MICROBIOLOGY LAB SYLLABUS

Course Number: BIOL 2421

Course Title: Principles of Microbiology Lab

Instructor’s Name: Donna M. Cain, Ph.D.
Office Number: B305-H, Central Park Campus
Office Hours: Monday/ Wednesday 9-11 am
Tuesday/ Thursday 10-10:30 am and 1:30-2:00 pm
Phone Number: 972-548-6781
Email: DCain@collin.edu
In case of emergencies, contact the Office of Academic Affairs, B-122 F
214-491-6270

Class Information:
  Section Number: c2L
  Meeting Times: Tuesday/Thursday 11:00 am-12:50 pm
  Meeting Location: A312, Central Park Campus

Course Description: Classification, cell structure, metabolism, and historical concepts of microorganisms including bacteria, viruses, fungi, protozoa, Chlamydia and Rickettsia. Infectious diseases and immunology will be emphasized. Practical microbiology will include diagnostic microbiology of water, food, sewage, soil, and industrial applications. Laboratory methods are stressed, and experimentation with pure cultures of medical, environmental, and industrial importance is used extensively.

Course Credit Hours: 4
  Lecture: 3 contact hours
  Lab: 4 contact hours

Pre-requisite: BIOL 2402 within the last 5 years with a grade of “C” or higher, or consent of department chair

Co-requisite: Biol 2421 Lecture

Course Resources:
  Required
    Online course packet: “Microbiology Lab Manual 2421L” by Cain et. al.
    (Available on Blackboard or at http://iws2.collin.edu/dcain/CCCD%20Micro/index.htm)
    Internet access – for supplemental course material and assignments on Blackboard

Supplies:
  Required
    3-ring binder, Disposable plastic lab coat or lab apron, Disposable gloves
  Recommended
    Safety goggles

Student Learning Outcomes:
1. Demonstrate a working knowledge of appropriate biosafety procedures and proper aseptic technique.
2. Effectively use a compound light microscope, including correctly setting up and focusing the microscope; proper handling, cleaning, and storage of the microscope; and correct use of all lenses, including the oil immersion lens.
3. Perform a Gram-stain, and describe the differences between Gram-positive and Gram-negative cells.
4. Obtain single, isolated colonies of bacteria using a streak plate method.
5. Correctly perform serial dilutions and plate counts to estimate the number of microbes in a sample.
6. Describe the major oxygen classes of bacteria, and explain how to grow bacteria in anaerobic environments.
7. Measure the efficacy of antibiotics and antimicrobial chemicals using a disk diffusion assay.
8. Demonstrate the ability to use biochemical tests to determine the identity of bacterial unknowns.

Method of Evaluation:

**Quizzes:** Quizzes will be given at the beginning of class according to the laboratory schedule, and will cover material from the previous day’s experiments. If you arrive late to class after the quizzes have been collected, you will not be allowed to take the quiz. No makeup quizzes will be given. Grades will be assigned for quizzes missed during excused absences based on your final practical exam grade. When final grades are calculated, the lowest quiz grade will be dropped.

**Unknown Identification Project:** Unknowns will be assigned to each student the latter part of the semester, and will require a formal lab write up. A separate handout will provide detailed instructions for the format of these reports.

**Practical Exams:** There will be a midterm lab practical and a final lab practical.

**Grades** for the lab portion of the course will be calculated as follows:

- Practical Exams (2) 60%
- Quizzes 20%
- Unknown ID Project 20%

A: 90-100  B: 80-89  C: 70-79  D: 60-69  F: 59 and below

The lab grade with be integrated with your lecture grade to determine the final grade for the course (35% lab and 65% lecture).

**Attendance Policy:** PARTICIPATION is a vital component of all laboratory courses, therefore attendance is mandatory. You will be allowed two unexcused absences during the semester before your grade is affected. Each additional unexcused absence will result in a 5% reduction in your final grade. ABSENCES will be excused only if documentation of an instructor-approved excuse is provided. It is your responsibility to provide such documentation upon your return to class. If an absence is unexcused, you will not be allowed to make up any missed assignments. If a student misses more than three lab periods in the semester, that student will be strongly urged to drop the course. If you do not drop in accordance with the Collin College Academic Calendar, a grade of “F” will be assigned.

**Withdrawal Policy:** See the current Collin Registration Guide for the last day to withdraw.

**Americans with Disabilities Act:** Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal opportunity. It is the student’s responsibility to contact the ACCESS office, Room D118-I, (972.548.6816) to arrange for appropriate accommodations. See the current Collin Student Handbook for additional information.

**Course Swapping and Lateral Transfers:** Students who decide to switch to another section of this course any time after the first day of the semester will be assessed a course transfer fee. Lateral transfers will not be granted after the 4th week of class or after the first lecture exam, which ever comes first. Exceptions to this are for documented changes in work schedule or family emergencies. If a student does transfer to another section, all previous grades will accompany the student. However, the new instructor can require the student to retake any exam or quiz. For questions concerning this policy, contact the Biology Department Chair.
Collin College Academic Policies: See the current Collin Student Handbook.

Scholastic Dishonesty:
Every member of the Collin College community is expected to maintain the highest standards of academic integrity. Collin College may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission as one’s own work material that is not one’s own. Scholastic dishonesty may involve, but is not limited to, one or more of the following acts: cheating, plagiarism, collusion, use of annotated texts or teacher’s editions, use of information about exams posted on the Internet or electronic medium, and/or falsifying academic records. Students found guilty of scholastic dishonesty will receive no credit for that assignment. (See the current Collin Student Handbook for more information.)

FERPA Compliance
Student performance cannot be discussed with anyone other than the student, unless written permission is provided by the student. Student information can not be given to students over the phone or via non-secure e-mail addresses. Students may communicate with the professor about grades and other sensitive information through Blackboard, or via their cougarmail e-mail address, provided by the college to all students.

STUDENT CONDUCT
Students are expected to adhere to the Collin College Student Code of Conduct as outlined in the Student Handbook. The college expects students to conduct themselves in class in such a way as to not interfere with or disrupt the educational process. Students are to speak and act in a respectful manner toward their fellow students and the professor. Those who participate in inappropriate behavior such as excessive talking, cell phone use (including texting), verbal altercations, or blatantly disregarding instructor’s directions will be asked to leave the class. Continuance of such behavior will result in a referral to the Dean of Students for disciplinary action.

LABORATORY RULES
*Absolutely no eating or drinking in the lab.
*No open-toed shoes may be worn in the lab.
*Microscopes must be cleaned thoroughly after each use and put away properly.
*Students are responsible for cleaning up their areas at the end of each lab period, and properly disposing of all waste.
*All biosafety rules must be followed at all times.

LABORATORY EXERCISES will usually be performed as group exercises. Each lab group will be assigned a specific color, and will use colored tape to label their bacterial cultures, making it easier to identify and retrieve them from the incubator. Since bacteria need time to grow, most of the lab exercises will be set up and inoculated during the Tuesday lab period, and results will be obtained during the Thursday lab period.

LABORATORY ETIQUETTE
*Cell phones and other telecommunication devices should be turned off or silenced during lab.
*Students should not talk to each other while the instructor or another student is speaking.
*Students should be ON TIME.
*Students should contribute equally to group laboratory exercises.

Note: The instructor reserves the right to make changes to the syllabus as needed. Any changes will be discussed in class, and an updated syllabus will be posted on Blackboard.
<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPICS</th>
<th>LABS</th>
<th>ASSIGNMENTS/QUIZZES</th>
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</thead>
</table>
| 1 (1/22-1/25) | T: Course Introduction and Biosafety  
R: Microscopy | pp. 4-6  
Exp 1 | R: (1/24) Quiz 1: Biosafety |
| 2 (1/28-2/1) | T: Staining Specimens and Smear Preparation  
Gram Stain & Capsule Stain  
R: Acid Fast Stain & Endospore Stain | pp. 8-9  
Exp 2, 3  
Exp 4, 5 | R (1/31): Quiz 2: Gram/ Capsule stains |
| 3 (2/4-2/8) | Culture Transfer Techniques  
Isolation of Pure Cultures  
Viable Plate Counts | Exp 6  
Exp 7  
Exp 8 | T (2/5): Quiz 3: Acid fast & endospore stains |
| 4 (2/11-2/15) | Effect of Temperature on Microbial Growth  
Atmospheric Oxygen Requirements  
Cultivation of Anaerobic Organisms | Exp 9  
Exp 10  
Exp 11 | T: (2/12): Microscopy Skills Quiz must be completed by today (Quiz 4)  
R: (2/14): Quiz 5 due (Take home) |
| 5 (2/18-2/22) | Use of Selective, Differential, & Enriched Media  
Chemical Control of Microorganisms  
Chemotherapeutic Agents  
Additive and Synergistic Effects of Antibiotics | Exp 12  
Exp 13  
Exp 14  
Exp 15 | T (2/19): Quiz 6: Temperature & Oxygen |
| 6 (2/25-3/1) | Microbial Flora of the Mouth  
Normal Flora of the Throat and Skin  
Cultivation of Urine Specimens | Exp 16  
Exp 17  
Exp 18 | T (2/26): Quiz 7: Selective & Differential Media; Antibiotics |
| 7 (3/4-3/8) | T: Review for Practical  
**Spring Break – March 11-15**  
R: Lab Practical I  
(Labs 1-18) | | T (3/5): Quiz 8: Normal flora & Urine Cultures  
R: LAB PRACTICAL I (March 7) |
| 8* (3-18-3/22) | Identification of *Bacillus* species  
Transformation | Exp 19  
Exp 20 | |
| 9 (3/25-3/29) | Catalase Test  
Identification of *Streptococcus* species  
Rapid Strep test  
Identification of *Staphylococcus* species  
Rapid Staph test  
Coagulase Test | Exp 21  
Exp 22  
Exp 23  
Exp 24  
Exp 25  
Exp 26 | T (3/26): *Bacillus* flow chart due (Quiz 9) |
| 13 (4/22-4/26) | T: Epidemiology  
HIV Testing Using ELISA  
R: Library Day (lab will not meet) | Exp 28  
Exp 29 | T (4/30) Quiz 10: Epidemiology & ELISA  
R: Unknown report DUE (May 2) |
| 14 (4/29-5/3) | Yogurt Production  
Water Microbiology  
Food Microbiology | Exp 30  
Exp 31  
Exp 32 | |
| 15 (5/6-5/10) | T: Review for Practical  
R: Lab Practical II  
(Labs 19-32 and Unknowns) | | T (5/7): Quiz 11: Food & Water Micro  
R: LAB PRACTICAL II (May 9) |
| 16 (5/13-5/17) | (Labs do not meet during final exam week) | | |

*Last day to withdraw: Friday, March 22*