Course Description

BIOL 2420 Microbiology for Non-Science Majors (4 credit hours, 3 lec., 4 lab.) This is a Texas Common Course Number. This is a Core Curriculum course selected by the colleges of DCCCD. Student cannot take both BIOL 2420 and BIOL 2421 to satisfy the Core science credit.

Study of the morphology, physiology, and taxonomy of representative groups of pathogenic and nonpathogenic microorganisms. Emphasis is placed on applications to humans. Pure cultures of microorganisms grown on selected media are used in learning laboratory techniques. Includes a brief preview of food microbes, public health, and immunology. Designed for non-science majors and allied health students. (3 Lec., 4 Lab.) Coordinating Board Academic Approval Number 2605035103

Prerequisite:
BIOL 1406 or BIOL 2401 or SCIT 1407.

Students are expected to have a basic knowledge of cell anatomy, cell function, and biochemistry. Some of the information in the textbook will be considered review and will, therefore, not be covered at length. However, students will be responsible for all of the information included in all of the chapters covered over the semester. This course requires that each student possess a spoken, reading, and written knowledge of the American English language at the college level.

Learning Outcomes

Lecture specific
Upon successful completion of this course, students will:
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 specific
Upon successful completion of this course, students will:
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.

Core Objectives
Texas Foundational Component Areas: BIOL 2420 is part of the Life and Physical Sciences Foundational Component Area 030. Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences. The following four Core Objectives are addressed in this course.

A) Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
B) Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
C) Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions;
D) Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal;

BIOL 2420 develops Critical Thinking, Empirical and Quantitative and Communication Skills by requiring students to research, analyze and interpret data derived from an experimental setting and drawing a well-informed conclusion of the data through the application of sound biological concepts. The work will be presented in a written and visual format.

BIOL 2420 develops Teamwork by requiring students to effectively work in a small group on an assigned problem, exercise or course concept that will then be presented in a written, oral or visual format.

Required Materials
- Microbiology with Diseases by Body System with Modified Mastering Microbiology, Value Pack, fifth edition, by Robert Bauman; ISBN: 9780134793917 (Note: This is Modified Mastering Microbiology. It is not the same as Mastering Microbiology. You may not use the standard Mastering Microbiology product.)
- Scientific Lab Value Notebook, 50-Set by Hayden McNeil; ISBN: 9781930882997 or 9781930882898

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>-6 Apperson 100-question test forms</td>
<td>#2 Pencils with erasers</td>
</tr>
<tr>
<td>-one box glass microscope slides (72)</td>
<td>a black ultra-fine-point Sharpie (for lab)</td>
</tr>
<tr>
<td>-lab goggles or safety glasses with side shields</td>
<td>a pad of 3inch Post-it notes (for lab)</td>
</tr>
<tr>
<td>-lab gloves (in your size!!)</td>
<td>a three ring binder with ruled notebook paper</td>
</tr>
<tr>
<td>-lab coat (all available in campus bookstore)</td>
<td>(to hold lab manual)</td>
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Attendance
Students are expected to be punctual and to remain for the duration of all lectures and laboratories. Some tested material will only be presented in class. Attendance will be taken daily. If you miss class, it is your responsibility to update yourself on what you might have missed. A student shall be excused from attending classes for the observance of a religious holy day. (Inform the instructor within the first week of class that you will require a religious exemption for missing class.) Consult the Brookhaven College Catalog.
The online lecture for this course is accomplished through reading the textbook and working with the Mastering Microbiology web resources. Homework will assist students in mastering the lecture content.

Laboratory attendance is crucial to achieving competence in microbiology. **Therefore, if you miss six laboratory sessions you will automatically receive a course grade of F.** Students are responsible for signing themselves in and out of lab, thereby documenting their attendance. Missing the laboratory session includes instances where a student arrives after the required exercises for the day have been completed by the class. Please note: when the required exercises have been completed, students are often given lab time to work on projects or prepare for laboratory exams.

If you are absent or late for a class or lab where points are awarded, you will not be able to make-up that work, barring extraordinary circumstances. All late work allowed will incur a minimum 10% penalty per day. **All work is due at the beginning of class on the due date and is considered late if turned in after the beginning of class.** If you stop participating in class activities, you will not be allowed to take exams.

**Laboratory Safety**

Students will be routinely handling pathogenic organisms during lab. You should consult your physician as to whether you can safely participate in a microbiology lab class if you are pregnant, immunocompromised, or have any other health issues. Students will be taught to perform all microbiological procedures safely and we expect that students will do their utmost to perform all procedures in the approved manner. If a student does not follow all microbiological procedures in a safe manner, that student will be asked to leave and will be dropped from the course. Students are required to wear closed-toe shoes and a lab coat at all times in the lab. Lab goggles and gloves must be worn when microorganisms are being handled.

Lab coat, goggles, and any writing utensils used for lab must be kept in lab throughout the semester and must be disinfected before leaving the lab. Handling any personal items at the lab table is likely to contaminate the items which the student must then disinfect before removing them from the lab. **You may not take the lab coat or goggles from the microbiology lab to use for any other course.**

**Withdrawal Policy**

If you are unable to complete this course, it is your responsibility to withdraw formally. The withdrawal request must be received in the Registrar’s Office by the drop date published on eConnect to receive a grade of “W”. (**Thursday, November 14th**) Failure to do so will result in your receiving a performance grade, usually an “F.” If you drop a class or withdraw from the college before the official drop/withdraw deadline, you will receive a “W” (Withdraw) in each class dropped. The withdrawal policy is **online in the college catalog.**

**How Your Grade is Determined**

- **Beware!** The automatically calculated percentage score in Blackboard is rarely correct.

**Lecture Points:**

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<thead>
<tr>
<th>Activity</th>
<th>Points</th>
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<tbody>
<tr>
<td>4 Lecture Exams @ 50 each</td>
<td>200</td>
</tr>
<tr>
<td>1 Research Project @ 50</td>
<td>50</td>
</tr>
<tr>
<td>1 Final Exam</td>
<td>100</td>
</tr>
<tr>
<td>Homework</td>
<td>50</td>
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**TOTAL** 400

**Laboratory Points:**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
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<tbody>
<tr>
<td>3 Practical Exams @ 30 pts</td>
<td>90</td>
</tr>
<tr>
<td>Unknown Determination (Paper)</td>
<td>100</td>
</tr>
<tr>
<td>22 Pre-lab Quizzes (online)</td>
<td>110</td>
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**TOTAL** 300

**TOTAL POINTS FOR THE COURSE (lecture + lab) 700 points**

**FINAL GRADE DETERMINATION:**

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<thead>
<tr>
<th>Grade</th>
<th>Points</th>
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<tbody>
<tr>
<td>A</td>
<td>630 - 700</td>
</tr>
<tr>
<td>B</td>
<td>560 – 629</td>
</tr>
<tr>
<td>C</td>
<td>490 – 559</td>
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Major Graded Work

Lecture Exams:
Exams consist of fifty multiple choice questions. Any test taken late will incur a minimum penalty of 10% of the maximum score. Tests taken more than 72 hours late incur a 50% penalty.

Infectious Disease Research Project:
Students will choose a topic from a list provided or they may submit a topic of their choice to the instructor for approval. Detailed instructions for this project will be available on eCampus under Assignments. In general, students will do library research on their topic. Students will complete a fact sheet for the topic using reliable, professional sources. The sources will be cited in APA format. The project topics will form approximately 66% of the material covered on the final exam.

Final Exam:
The exam will be over the Infectious Disease Research Project topics and selected concepts from the entire semester. It will be multiple choice. It will be held in a classroom according to the college exam schedule.

Assignments
Your instructor will choose a mix of assignments to enhance your understanding of microbiology. Most of the activities will be on the textbook publisher’s (Pearson) web site Pearson My Lab and Mastering Microbiology. You are required to have access to this site in order to work the problems assigned.

Lab Practical Exams:
These are three exams over material specific to the microbiology lab. There will be 30 multiple choice questions. The exam is given during your scheduled lab time in X2020.

Unknown Determination Project:
You will be given a culture of an unknown organism and identify the organism through standard techniques available to you in the lab. You will write a formal paper on the project that will include your lab journal entries, a flow chart, and a descriptive chart. Specific details for this assignment are available on eCampus.

Daily Lab Quizzes:
Daily lab quizzes are available on eCampus and are to be taken prior to lab. Lab quizzes cover material that you will use in the upcoming lab. If you have not taken the lab quiz prior to the lab, you will earn a score of zero, with no opportunity to make up the work. Lab quizzes on eCampus are timed, and you will be allowed one attempt at the quiz. If you take an online lab quiz but do not show up for the lab corresponding to that quiz, you will receive a grade of zero on the quiz. If you are late or leave early, you will have points deducted from your quiz score.

Academic Integrity
Academic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion. As a college student, you are considered to be a responsible adult. Your enrollment indicates acceptance of the DCCCD Code of Student Conduct published in the DCCCD Catalog. Incidents of academic dishonesty will be met with a course grade of “F”. Additionally, a letter describing the incident will be attached to your permanent student file. Consult the Brookhaven College Catalog for more details. Any irregularities that occur in the Testing Center will result in a zero for that exam, whether or not a report is filed by the Testing Center. During testing, behaviors such as talking to another student, looking in the area of another student’s exam paper, or particular attention to clothing arrangement will be considered cheating. You may not have any class
materials or electronic devices during testing. If you engage in academic dishonesty you will receive an F in the course and you will not be allowed to participate further in the course.

**Plagiarism**

This is a writing-intensive course. It is expected that students will always present their own work. As defined by the Writing Program Administrators (wpacouncil.org), “plagiarism occurs when a writer deliberately uses someone else’s language, ideas, or other original (not common-knowledge) material without acknowledging its source.” Extensive use of quotation does not constitute original student work and will also be penalized. **Instances of plagiarism will earn a zero for the assignment and a grade of F in the course.**

**Institutional Policies**

Brookhaven College Institutional Policies are available online.

**Additional Information**

- Contact your instructor for issues relating to class content and policies. For Technical Support contact:
  - eCampus Technical Support and Help Desk
  - Pearson My Lab & Mastering Student Support
- Points in this course are awarded for work done on both eCampus Blackboard AND Pearson My Lab & Mastering. You must use both of these sites regularly throughout the semester.
  - Check eCampus (Blackboard) regularly, as that is where I will post grades, announcements, staff information, course information, course documents, and assignments! Lab quizzes are only available on eCampus and some assignments also require you to have regular access to eCampus.
  - In addition to completing assignments on the Mastering Biology web site, you should use the other resources on the site to improve your understanding and performance in the course.
- **Open Labs:** The laboratory will be open outside of regular lab times. Open lab hours will be posted on eCampus and in the Microbiology lab (X2020). Microbiology students can use the open lab times to subculture microorganisms, work on their unknowns, use reference materials, or practice/study for practical exams. Open labs are not for make-up or missed lab exercises.
- You are responsible for all information from laboratory exercises, including the results of the exercises. **When our method of performing an exercise differs from the book, you are responsible for knowing the modified way that we performed the exercise.**
- Lab safety standards will be detailed as we introduce lab procedures. All students are expected to meet those standards at all times in the lab. There is **NO EATING OR DRINKING in the laboratory**!
- Cell phones **must be silenced** during lecture and laboratory. They are not allowed in the Testing Center. You may not have physical possession of an electronic device during in-class testing. If you need to leave your phone on for an emergency, notify the instructor in advance. You will be asked to leave class if the instructor notes use of any unapproved electronic device. **Photographing or recording any test or quiz will result in a grade of "F" for the course.**
- Computer use during class is restricted to class related activity.
- You are responsible for reading the scheduled chapters and lab exercises. I will highlight specific items during lecture, but you are responsible for reading the text. The text is no substitute for lecture, and lecture does not substitute for the text. Some concepts will be discussed in lecture but will not appear in the text. Students are responsible for all material presented during lecture.
- All assessments must be contested within one week of posting of scores on eCampus. Any grade not contested by that time will stand as is.
- Students are responsible for keeping informed of testing center hours of operation. **You are not allowed a restroom break** while testing in the Testing Center. Those with medical conditions require a physician’s note to have a restroom break.
- Apperson test forms may be purchased in the campus bookstore in S building. A vending machine in S building sells forms but is unreliable. Bring a Student ID or Driver’s License with you to the Testing Center, or they will not let you take the exam! You must arrive at the testing center at least an
hour before they close, or they will not let you take the exam! No cell phones or other electronic devices are allowed. The Testing Center is in Bldg. S, first floor, Brookhaven Campus. (*See the BHC Testing Center hours of operation on-line.)

Please Note: The instructor reserves the right to modify any course requirements and calendar due dates as necessary to manage and conduct this course online. Students are responsible for contacting the instructor and seeking clarification of any requirement that is not understood.