

GRAYSON COLLEGE

BIOL21201
MICROBIOLOGY LAB FOR NON-MAJORS
Course Syllabus

Please Note: Due to extenuating circumstances, including public health issues, course and testing delivery methods, instructional schedules, housing contracts, campus procedures and/or operating hours may be altered, interrupted and/or ceased for a limited or extended period of time. Such changes will be posted on the College website.

Course Information

Course: Biol 2120 Microbiology laboratory for non-science majors

Delivery: Face to face, laboratory meets 3 hours/week, Testing conducted online via Canvas.

Semester:

Professor Contact Information

Professor Contact Information

Professor name: Michael Dill

Office phone: 903-463-8635

Email: dillm@grayson.edu

Office location: Science 105F

Office hours: During the pandemic by appointment and/or virtual

Science Department Program Assistant: 903-463-8797 (Karen Sheffield)

Course Pre-requisites, Co-requisites, and/or Other Restrictions

Co-requisite: BIOL 2320. Students must have passed the reading portion of the THEA (score of at least 230). Pre-requisites: Successful completion with a grade of C or better in BIOL 2301/2101, CHEM 1406 or CHEM 1311/1111 or consent of the Science Chair required. College readiness in reading required. (R)

Course Description – from college catalog

BIOL 2120. Microbiology Laboratory. (0-3-1). This course covers basics of culture and identification of bacteria and microbial ecology. This course is primarily directed at pre-nursing and other pre-allied

health majors and covers basics of microbiology. Emphasis is on medical microbiology, infectious diseases, and public health.

Student Learning Outcomes

BIOL 2120. Microbiology Laboratory. (0-3-1). This course covers basics of culture and identification of bacteria and microbial ecology. This course is primarily directed at pre-nursing and other pre-allied health majors and covers basics of microbiology. Emphasis is on medical microbiology, infectious diseases, and public health.

State Core Objectives Met in this Combined Lecture and Lab Course:

1. Communication Skills, CS1 – Students will develop, interpret, and express ideas through written communication.
2. Critical Thinking Skills, CT2 – Gather and assess information relevant to a question.
3. Critical Thinking Skills, CT3 – Analyze, Evaluate, and Synthesize Information.
4. Empirical and Quantitative Skills, EQS2 – Students will describe, explain, and predict natural phenomena using the scientific method.
5. Teamwork, TW1 – Students will work cooperatively with their peers and leaders to more effectively solve problems by utilizing insights from multiple perspectives.

State Learning Outcomes Met in this Combined Lecture and Lab Course:

Lab component

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.

Lecture component

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.

Student Learning Outcomes

Student learning outcomes which will be addressed in laboratory and/or lecture:

1. Students will demonstrate an understanding of factors that lead to microbial antibiotic resistance, as well as techniques for detecting resistance, and assess the effects of such resistance on society.
2. Students will identify examples of harmful as well as beneficial actions of microorganisms, and extrapolate their effects on society.
3. Students will demonstrate critical thinking, problem solving, and decision making while identifying of bacteria in a culture.

Required Textbooks (ISBN # included) and Materials

Microbiology: Laboratory Theory & Application by Michael J. Leboffe and Burton E. Pierce, 3RD ed. Morton Publishing. ISBN 13: 978-0-89582-947-4

Required Assignments & Academic Calendar

In case of inclement weather, emergency closings, or other unforeseen disruptions to scheduled classes, student must log onto their Canvas accounts for directions on where or how to continue their coursework.

Outline of Topics Covered

	Laboratory Safety p.4, Safety Handout. Experiment: Introduction to the Light Microscope p.143
	Experiment: Bacterial Motility: Wet Mount and the Hanging Drop Preparations p.211
	Bacterial Smear (p.178) and the Gram Stain p.187
	Common Aseptic Transfers and Inoculation Methods p.31, Streak Plate Method of Isolation p.45, Colony Morphology p.67, and Growth Patterns in Broth p.83.

	Streak Plate Method of Isolation p.45, Make-up for Gram Stain and Hanging Drop, Control of Pathogens: Antimicrobial Susceptibility Testing (The Kirby Bauer Method) p.447,
	Midterm Exam online
	Selective and Differential Media: Phenylethyl Alcohol Agar p.229, Mannitol Salt Agar p.241, MacConkey Agar p.247, and EMB Agar p.255. Tests detecting Hydrolytic Enzymes: Starch Hydrolysis p.293, Urea Hydrolysis p.299, Casein Hydrolysis p.303, Hemolysis
	“Carbohydrate Fermentation” Phenol Red Broth p.245. IMViC Test: : SIM (Indole) p.323, Methyl Red /Voges-Proskauer p.251, Citrate p.273, Hydrogen Sulfide Test p.323
	Catalase Test p.295, Oxidase Test p.301. Decarboxylation Test p.319, Nitrate Reduction Test p.307
	Species Identification of Unknown Bacterial Cultures
	Species Identification of Unknown Bacterial Cultures
	Last minute UK stuff (if necessary)
	Unknown Reports Due
	Final exam online

Dates and sequence of topics are subject to change. Changes will be announced in class or on Canvas in a timely manner.

Academic Calendar

In case of inclement weather, emergency closings, or other unforeseen disruptions to scheduled classes, student must log onto their Canvas accounts for directions on where or how to continue their coursework.

Important Dates:

First day of classes:

Professional Development (no class)

Thanksgiving (no class)

Last day to withdraw from classes

Final Exams:

Methods of Evaluation

Students will take weekly written quizzes over assigned material. **There are NO make-ups for the regularly scheduled weekly quizzes.** In addition to these regularly scheduled quizzes, there will be several performance assessments during the semester where students will be graded on their ability to perform certain tasks in the laboratory. These performance assessments will include, but are not limited to, the hanging drop, the Gram Stain and the streak plate isolation. Each performance assessment will count as a quiz grade, and missed performance assessments may be made up only at the instructor's discretion. A single low quiz score may be dropped at the end of the semester at the instructor's discretion.

There are two scheduled examinations – a laboratory midterm exam and a laboratory final exam. Make-up exams are at the instructor's discretion, but will NOT be permitted after graded exams have been handed back. Students that know they will miss an exam should arrange with their professor to take the exam early.

There is an end of the year project, the Unknown Organism Project, in which students will have two weeks in class to conduct experiments of their choice in the laboratory with the aim of identifying an unknown organism provided to them. The project will culminate in the students writing a laboratory report in traditional scientific format detailing their experimentation during the project. The project lab report will be graded for a combination of experimental performance, critical thinking and writing quality. Because the Unknown Organism Project is self-directed, it is important for students to be sufficiently well-versed in laboratory safety and laboratory protocol that they may safely complete the project. **Any student that misses 6 or more mandatory laboratory class periods will be considered ineligible to participate in the project for safety reasons and will receive a grade of "0" for their Unknown Organism Project. If the instructor believes that any student cannot safely conduct their Unknowns project for any other reason, then that student will not be able to complete the Unknowns project and will receive a grade of "0" for the project.**

Microbiology Laboratory Grading

Lab scores will be calculated in the following manner:

Quiz average – 25%

Lab Midterm exam – 25%

Lab Final exam – 25%

Unknown Organism Project lab report – 25%

Microbiology Course Grade

Due to the combined course format, lab and lecture will be combined to produce a single grade. The combined grade is calculated by scoring the lab and lecture as described in their individual syllabi. Those grades will then be weighted with the lecture accounting for 60% of the student's final grade and the lab 40%.

Averages will be rounded up or down. For example, an 89.5 will be rounded up to a 90 and 89.4 will be rounded down to an 89.

Letter grades will be assigned as follows:

89.5 - 100 = A

79.5 - 89.4 = B

69.5 - 79.4 = C

59.5 - 69.4 = D

0 - 59.5 = F

Methods of Instruction

Students will work individually or in small groups in order grow, visualize and analyze microorganisms, with particular attention payed to safe conduct in a Biological Safety Level 2 laboratory. The instructor will provide preparatory information at the beginning of the class and assist the students execute the laboratory experiments as necessary.

Class Attendance and Participation

Attendance and Participation Academic success is closely associated with regular class attendance and course participation. All successful students, whether on campus or online, are expected to be highly self-motivated. All students are required to participate in courses regularly and are obliged to participate in class activities and complete and submit assignments following their faculty' instructions. Students taking courses during compressed semester timeframes such as mini-mester, summer sessions, and 8-week courses should plan to spend significantly more time per week on the course. Responsibility for work missed because of illness or school business is placed upon the student. Instructors are required to include in their syllabi the attendance policy for the courses(s) they teach. The college considers absences equal to or greater than 15% of the course's requirements to be excessive.

In order for students to be counted as having attended a class before the census date, the following guidelines are to be used: • Physical attendance in class with an opportunity for instructor and student interaction • Submission of an academic assignment • Completion of an exam, interactive tutorial, or computer-assisted instruction • Attendance at a study group assigned by the faculty • Participation in an online discussion in the class • Contact with a faculty member to ask a question

Student Conduct & Discipline

Classroom Behavior

Students are expected to maintain classroom decorum that includes respect for other students and the instructor, prompt and regular attendance and an attitude that seeks to take full advantage of the educational opportunity.

Defacing College Property

Anyone caught defacing property in the lab will be responsible for cleaning, repairing or replacing the defaced property. The individual will also receive a zero (0) for the current lab assignment. Defacing property includes, but is not limited to, writing, marking or scratching on the tables, tabletops, chairs, cabinets, counter tops, shelving or walls.

Cell Phone Policy

All cell phones and other electronic devices must be turned off before entering the classroom. Text messaging is not permitted during class. If you have an emergency and need to take a call during class, you must inform the instructor before the beginning of class. Turn your ringer to vibrate, and when your call comes in, pick up all of your belongings and leave the classroom. You may return to class the next time the class meets.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the college's policy on plagiarism (see GC Student Handbook for details). Grayson College subscribes to turnitin.com, which allows faculty to search the web and identify plagiarized material. Students are prohibited, too, from engaging in self-plagiarism. Self-plagiarism is the act of using work created for another course and submitting that work for credit in this course. This includes work submitted previously for one of this instructor's courses. There are limited circumstances under which the instructor will permit self-plagiarism, and special permission must be received in order to do so. Those who engage in acts of self-plagiarism (without the necessary permission) will be subject to the penalties listed in this syllabus for all other acts of plagiarism.

The policy of the Science Department: Any instance of a) plagiarism, b) collusion, c) cheating, or d) falsifying records, will result in a "0" for the assignment. The "0" assigned for cheating cannot be dropped or replaced by another grade when calculating the laboratory average.

Basic Rules for the Compound Microscope

1. Check the number on the microscope assigned to you with its corresponding place in the cabinet.
2. Grasp the microscope arm firmly with one hand, and lift the instrument carefully from the shelf. Hold it upright and close to your body when carrying it. Gently place it on the laboratory bench away from the edge of the bench.
3. Remove the dust cover, uncoil the power cord, and plug it into an appropriate outlet.
4. Examine the microscope to see if any damage is apparent or if the microscope was put away in an unacceptable condition, if so report this immediately to your instructor.
5. Clean all lenses by wiping several times with an acceptable lens paper. Do not use paper towels, Kleenex, clothing, or other types of material on lenses. Especially do not use Kimwipes!
6. Examine the stage to see if it is free of oil, that no slide has been left on the stage, and that the stage is racked all the way down into the lowest possible position. The scanning objective (or low power objective) should be in the path of light position. In other words, you want the objectives and the stage to be as far apart as possible.
7. Turn on the light to check if it is functional.
8. Follow your lab manual's and instructor's directions for using the microscope.
9. At the end of each lab session, turn off the light and check the stage to be sure no slide is on it and it is clean.
10. Clean all lenses with dry lens paper. If the oil immersion objective lens has been used, clean it last to avoid contaminating the other objectives with oil.
11. Rotate the nosepiece so that the scanning objective (low power objective) is in the light path.
12. Rack the stage down so that the objective and stage are as far apart as possible.
13. Unplug the power cord and rewind it. Replace the dust cover.
14. Carry the microscope as previously described back to the cabinet, returning it to its appropriate (numbered) place.

Biology Laboratory Safety Guidelines

1. Locate safety equipment: know where to find exit(s), fire extinguisher, and first aid kit. Know how to use the safety equipment.
2. **Do not eat or drink in the laboratory.**
3. Monitor risk: inform the instructor if you are pregnant, taking immunosuppressive medicines, or have any medical condition that might require special precautions in the lab, such as medications that would influence your response or reflex time. Under NO circumstances should you attend a lab session while “under the influence” of any chemical substance.
4. Avoid spills: place liquids toward the center of the bench, away from the edges.
5. Labels: read labels carefully before removing substances from containers. Properly label glassware before use.
6. Dissection: use care at all times when handling sharp dissection tools. Wear disposable gloves when dissecting preserved materials. Cover open cuts with a bandage before donning gloves. Do not touch face or eyes while wearing soiled gloves, and wash hands immediately after gloves are removed.
7. Discard used chemicals and materials into appropriately labeled containers, do not dispose of them down the sink unless specified by the instructor.
8. Broken glass: be careful handling broken glassware with bare hands. Dispose of all cracked or broken glassware in a puncture resistant container found in S 200 (chemistry lab), not the regular trash can.
9. Report any spills, accidents, strange occurrences, or other safety incidents to the instructor. Immediately report damaged equipment to your instructor
10. Professional conduct is expected to avoid creating dangerous situations. If you have any questions concerning the safety of a procedure, consult your instructor.
11. To find the MSDS on any product used by Grayson, please go to this link and search <https://msdsmanagement.msdsonline.com/?ID=C9DFE03B-6CE5-4E53-AD11-CB6588BAE690>
12. Thoroughly wash hands with soap and water before leaving the laboratory.

You will be asked to sign the following during class:

Waiver of Liability

As a Science student in a Grayson College laboratory course, I hereby confirm that I have been advised of laboratory safety measures and rules and agree to comply with these rules at all times during my enrollment in this laboratory course. In addition, I agree to hold harmless GC in any event resulting from the laboratory environment.

Contact Lenses

I am aware of the added health risks associated with wearing contact lenses in the lab, but have elected to do so against the advice of my instructor. (If unsigned, I have agreed not to wear contact lenses at any time during this course.)

Student Responsibility

You have already made the decision to go to college; now the follow-up decisions on whether to commit to doing the work could very well determine whether you end up working at a good paying job in a field you enjoy or working at minimum wage for the rest of your life. Education involves a partnership that requires both students and instructors to do their parts. By entering into this partnership, you have a responsibility to show up for class, do the assignments and reading, be engaged and pay attention in class, follow directions, and put your best effort into it. You will get out of your experience here exactly what you put into it – nothing more and nothing less.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the college's policy on plagiarism (see GC Student Handbook for details). Grayson College subscribes to turnitin.com, which allows faculty to search the web and identify plagiarized material.

Plagiarism is a form of scholastic dishonesty involving the theft of or fraudulent representation of someone else's ideas or words as the student's original work. Plagiarism can be intentional/deliberate or unintentional/accidental. Unintentional/Accidental plagiarism may include minor instances where an attempt to acknowledge the source exists but is incorrect or insufficient. Deliberate/Intentional plagiarism violates a student's academic integrity and exists in the following forms:

- Turning in someone else's work as the student's own (such as buying a paper and submitting it, exchanging papers or collaborating on a paper with someone else without permission, or paying someone else to write or translate a paper)
- Recycling in whole or in part previously submitted or published work or concurrently submitting the same written work where the expectation for current original work exists, including agreeing to write or sell one's own work to someone else

- Quoting or copy/pasting phrases of three words or more from someone else without citation, • Paraphrasing ideas without citation or paraphrasing incompletely, with or without correct citation, where the material too closely matches the wording or structure of the original
- Submitting an assignment with a majority of quoted or paraphrased material from other sources
- Copying images or media and inserting them into a presentation or video without citation,
- Using copyrighted soundtracks or video and inserting them into a presentation or video without citation
- Giving incorrect or nonexistent source information or inventing source information
- Performing a copyrighted piece of music in a public setting without permission
- Composing music based heavily on someone else's musical composition.

Finish with actions or penalties for plagiarism for your course. (and use of Turn-it-in)

Student Responsibility

You have already made the decision to go to college; now the follow-up decisions on whether to commit to doing the work could very well determine whether you end up working at a good paying job in a field you enjoy or working at minimum wage for the rest of your life. Education involves a partnership that requires both students and instructors to do their parts. By entering into this partnership, you have a responsibility to show up for class, do the assignments and reading, be engaged and pay attention in class, follow directions, and put your best effort into it. You will get out of your experience here exactly what you put into it – nothing more and nothing less.

TITLE IX

GC policy prohibits discrimination on the basis of age, ancestry, color, disability, gender identity, genetic information, national origin, race, religion, retaliation, serious medical condition, sex, sexual orientation, spousal affiliation and protected veterans status.

Furthermore, Title IX prohibits sex discrimination to include sexual misconduct: sexual violence (sexual assault, rape), sexual harassment and retaliation.

For more information on Title IX, please contact:

- Dr. Molly M. Harris, Title IX Coordinator (903)463-8714
- Ms. Logan Maxwell, Title IX Deputy Coordinator - South Campus (903) 415-2646
- Mr. Mike McBrayer, Title IX Deputy Coordinator - Main Campus (903) 463-8753

- Website: <http://www.grayson.edu/campus-life/campus-police/title-ix-policies.html>
 - GC Police Department: (903) 463-8777- Main Campus) (903-415-2501 - South Campus)
 - GC Counseling Center: (903) 463-8730
 - For Any On-campus Emergencies: 911
-

**Grayson College is not responsible for illness/injury that occurs during the normal course of classroom/lab/clinical experiences.

**These descriptions and timelines are subject to change at the discretion of the Professor.

** Grayson College campus-wide student policies may be found at the following URL on the College website: <https://www.grayson.edu/currentstudents/Academic%20Resources/index.html>