Course Number: BIOL 2421 C2L        Fall 2010

Course Title: Principles of Microbiology Lab

Instructor’s Information:
Instructor’s Name: Donna M. Cain, Ph.D.
Office Number: B305-H
Office Hours: Monday/Wednesday – 9:00 to 11:00 am
Tuesday/Thursday – 10:00 to 10:30 am & 2:15 to 2:45 pm
Contact Information: Phone – 972.548.5671; e-mail – dcain@collin.edu
In case of emergencies, contact the Office of Academic Affairs, B-122 F
214.491.6270

Class Information:
Tuesday/Thursday 11:00 am to 12:50 pm
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. Lab required. Prerequisite: BIOL 2402 within the last five years

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

Pre-requisite Course: BIOL 2402 with a grade of “C” or better within the last five years, or Consent
of Department Chair

College Repeat Policy: A student may repeat this course only once after receiving a grade, including
“W”.

Course Delivery Method: Laboratory

Textbook: Online course packet: “Microbiology Lab Manual 2421L” by Cain et. al.
(http://iws2.collin.edu/dcain) (Required)

Required Readings: See course calendar.

Supplies: Required: 3-ring binder, Permanent marker (such as a Sharpie), Disposable plastic lab apron
or lab coat, Disposable gloves

Student Learning Outcomes:
Upon completion of the laboratory course, the students should be able to do the following:
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.

Course Requirements:
Major course requirements include Lab Practical Exams (2), Quizzes, and Laboratory Reports (lab notebooks and unknown identification project).

General Description of the subject matter of each laboratory session. See course calendar.

Brief Description of Major Course Requirements:
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.

LAB NOTEBOOKS will be collected and graded at the midterm and final practical exams.

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.

EXAMS will consist of a midterm lab practical and a final lab practical.

Method of Evaluation:
Grades for the lecture portion of the course will be calculated as follows:
- Practical Exams (2)  60%
- Quizzes 20%
- Lab Notebooks 5%
- Unknown ID Project 15%

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 CCCCD Academic Calendar, a grade of “F” will be assigned. See the current Collin Registration Guide for the last day to withdraw.

Course Drop Limit Provisions: Texas Education Code 51:907
Students who enroll as an entering freshman or a first-time college student in undergraduate courses at any Texas public community college, technical institute, health sciences institution, or any public university offering undergraduate courses must comply with the legislation of TEC51.907.
TEC51.907 states that students who enroll for the first time during the fall 2007 semester, or any subsequent semester, are subject to the course drop limit of six course drops. This includes any course a transfer student has dropped at another institution. Collin College will not begin to count dropped course until the fall 2009 semester. For more information, please contact Academic Advising or the Admissions and Records Office on any campus.

**Religious Holy Days:** please refer to the current *Collin Student Handbook*

**ADA Statement:** It is the policy of Collin County Community College to provide reasonable accommodations for qualified individuals who are students with disabilities. This 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 educational opportunity. It is the student’s responsibility to contact the ACCESS office, SCC-G200 or 972.881.5898 (V/TTD: 972.881.5950) in a timely manner to arrange for appropriate accommodations.

7.2.3. **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. While specific examples are listed below, this is not an exhaustive list and scholastic dishonesty may encompass other conduct, including any conduct through electronic or computerized means:

**Plagiarism** is the use of an author’s words or ideas as if they were one’s own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation.

**Cheating** is the willful giving or receiving of information in an authorized manner during an examination; collaborating with another student during an examination without authority; using, buying, selling, soliciting, stealing, or otherwise obtaining course assignments and/or examination questions in advance; copying computer or Internet files; using someone else’s work for assignments as if it were one’s own; or any other dishonest means of attempting to fulfill the requirements of a course.

**Collusion** is intentionally or unintentionally aiding or attempting to aid another in an act of scholastic dishonesty, including but not limited to, failing to secure academic work; providing a paper or project to another student; providing an inappropriate level of assistance; communicating answers to a classmate about an examination or any other course assignment; removing tests or answer sheets from a test site; and allowing a classmate to copy answers.

In cases where an incident report has been filed for alleged violation of scholastic dishonesty, faculty are requested to delay posting a grade, for the academic work in question, until the Dean of Student’s Office renders an administrative decision of the case. Students found responsible for scholastic dishonesty offenses will receive an authorized disciplinary penalty from the Dean of Students Office. The student may also receive an academic penalty in the course where the scholastic dishonesty took place. The professor will determine the appropriate academic penalty.

**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 (Section 7, pp. 177-202). The college expects students to conduct themselves in the lab 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 make every effort to be ON TIME.
* Students should contribute equally to group laboratory exercises.
<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPICS</th>
<th>EXPERIMENTS (Required Reading)</th>
<th>ASSIGNMENTS/QUIZZES</th>
</tr>
</thead>
</table>
| 1    | T: Course Introduction and Biosafety  
      R: Microscopy | pp. 4-6 1 | R (8/26): Quiz 1: Biosafety |
| 2    | T: Staining Specimens and Smear Preparation  
      Gram Stain & Capsule Stain  
      R: Acid Fast Stain & Endospore Stain | pp. 8-9 2, 3 4, 5 | R (9/2): Quiz 2: Gram & Capsule stains |
| 3    | Culture Transfer Techniques  
      Isolation of Pure Cultures  
      Viable Plate Counts | 6 7 8 | R (9/9): Quiz 3: Acid fast & spore stains |
| 4    | Effect of Temperature on Microbial Growth  
      Atmospheric Oxygen Requirements  
      Cultivation of Anaerobic Organisms | 9 10 11 | T: (9/13): Microscopy Skills Quiz must be completed by today (Quiz 4)  
                                 | R: (9/15): Quiz 5 due (take-home) |
| 5    | Use of Selective, Differential, & Enriched Media  
      Chemical Control of Microorganisms  
      Chemotherapeutic Agents  
      Additive and Synergistic Effects of Antibiotics | 12 13 14 15 | T (9/21): Quiz 6: Temperature & Oxygen |
| 6    | Microbial Flora of the Mouth  
      Normal Flora of the Throat and Skin  
      Cultivation of Urine Specimens | 16 17 18 | T (9/28): Quiz 7: Selective & Differential Media; Antibiotics |
| 7    | T: Review for Practical  
      R: Lab Practical I (Labs 1 -18) | 19 20 | T (10/4): Quiz 8: Normal flora & Urine Cultures  
                                  | R: LAB PRACTICAL I & Notebooks due (October 7) |
| 8*   | Identification of *Bacillus* species  
      Transformation | 15 16 | |
| 9    | Catalase Test  
      Identification of *Staphylococcus* species  
      Identification of *Streptococcus* species  
      Coagulase Test | 21 22 23 24 | T (10/19): *Bacillus* flow chart due (Quiz 9) |
| 10   | Identification of Gram-negative species | 26 | |
| 11   | Unknowns | Appendix A | R: Unknown flow chart due (11/13) |
| 12   | Unknowns | Appendix A | |
| 13   | Yogurt Production  
      Water Microbiology  
      Food Microbiology | 31 32 33 | |
| 14   | T: Rapid Strep and Staph Tests  
      Staining Patient Specimens | 27, 28 29, 30 | T: Unknown report DUE  
                                 | (November 23)  
                                 | Quiz 10: Food & Water Micro |
| 15   | T: Review for Practical  
      R: Lab Practical II (Labs 19-33 and Unknowns) | 15 | T (11/29): Quiz 11 (Take home) Due  
                                 | R: LAB PRACTICAL II & Notebooks due (December 2) |
| 16   | (Labs do not meet during final exam week) | | |

*Last day to withdraw: October 15*

*Thanksgiving Break November 24-28*