. Identify major characteristics and classification strategies for prokaryotic and eukaryotic organisms.
2. Differentiate between prokaryotic and eukaryotic cell structure and function.
3. Identify specific bacteria based on morphological and biochemical characteristics.
4. Identify the role of microbes in infection, disease, and epidemiology.
5. Identify the causative agent of disease, pathogenicity abilities, symptoms, diagnosis, prevention and treatment of selected bacterial, fungal, protozoan, and parasitic worm infections.
6. Identify the major components and principles associated with innate and specific immunity.
7. Identify major metabolic pathways or processes associated with microorganisms.
8. Identify basic requirements for microbial nutrition and growth.
9. Discuss the principles associated with microbial genetics and identify contributions associated with genetic engineering.
10. Identify methods used to control microorganisms in the environment and the chemical control of microorganisms in the human body.
11. Discuss the general characteristics of viruses and identify the causative agent, mechanism of transmission, symptoms, prevention, and treatment of selected viral diseases.
12. Identify the importance of immunization and immune testing.
13. Identify the importance of microbes in applied microbiology and biotechnology.
14. Identify to importance of microbes in food microbiology, industrial microbiology, and environmental microbiology.

Upon the successful completion of this course, the student should have an understanding of the following specific laboratory course objectives:

1. Identify and demonstrate proper safety procedures concerning laboratory safety.
2. Apply scientific reasoning to investigate and analyze collected data.
3. Identify the parts and function of the microscope.
4. Understand proper use of the microscope, including technique for oil immersion.
5. Demonstrate the ability to properly prepare slides for microscopic examination.
6. Understand the role of proper aseptic technique in the handling of microorganisms.
7. Identify the purpose and principles associated with negative, simple, Gram, capsule, acid-fast, and endospore staining.
8. Discuss the importance of constructing wet mounts, streak plates, and spread plates.
9. Estimate microbial numbers in a sample using serial dilution techniques.
10. Understand the effect of environmental factors on microbial growth as related to cell structure and metabolism (osmotic pressure, temperature, oxygen requirements, and pH).
11. Identify the purpose and principles associated with different media types utilized in the laboratory.
12. Understand the purpose and principles associated with biochemical test media in determining metabolic differences between microbes.
13. Utilize resources such as Bergey's Manual to correctly identify an unknown bacterial strain.
14. Understand the role of chemical and physical control of microbes (antibiotics and disinfectants).

Methods of Instruction/Course Format/Delivery

This course is offered in the traditional face-to-face classroom environment and online for both lecture and/or lab. Students will have access to this course using Canvas, a learning management system. Student learning outcomes, outlines/notes, power points, reviews, videos, and other study aids are provided within Canvas. A **Connect Microbiology access code** (provides access to the publisher's digital learning environment that helps to improve performance) is **required** to provide access to an eBook and homework (participation) assignments that help in the understanding of learning outcomes. Connect also contains the SmartBook study tool that can help improve memory recall and increase student performance and retention. The Connect Microbiology access code also provides quizzes and demonstration labs for enhancing certain laboratory topics for both face-to-face and online students. Online laboratory students are **required** to use a hands-on Carolina Lab Kit to complete a number of laboratory assessments.

Students completing a face-to-face lab will follow class attendance guidelines as indicated in the Panola College catalog with required attendance to laboratory sessions. **Students that are participating in an online laboratory** are responsible for properly acquiring their lab kit, properly evaluating the responsibilities, safety issues, and instructions associated with the Carolina Lab Kit, properly completing and submitting assignments by requested due dates, and properly following clean-up instructions associated with their Lab Kit. **Online students will be completing your lecture exams (and major online lab quizzes if you are in the online lab) using the Proctorio Online Testing program within Canvas. Some requirements for Proctorio include a computer with a camera/Webcam, Google Chrome as your browser, reliable Internet service, and a quiet location.** Online students may also choose to complete their exams at an On-Campus Testing Center (Carthage, Marshall, or Center). Hours of operation of the On-Campus testing centers are posted on the Student Support Services webpage (Student Support | Panola College). Examinations will require **approximately 60 minutes** for completion and the completion time for quizzes vary (is much shorter) depending on content.

Students should feel free to email any questions or concerns associated with this course to the instructor. Please be sure to check and appropriately respond to your emails in Canvas. Students should also feel free to communicate by phone or in person during scheduled office hours.

Students in both the traditional and online classes should use e-mail within Canvas to communicate with the instructor. Using Canvas email gives you access to the instructor and other classmates--you just select a name from the list. If there is an issue in contacting your instructor using email in Canvas, you may use their Panola College email address (located in the "Getting Started" module in Canvas). I will attempt to respond to all emails within 24 hours.

Students are expected to demonstrate academic integrity. Evidences of any form of cheating (from lecture or lab assessments to examinations), plagiarism, collusion, or inappropriate use of artificial intelligence (AI) will result in a grade of "0" for that assignment. Completing online examinations using the Proctorio Online testing service requires the student to follow provided instructions/guidelines. Deviating from these instructions/guidelines will result in a grade of "0" for that exam/quiz evaluation. **Academic integrity during**

the testing process is the student's responsibility and has to be maintained. The testing experience at your location should mimic the testing environment in a face-to-face classroom. Some of the **major guidelines** include a proper 360-degree room scan, maintaining consistent eye contact with your computer screen, no other individuals should be present in your immediate testing vicinity (unless you are testing in a public place), and there should not be conversations with others during the exam (unless you are completing your exam with a reader (through Student Disability Services). Using the Proctorio program is an advantage to provide a degree of flexibility and convenience to your schedule. **Misuse of this privilege will result in a grade of "0" for an exam/quiz evaluation and will require that you complete your future exams/quizzes in a face-to-face proctored environment (testing center). Further information concerning proper online testing instructions/guidelines are provided within your Proctorio module within Canvas. Technical issues** related to internet service or computer glitches/problems occurring during proctored online evaluations (quizzes/examinations) **may require the student to complete these evaluations face-to face at an On-Campus Testing Center.**

A course information sheet will be provided to all students and will include instructor information, course requirements, information on academic integrity, testing information, grading information, course materials, strategies for success, and a tentative schedule. The course information sheet will be located in Canvas.

Major Assignments/Assessments

The following items are assigned and assessed during the semester and used to calculate the student's final grade.

Assignments

Lecture

1. 20+ participation assignments are provided in Connect (publisher's digital learning environment thathelps to improve performance) and these assignments include a variety of question types to assistin the learning process
2. .Unit exams occur at scheduled intervals during the semester and a Final comprehensiveexamination occurs during scheduled exam times at the end of the semester. A variety of questiontypes are used to assess learning outcomes. Exam dates/times are provided/posted in Canvasmodules, within the Course Information Sheet, and on the Canvas calendar.

Laboratory

1. Laboratory quizzes and laboratory exercises will provide an understanding of a number ofmicrobiology concepts and activities (including microscope use, stain procedures, streak andspread plates, factors influencing microbial growth, culture transfers, antibiotic sensitivity, andbacterial/protozoan structure).
2. Determination of a microbiology unknown using a variety of morphological and biochemical tests.This activity will involve data collection, using a dichotomous key, and critical thinking.
3. A comprehensive laboratory exam will occur at the end of the

Assessments

Lecture

The lecture component of the microbiology course is 70% of your total grade.

1. Participation assignments are assessed in Connect. These weekly assignments can be retaken/ corrected (prior to the due date) to improve your grade. Cumulatively, these assignments represent 10% of the total grade in the course.
2. Unit exams for the online course are computer-based using the Proctorio Online Testing Program and Unit exams for face-to-face classes are scantron-based. Cumulatively, these exams represent 45% of the total grade in the course. Test information and specific exam content are provided within the course information sheet and within the Canvas modules provided at the start of the course. In a regular semester, each unit exam represents 9% of the total grade and (content-wise), the exams are divided as follows:
    1. Exam # Major Topic(s)
        - Unit #1 History, Chemistry, Prokaryotic Organisms, Applied and Industrial Microbiology, and Environmental Microbiology

- Unit #2 Eukaryotic Organisms, Introduction to Viruses, Microbe-Human Interactions, and Identifying and Diagnosing Pathogens
- Unit #3 Physical and Chemical Agents, Chemotherapy, RNA and DNA Viruses, and Immunity
- Unit #4 Bacteria, Fungi, and Parasites of Medical Importance
- Unit #5 Metabolism, Genetics, and Genetic Engineering

3. Final Exam is a major assessment and includes a variety of multiple-choice questions assessing the content from the entire course. The microbiology final exam is computer-based in the online course and for face-to-face classes is scantron-based. The final examination is comprehensive and is worth **15%** of your grade. **Finals should not be missed unless there is a serious situation (illness, loss of loved one, etc.); prompt contact with the instructor is vital or a grade of "0" will be assigned. Finals should not be missed for non-valid reasons/excuses (family vacations/reunions, plane/bus tickets, going home prior to the end of the semester, etc.) and cannot be administered early (unless there is a serious crisis).** The final exam will be given during the official final exam schedule for Panola College.

Laboratory

The laboratory component of the microbiology course is 30% of your total grade.

1. Laboratory activities may include quizzes, drawings, laboratory reports, or any other methodologies deemed important by the instructor. **Face-to-face lab students** must be both present and participating in the lab activity. Lab assessments are generally due the next scheduled lab class after a laboratory activity has been completed but due dates will be provided within your provided lab agenda. **Late work is not accepted.** If the student misses a laboratory activity/assignment, the instructor should be contacted ASAP to develop an alternate schedule. For lab activities and quizzes, legitimate missed labs should be scheduled and completed within a week of the missed lab class. The quantity of materials necessary and the time sensitive nature of some exercises are usually not conducive for make-up sessions. **Online lab students** will need to evaluate their instructions for a specific lab activity and use proper time management skills to complete their lab activity and properly submit their work prior to the due date. Ample time will be provided for the completion of lab assignments in the online lab so proper time management skills will be essential. **Due dates are provided in posted lab agendas/emails in both the face-to-face and online labs for lab quizzes and lab assessments. Late work is not accepted.**
2. The microbiology unknown assignment is a major assessment in the microbiology lab and involves determining the identity of an unknown microorganism. The assessment grade sheet evaluates streak plate technique, proper aseptic technique, subculturing, Gram staining, interpreting a number of biochemical tests, data collection, and constructing a dichotomous key. The dichotomous key allows the selection of the potential unknown organism which the student will submit to the instructor.
3. A comprehensive laboratory exam will be administered at the end of the semester. A variety of question types are used to assess laboratory learning outcomes. The comprehensive laboratory exam may be scantron-based or computer-based.

Course Grade

The lecture component of the microbiology course is 70% of your total grade and the laboratory component of the microbiology course is 30% of your total grade.

The grading scale for this course is as follows:

- **Participation** activities will represent **10%** of your total grade and will be evaluated from homework assignments provided in Connect. **Due dates will be supplied with the homework assignments in Connect and within your modules within Canvas; it is the student's responsibility to properly submit responses in a timely manner (Late responses will not be accepted!).**
- **Unit Exams** will represent **45%** of your total grade. Scheduled examination dates are provided within the course information sheet, within your modules in Canvas, and on your calendar. **Microbiology Unit examinations will be computer-based (Proctorio) in the online course and scantron-based in faceto-face microbiology courses. Exams should be completed on the scheduled completion date and time.** Exam questions will be drawn from a variety of sources including your course outlines/notes/power points, review sheets, student learning outcomes, vocabulary terms, and textbook/online (Connect) review questions. Missed examinations due to legitimate reasons should be rescheduled as soon as possible (ASAP). **The student will have one week to schedule/complete a missed Unit Exam** (in a normal Fall/Spring semester). The instructor reserves the right to change the exam format on any

make-up exam. Each exam is worth 100 points and may consist of multiple-choice, matching, short answer (completion), true and false, and/or essay type questions. **Cheating on an exam or failure to follow Proctorio guidelines/instructions can result in a grade of "0" for an exam evaluation. On future computer-based exams, you must complete your exams in a face-to-face proctored environment (testing center).**

- **Final Exam**: A final computer-based examination (online students) and a final scantron-based examination (face-to-face students) will be given during officially scheduled final exam dates/times during the given semester and will cover content from each of your assigned units during the course. The final examination is comprehensive and is worth **15%** of your grade. **Finals should not be missed unless there is a serious situation (illness, loss of loved one, etc.); prompt contact with the instructor is vital or a grade of "0" will be assigned. Finals should not be missed for non-valid reasons/excuses (family vacations/reunions, plane/bus tickets, going home prior to the end of the semester, etc.) and cannot be administered early (unless there is a serious crisis). Cheating or failure to follow Proctorio guidelines/instructions can result in a grade of "0" for the final exam evaluation.**
- **Lab**: The laboratory component of the microbiology course is 30% of your total grade. Within the laboratory component of the course, laboratory quizzes and exercises represent ~71% of your lab grade, the microbiology unknown represents ~17% of your lab grade and the comprehensive laboratory final lab exam represents ~12% of your lab grade. **Failure to follow Proctorio guidelines/instructions can result in a grade of "0" for an online quiz/examination and will require that you complete your future quizzes/exams in a face-to-face proctored environment (testing center). Cheating of any form will result in a grade of "0" on any lab assessment.**
- **Grade Determination**
  Final course grades are determined by the following scale:
  A=100-90 B=89-80 C=79-70 D=69-60 F=< 59.5

Texts Materials, and Supplies

- Connect Online Access Code for Talero's Foundations in Microbiology from McGraw-Hill Publishers with SmartBook (digital teaching assignment/assessment tool used to increase engagement and learning). Contains the eBook for Talero's Foundations in Microbiology. (ISBN 9781265097776)
- **Online laboratory students** (only) will need the Connect Online Access Code (above) and a Hands-On Online Microbiology Laboratory Kit (Carolina). Vouchers for the Online Lab Kits are available for purchase from the Panola College Bookstore or students may elect to purchase their Online Lab Kit directly from Carolina Biological Supply Company. Once vouchers are redeemed and kits are received/ opened they are not refundable.

Required Readings

- Chess, Barry, Talero's Foundations in Microbiology. 12th Edition. 2024. McGraw-Hill Publishers,

Dubuque, Iowa.

Recommended Readings

There are not any recommended readings for this course at this time.

Other

- Courses conducted via video conferencing may be recorded and shared for instructional purposes by the instructor.
- For current texts and materials, use the following link to access bookstore listings: https://www.panolacollegestore.com.
- For testing services, use the following link: https://www.panola.edu/student-services/studentsupport/academic-testing-center.
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Charles C. Matthews Student Center or go to https://www.panola.edu/studentservices/student-support/disability-support-services for more information.

- Withdrawing from a course is the student's responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
- Student Handbook: https://www.panola.edu/ (located on at the bottom under student)