CENTRAL TEXAS COLLEGE
BIOX 2421
MICROBIOLOGY, Non-Science Majors (LAB)

INSTRUCTOR: _____________
OFFICE HOURS: ______________

I. INTRODUCTION

A. This laboratory accompanies Biology 2421 lecture, Microbiology for Science Majors. Laboratory activities will reinforce the principles of microbiology, including metabolism, structure, function, genetics, and phylogeny of microbes. The course will also examine the interactions of microbes with each other, hosts, and the environment.

B. This course satisfies the Biology requirement in most curricula. Please check your degree plan to determine the status of this course in your program of study.

C. This course is occupationally related and serves as preparation for careers in science.

D. Prerequisite: CHEM 1411 and (BIOL 1406 and BIOL 1407) OR (BIOL 1411 AND BIOL 1413).

II. LEARNING OUTCOMES

Upon successful completion of this course, Biology 2420 Microbiology for Non-Science Majors, the student will:

A. Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.

B. Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.

C. Communicate effectively the results of scientific investigations.

D. Provide examples of the impact of microorganisms on agriculture, environment, ecosystem, energy, and human health, including biofilms.

E. Identify unique structures, capabilities, and genetic information flow of microorganisms.

F. Compare the life cycles and structures of different types of viruses.

G. Discuss how microscopy has revealed the structure and function of microorganisms.

H. Give examples of the range of metabolic diversity exhibited by microorganisms, impact of metabolic characteristics on growth, and control of growth.

I. Describe evidence for the evolution of cells, organelles, and major metabolic pathways from early prokaryotes and how phylogenetic trees reflect evolutionary relationships.
J. Describe the causes and consequences of mutations on microbial evolution and
the generation of diversity as well as human impacts on adaptation.

K. Classify interactions of microorganisms on human and non-human hosts as
neutral, detrimental, or beneficial.

III. INSTRUCTIONAL MATERIALS

A. The instructional materials identified for this course are viewable
through www.ctcd.edu/books

IV. COURSE REQUIREMENTS:

A. **Reading Assignments:**
You will be given a laboratory schedule which details the reading requirements.
Reading should always be done before the corresponding laboratory to ensure
that you have the appropriate background to understand the laboratory material.
Students should thoroughly read through each lab exercise(s) and hand-outs prior
to lab class.

B. **Class Performance:**
Students are expected to attend lab during their regularly scheduled time. It is the
responsibility of the student to sign-in during lab time. If for any reason a student
cannot or decides not to complete the course, then it is the responsibility of the
student to withdraw from the course prior to the withdrawal date. The Instructor
will not withdraw/drop a student from the course at any time. If a student ceases
to attend class and does not withdraw from the course, then an appropriate course
grade will be submitted at the end of the semester.

The student will be provided a lab schedule that links dates to lab exercises,
exams/projects and holidays. If you must be absent from any lab meeting, it is
your responsibility to try to compensate for missing the lab experience since there
are no lab makeups.

V. **EXAMINATIONS:**
There will be two lab exams that students will take during their regularly scheduled lab
time. If a student is late to class on exam day no extra time will be allotted for taking the
exam. The exams may consist of multiple choice, matching, true/false, short answer,
labeling, definitions, and essay questions. Each lab period is an opportunity for the
student to deepen his/her understanding of some of the key concepts of the course. If a
student misses the Midterm lab exam then the Comprehensive Final lab percentage will
substitute for the missed Midterm exam. The Midterm will be available for review in the
Science Office. The opportunity to review the Midterm exam will be made available for
two weeks after the Midterm exam results have been provided to students. Under no
circumstances are you allowed to copy the exam, copy questions from the exam, photograph the exam or reproduce the exam in any other way. Reproducing exam questions in any way constitutes scholastic dishonesty which will lead to disciplinary action that may include suspension and expulsion.

VI. **SEMESTER GRADE COMPUTATIONS**

Microbiology 2421 course grade is based on a total of 1000 points.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURE EXAMS- Four @ 100 points each</td>
<td>400</td>
</tr>
<tr>
<td>FINAL EXAM (comprehensive)</td>
<td>150</td>
</tr>
<tr>
<td>LAB UNKNOWN</td>
<td>070</td>
</tr>
<tr>
<td>LAB MIDTERM EXAM</td>
<td>100</td>
</tr>
<tr>
<td>LAB FINAL EXAM (comprehensive)</td>
<td>100</td>
</tr>
<tr>
<td>PRESENTATIONS</td>
<td>100</td>
</tr>
<tr>
<td>QUIZES/EXERCISES</td>
<td>080</td>
</tr>
<tr>
<td><strong>COURSE TOTAL:</strong></td>
<td>1000</td>
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</tbody>
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**COURSE GRADE:**

- **A-** 900-1000 points
- **B-** 800-899
- **C-** 700-799
- **D-** 600-699
- **F-** 0-599
*To determine one’s standing in the course at any point in time, divide total points earned by total possible points for both lab & lecture.

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

**A. Course Withdrawal:** It is the student’s responsibility to officially drop/withdraw from a class if circumstances prevent attendance or if the student decides not to continue with the course and this must be done before the withdrawal date. An instructor cannot initiate a withdrawal or drop a student based on the student’s request. GoArmyEd students should contact their ACES counselor before withdrawing and withdraw through the GoArmyEd portal. All other students who desire to or must officially withdraw from a course on or after the first scheduled class meeting must file an Application for Withdrawal with the local CTC representative by the last date to withdraw. Students enrolled in distance learning courses and who do not have access to a local CTC representative should submit a withdrawal form to EaglesOnCall@ctcd.edu or the CTC Records Office in Killeen, Texas.

*Applications for Withdrawal will be accepted at any time before the completion of the 12th week of classes for 16-week courses, the sixth week of classes for eight-week courses, or the fourth week of classes for six-week courses.

*For non-GoArmyEd active military students, the effective date of withdrawal is the filing date with the Education Center. For all other students, the effective date of withdrawal is the date that the withdrawal application is received by the Central Texas College representative.

*Students who used financial aid, military tuition assistance, VA benefits, or other non-personal funds may be required to repay tuition and fees to the funding agency. For specific repayment requirements, contact the Office of Student Financial Aid or Veterans Services Office before withdrawing. Military tuition assistance students should visit their military Education Center or Navy College Office.

*Students may not withdraw from a class for which the instructor has previously issued a grade of “F.”

**B. Administrative Withdrawal:** A student may be administratively withdrawn by a designated member of the administrative staff of the College under the following conditions:

The student has been placed on Academic Suspension or Disciplinary Suspension;
The student has an outstanding financial obligation owed to the college; or
The student registered for a course without the required prerequisite or departmental permission.

The college is under no obligation to refund tuition and fees, or other costs associated with a student who is administratively withdrawn.

**C. Incomplete Grade:** Incomplete, Course in Progress (for non-developmental courses): An “IP” grade may be assigned by an instructor if a student has made
satisfactory progress in a course with the exception of a major quiz, final exam, or other project. The “IP” grade may also be assigned for extenuating circumstances beyond a student’s control such as personal illness, death in the immediate family, military orders, or in the case of distance learning courses, institutional technology failures and mail delays. Notice of absences with supporting documentation may be required by the instructor. The instructor makes the final decision concerning the granting of the incomplete grade. The instructor may set a deadline for completing the remaining course requirements. In no case will the deadline exceed 110 days after the scheduled end of the course. An “IP” grade cannot be replaced by the grade of “W.” If a student elects to repeat the course, the student must register, pay full tuition and fees and repeat the entire course.

At the end of the 110 calendar days if the student has not completed the remaining coursework as required by the instructor, the “IP” will be converted to an “FI” and appear as an “F” on the student’s official transcript. A student who merely fails to show for the final examination will receive a zero for the final and a “F” for the course.

D. **Cellular Phones:** Cellular phones will be turned off while the student is in the classroom or laboratory. Use of a cell phone during an exam will result in a zero for that exam. A student who in any way makes a copy of exam questions will be committing scholastic dishonesty which will lead to disciplinary action that may include suspension and expulsion. The number for your family members to call in an emergency is 254-526-1200. Appropriate personnel will immediately communicate the message to you.

E. **Americans With Disabilities Act (ADA):** Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

F. **Instructor Discretion:** The instructor reserves the right of final decision in course requirements.

G. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in the learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

H. Absolutely no food or drinks in the lecture classroom or the laboratory room.

I. Courtesy dictates that you discuss any problem with your instructor first. If the issue cannot be resolved, then contact the Chair of the Science Department.
VIII. LAB OUTLINE

A. Scientific Notation and Dimensional Analysis
B. Light Microscope, Field of View
C. Calibration of the Light Microscope
D. Inoculation and interpretation of environmental bacterial and fungal colonies
E. Identification of Eukaryotic Supergroups
F. Simple and Negative Staining of Microorganisms
G. Gram Staining of Microorganisms
H. Endospore Staining of Microorganisms
I. Motility Determinations
J. Bacterial Count Math and Calculation of Generation Time
K. Selective and Differential Media
L. Leukocytes and White Blood Cell Counts
M. Power Point Presentations of Pathogenic Bacteria
N. Oxidase and Catalase reactions
O. Antimicrobial Susceptibility Test
P. Bergey’s Manual of Determinative Bacteriology
Q. Abis Online Biochemical identification program
R. Morphological and Biochemical Unknown