BIOL 1307

General Microbiology

Instructor: Dr. Sangita Pal.

Email Address: sapal@pvamu.edu
I will always respond back within 24 hours - 48 hours.

Office / Phone/ Office Hours: Office Room 430 X / Office Phone 9362613167/M 9-10 PM, T 8.30-9.30PM, S 3-5 PM or by appointment via zoom. Face to face - as needed and before / after any class. Please email me before the meeting to avoid any overlap.

Mode of Instruction: Face To Face

Course Location: O’Banion Science – Lab Room 308/
Lec Room: TBA. We might continue Lecture in the Lab room or in another room due to internet issue. (Always check Canvas announcement for any change)
P06 – 20333 /P66 – 20342

Catalog Description: Morphology and physiology of microorganisms related to health and sanitation; disinfection, growth, and control of those organisms causing common infectious diseases. Laboratory fee required.

Prerequisites: None
Co-requisites: None

Required Texts: Lecture Textbook/ Lab book:
BIOL 1073 Lecture /Lab– Cowan 6e: Connect DPF ISBN – 9781264717637 $81.80 Net to bookstore Students must purchase through the bookstore(online)- Mandatory
There is no way to pass this course without the purchase of this book on the first week of the term.

Other Materials: Blue / black pens, #2 lead pencils, notebook paper, access to computer (with Proctorial and Web Camera) and access to Connect/McGraw Hill website/ printer, color pencils – red, blue, green, purple.

Course Objectives / Student Learning Outcomes:

<table>
<thead>
<tr>
<th>Upon successful completion of this course, students will be able to:</th>
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<td>6</td>
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Major Course Requirements

Method of Determining Final Course Grade:

Evaluation Procedures:
GRADE EVALUATION: Grades determined by performance, not needs or wants. Standard grading scale will be used: 100-90% = A; 89-80% = B; 79-70% = C; 69-60% = D
[This may change at the discretion of the instructor.]
<table>
<thead>
<tr>
<th>Assignment</th>
<th>Value</th>
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<tbody>
<tr>
<td>4 lecture exams /100 pts each</td>
<td>400 pts</td>
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<tr>
<td>Lecture/Lab Class quizzes / Participation</td>
<td>=100 pts</td>
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<tr>
<td>Lab report / Participation</td>
<td>=100 pts</td>
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<tr>
<td>Research project /Participation</td>
<td>=50 pts</td>
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<tr>
<td>Quizzes / Homework</td>
<td>=50 pts</td>
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<tr>
<td>Lab Final exam</td>
<td>=150 pts</td>
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<tr>
<td>Final exam</td>
<td>=150 pts</td>
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<td>Total:</td>
<td>=1000 pts</td>
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**NOTES ABOUT GRADED MATERIALS:**

**LECTURE/LAB EXAMS:** Exams should be taken as scheduled face to face and some assignments are using Proctorial and Web camera on Canvas. **No makeup exams!** It will be only allowed except under documented emergencies and student must provide an officially documented excuse (See Student Handbook). If you miss the test, a grade of zero (0) will be entered on the grade sheet. It is your responsibility to notify your instructor when you miss an exam and to be present at the scheduled make-up time. All make-up exams will be essay exams and/or different set of questions will be on the make-up test. The final exam schedule is set by the University and will be given by the specified date. *Do not schedule any activity during the final exam period*

**LECTURE/ LAB QUIZZES:** The quiz will be usually administered every week on Wednesday. *If you did not attend, you cannot turn in a quiz for it.*

**LAB REPORTS:** You have to complete 10 lab reports on Connect (Web based). You have to attend the Lab class and then complete each week’s lab report by Sunday 11.59 PM. No late work is accepted.

**PARTICIPATION:** Includes individual in class quizzes/pop quizzes (based on reading assignments and the lecture) as well a group work during lecture. Thus, your active learning grade is a reflection of your effort to participate and attend class regularly. **These cannot be made up if absent.**

**HOMEWORK:** It is your responsibility to get the homework if you are absent from class. Failure to submit the homework at that time will result in points lost for the assignment. *If your homework is not submitted by the due date, you will get a zero for that assignment.*

**RESEARCH PROJECT:** Preparation 30 pts and quiz 20 points Prepare your powerpoint presentation on infectious diseases and any related work as approved by your instructor. **Submit it by the due date** (TBA in the class). No late work is accepted.

**LAB FINAL:** The lab final will be comprehensive. Date and time will be given in class.

**FINAL EXAM:** The final exam is comprehensive (labs and lectures included). It will consist of 50-100 multiple choice questions/ true/ false and short answer type questions.
**LETTER GRADE ASSIGNMENT:**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Final Average in Percent</th>
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<tbody>
<tr>
<td>A</td>
<td>89.5 - 100</td>
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<tr>
<td>B</td>
<td>79.5 - 89.4</td>
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<tr>
<td>C</td>
<td>69.5 – 79.4</td>
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<tr>
<td>D</td>
<td>59.5 – 69.4</td>
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<tr>
<td>F</td>
<td>0 – 59.4</td>
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**Course Procedures or Additional Instructor Policies**

**Taskstream**
Taskstream is a tool that Prairie View A&M University uses for assessment purposes. One of your assignments may be considered an "artifact,” an item of coursework that serves as evidence that course objectives are met. More information will be provided during the semester, but for general information, you can visit Taskstream via the link in eCourses.

**Cell phone policy during exams**
Cell phones must be secured within a backpack or purse during exams. The backpack or purse must be set aside, against a classroom wall and out-of-reach of any students. Any cell phones found on a person during an exam will result in an automatic “0” score on the exam.

**Instructor Policies and Suggestions for Student Success:**

1. Lecture will start promptly. If late by more than 5 minutes, please try to be as quiet as possible.
2. Turn off your mobile phone.
3. No use of headphones in the classroom.
4. Persistent talking among classmates during lecture will not be tolerated. A student may be asked to leave the classroom at the discretion of the instructor.

5. You are expected to take good care of all the equipment/materials provided to you in the lab. It is your responsibility to keep your working area and materials clean.

6. Consider this class as or more important than your job. It is not O.K. to leave lab early, or miss lab completely, because of work.
<table>
<thead>
<tr>
<th>Week Of</th>
<th>Chapter Title</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Pre-test, syllabus review, course materials review, introduction</td>
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<tr>
<td></td>
<td><em>Ch. 1 Main Themes of Microbiology</em></td>
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<tr>
<td>Week 2</td>
<td>Ch. 5 Eukaryotic cells and Microorganisms / Ch 8 Microbial metabolism / Class Quiz</td>
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<tr>
<td>Week 3</td>
<td>Ch 8 Microbial metabolism / Ch 7 Microbial Nutrition and Growth / ClassQuiz</td>
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<td>Week 4</td>
<td>Ch 7 Microbial Nutrition and Growth / LECTURE EXAM 1 Chapters 1, 5 and 8</td>
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<td>Week 5</td>
<td>CH 11 Physical and Chemical Control of Microbes</td>
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<tr>
<td>Week 6</td>
<td>CH 11 Physical and Chemical Control of Microbes/ Class Quiz</td>
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<td>Week 7</td>
<td>CH 12: Antimicrobial treatment/ Quiz Ch. 6: Viruses &amp; Prions / Class Quiz</td>
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<tr>
<td>Week 8</td>
<td>/ Ch 13 Microbe- Human Interaction ; health and Diseases / Class quiz</td>
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<tr>
<td>Week 9</td>
<td>Ch. 6: Viruses &amp; Prions / LECTURE EXAM 2: Chapters 7, 4, 11 and 12</td>
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<tr>
<td>Week 10</td>
<td>CH 18. Infectious diseases affecting skin and eye</td>
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<td>LECTURE EXAM 3: Chapters 6 and 18</td>
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<tr>
<td>Week 11</td>
<td>CH 18. Infectious diseases affecting skin and eye / CH 22 Infectious Diseases of gastro-intestinal tract / Class quiz</td>
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<tr>
<td>Week 12</td>
<td>CH 20/ Infectious Diseases of Cardiovascular system</td>
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<tr>
<td>Week 13</td>
<td>Research Project Class quiz</td>
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<tr>
<td>Week 14 /15</td>
<td>Review/Study day/ Research Project</td>
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<tr>
<td></td>
<td><strong>FINAL EXAM/ Comprehensive</strong></td>
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<tr>
<td>Week Of:</td>
<td>Exercise(s) to perform</td>
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<tr>
<td>Week 1</td>
<td>Lab safety/ Introduction</td>
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<tr>
<td>Week 2</td>
<td>Lab 1</td>
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<td>Week 3</td>
<td>Lab 2</td>
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<td>Week 11</td>
<td>Lab 10</td>
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<td>Week 12</td>
<td>Research Project on Infectious Diseases</td>
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<td>Week 13</td>
<td>Review for Final Exam</td>
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<td>Week 14</td>
<td>Lab Final</td>
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Student Support and Success

John B. Coleman Library
The John B. Coleman Library’s mission is to enhance the scholarly pursuit of knowledge, to foster intellectual curiosity, and to promote life-long learning and research through our innovative services, resources, and cultural programs, which support the Prairie View A&M University’s global mission of teaching, service, and research. It maintains library collections and access both on campus, online, and through local agreements to further the educational goals of students and faculty. Website: https://www.pvamu.edu/library/; Phone: 936-261-1500

Academic Advising Services
Academic Advising Services offers students a variety of services that contributes to student success and leads towards graduation. We assist students with understanding university policies and procedures that affect academic progress. We support the early alert program to help students get connected to success early in the semester. We help refer students to the appropriate academic support services when they are unsure of the best resource for their needs. Faculty advisors support some students in their respective colleges. Your faculty advisor can be identified in PantherTracks. Advisors with Academic Advising Services are available to all students. We are located across campus. Find your advisor's location by academic major at www.pvamu.edu/advising. Phone: 936-261-5911

The University Tutoring Center
The University Tutoring Center (UTC) offers free tutoring and academic support to all registered PVAMU students. The mission of the UTC is to help provide a solid academic foundation that enables students to become confident, capable, independent learners. Competent and caring staff and peer tutors guide students in identifying, acquiring, and enhancing the knowledge, skills, and attitudes needed to reach their desired goals. Tutoring and academic support are offered face-to-face in the UTC, in virtual face-to-face sessions (https://www.pvamu.edu/student-success/sass/university-tutoring-center/), and through online sessions (https://www.pvamu.edu/pvplace/). Other support services available for students include Supplemental Instruction, Study Break, Academic Success Workshops, and Algebra Study Jam. Location: J. B. Coleman Library, Rm. 307; Phone: 936-261-1561; Email: pvtutoring@pvamu.edu; Website: https://www.pvamu.edu/student-success/sass/university-tutoring-center/

Writing Center
The Writing Center provides well-trained peer tutors to assist students with writing assignments at any stage of the writing process. Tutors help students with various writing tasks from understanding assignments, brainstorming, drafting, revising, editing, researching, and integrating sources. Students have free access to Grammarly online writing assistance. Grammarly is an automated proofreading and plagiarism detection tool. Students must register for Grammarly by using their student email address. In addition, students have access to face-to-face and virtual tutoring services either asynchronously via email or synchronously via Zoom. Location: J. B. Coleman Library, Rm. 209; Phone: 936-261-3724; Website: https://www.pvamu.edu/student-success/writing-center/; Grammarly Registration: https://www.grammarly.com/enterprise/signup

Academic Early Alert
Academic Early Alert is a proactive system of communication and collaboration between faculty, academic advisors, and PVAMU students that is designed to support student success by promptly identifying issues and allowing for intervention. Academic Early Alerts help students by providing a central location to schedule advising appointments, view advisor contact information, and request assistance. Students who recognize that they have a problem that is negatively affecting their academic performance or ability to continue school may self-refer an Academic Early Alert. To do so, students will log in to PV Place and click on Academic Early Alert on the left sidebar. Phone: 936-261-5902; Website: https://www.pvamu.edu/student-success/early-alert/

Student Counseling Services
The Student Counseling Services unit offers a range of services and programs to assist students in maximizing their potential for success: short-term individual, couples, and group counseling, as well as crisis intervention, outreach, consultation, and
referral services. The staff is licensed by the State of Texas and assists students who are dealing with academic skills concerns, situational crises, adjustment problems, and emotional difficulties. Information shared with the staff is treated confidentially and in accordance with Texas State Law. Location: Hobart Taylor, 2nd floor; Phone: 936-261-3564; Website: https://www.pvamu.edu/healthservices/student-counseling-services/

**Office of Testing Services**
Testing Services serves to create opportunities by offering a suite of exams that aid in the students' academic and professional success. Currently, we administer entrance (HESI A2), college readiness (TSI assessment), Prior Learning (CLEP, DSST), and proctored exams. Location: Wilhelmina Delco, 3rd Floor, Rm. 305; Phone: 936-261-3627; Email: aetesting@pvamu.edu; Website: www.pvamu.edu/testing

**Office of Diagnostic Testing and Disability Services**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, contact the Office of Disability Services. As a federally-mandated educational support unit, the Office of Disability Services serves as the repository for confidential disability files for faculty, staff, and students. For persons with a disability, the Office develops individualized ADA letters of request for accommodations. Other services include learning style inventories, awareness workshops, accessibility pathways, webinars, computer laboratory with adapted hard and software, adapted furniture, proctoring non-standardized test administrations, ASL interpreters, ALDs, digital recorders, Livescribe, and a comprehensive referral network across campus and the broader community. Location: Hobart Taylor, Rm. 1D128; Phone: 936-261-3583; Website: https://www.pvamu.edu/disabilityservices/

**Center for Instructional Innovation and Technology Services (CIITS)**
Distance Learning, also referred to as Distance Education, is the employment of alternative instructional delivery methods to extend programs and services to persons unable to attend college in the traditional manner. The Center for Instructional Innovation and Technology Services (CIITS) supports student learning through online, hybrid, web-assist, and 2-way video course delivery. For more details and contact information, visit: https://www.pvamu.edu/dlearning/distance-learning-2-2/students-2/; Phone: 936-261-3283

**Veteran Affairs**
Veterans Services works with student veterans, current military and military dependents to support their transition to the college environment and continued persistence to graduation. The Office coordinates and certifies benefits for both the G.I. Bill and the Texas Hazelwood Act. Location: Evans Hall, Rm. 102; Phone: 936-261-3563; Website: https://www.pvamu.edu/sa/departments/veteranaffairs/

**Office for Student Engagement**
The Office for Student Engagement delivers comprehensive programs and services designed to meet the co-curricular needs of students. The Office implements inclusive and accessible programs and services that enhance student development through exposure to and participation in diverse and relevant social, cultural, intellectual, recreational, community service, leadership development, and campus governance. Location: Memorial Student Center, Rm. 221; Phone: 936-261-1340; Website: https://www.pvamu.edu/studentengagement/

**Career Services**
Career Services supports students through professional development, career readiness, and placement and employment assistance. The Office provides one-on-one career coaching, interview preparation, resume and letter writing, and career exploration workshops and seminars. Services are provided for students at the Northwest Houston Center and College of Nursing in the Medical Center twice a month or on a requested basis. Distance Learning students are encouraged to visit the Career Services website for information regarding services provided. Location: Anderson Hall, 2nd floor; Phone: 936-261-3570; Website: https://www.pvamu.edu/careerservices/
University Rules and Procedures

Academic Misconduct
Academic dishonesty is defined as any form of cheating or dishonesty that has the effect or intent of interfering with any academic exercise or fair evaluation of a student's performance. The college faculty can provide additional information, particularly related to a specific course, laboratory, or assignment.

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with the University Administrative Guidelines on Academic Integrity, which can be found on the Academic Integrity webpage. Students who engage in academic misconduct are subject to university disciplinary procedures. As listed in the University Administrative Guidelines on Academic Integrity, the University Online Catalog, and the Student Code of Conduct, the following are examples of prohibited conduct. This list is not designed to be all-inclusive or exhaustive. In addition to academic sanctions, any student found to have committed academic misconduct that is also a violation of criminal law may also be subject to disciplinary review and action by the Office of Student Conduct (as outlined in the Student Code of Conduct).

Forms of Academic Dishonesty:

1. **Cheating**: Deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not learned, giving or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a "cheat sheet" on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher.

2. **Plagiarism**: Careless or deliberate use of the work or the ideas of another; representation of another's work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another's paper or answers, failure to identify information or essays from the internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another's words with quotation marks.

3. **Collusion**: When more than one student or person contributes to a piece of work that is submitted as the work of an individual.

4. **Conspiracy**: Agreeing with one or more persons to commit an act of academic/scholastic dishonesty; and

5. **Multiple Submission**: Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.

Nonacademic Misconduct
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. The Office of Student Conduct will adjudicate such incidents under nonacademic procedures.

Sexual Misconduct
Sexual harassment of students and employees at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating the university's sexual harassment policy will be subject to disciplinary action. In accordance with the Texas A&M University System guidelines, your instructor is obligated to report to the Office of Title IX Compliance (titleixteam@pvamu.edu) any instance of sexual misconduct involving a student, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which the instructor becomes
aware during this course through writing, discussion, or personal disclosure. The faculty and staff of PVAMU actively strive to provide a learning, working, and living environment that promotes respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like assistance or have questions, they may contact the Title IX Coordinator at 936-261-2144 or titleixteam@pvamu.edu. More information can be found at www.pvamu.edu/titleix, including confidential resources available on campus.

Pregnancy, Pregnancy-related, and Parenting Accommodations
Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related conditions, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Disability Services or the Dean of Students' Office for additional information and to request accommodations.

Non-Discrimination Statement
Prairie View A&M University does not discriminate on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or gender identity in its programs and activities. The University is committed to supporting students and complying with The Texas A&M University System non-discrimination policy. It seeks to establish an environment that is free of bias, discrimination, and harassment. If you experience an incident of discrimination or harassment, we encourage you to report it. If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are individuals who can meet with you. The Director of Equal Opportunity & Diversity has been designated to handle inquiries regarding the non-discrimination policies and can be reached at Harrington Science Building, Suite 109 or by phone at 936-261-1744 or 1792.

Class Attendance Policy (See the University Online Catalog for Full Attendance Policy)
Prairie View A&M University requires regular class attendance. Attending all classes supports the full academic development of each learner, whether classes are taught with the instructor physically present or via distance learning technologies such as interactive video and/or the internet. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in the assignment of a grade of "F." Absences are accumulated beginning with the first day of class during regular semesters and summer terms. Each faculty member will include the University's attendance policy in each course syllabus.

Student Academic Appeals Process
Authority and responsibility for assigning grades to students rest with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the University Online Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

TECHNICAL CONSIDERATIONS

Minimum Recommended Hardware and Software:
- Intel PC or Laptop with Windows 7; Mac with OS X; Smartphone or iPad/Tablet with Wi-Fi
- High speed Internet access
- 8 GB Memory
- Hard drive with 320 GB storage space
- 15” monitor, 800x600, color or 16 bits
- Sound card w/speakers
- Microphone and recording software
- Keyboard & mouse
- Most current version of Google Chrome, Safari, Internet Explorer or Firefox

Note: Be sure to enable Java & pop-ups

You should be able to access “CONNECT website for your Quizzes/ Homework/ Labs - Mandatory
Participants should have a basic proficiency of the following computer skills:
- Sending and receiving email
- A working knowledge of the Internet
- Proficiency in Microsoft Word (or a program convertible to Word)
- Proficiency in the Acrobat PDF Reader
- Basic knowledge of Windows or Mac O.S.

Netiquette (online etiquette):
Students are expected to participate in all discussions and virtual classroom chats as directed. Students are to be respectful and courteous to others on discussions boards. Foul or abusive language will not be tolerated.

Technical Support:
Students should go to https://mypassword.pvamu.edu/ if they have password issues. The page will provide instructions for resetting passwords and contact information if login issues persist. For other technical questions regarding eCourses, call the Office of Distance Learning / the Center for Instructional Innovation and Technology Services (CIITS) at 936-261-3283 or email at ciits@pvamu.edu

Video Conferencing Etiquette
When using Zoom, WebEx, or other video conferencing tools, confirm the visible area is tidy, clear of background clutter, inappropriate or offensive posters, and other distractions. Ensure you dress appropriately and avoid using high traffic or noisy areas. Stay muted when you are not speaking and avoid eating/drinking during the session. Before the class session begins, test audio, video, and lighting to alleviate technology issues.

Communication Expectations and Standards
Emails or discussion postings will receive a response from the instructor, usually in less than 48 hours. Urgent emails should be marked as such. Check regularly for responses.

Discussion Requirement
Online courses often require minimal to no face-to-face meetings. However, conversations about the readings, lectures, materials, and other aspects of the course can occur in a seminar fashion. The use of the discussion board will accomplish this. The instructor will determine the exact use of discussion boards.

It is strongly suggested that students type their discussion postings in a word processing application such as Word and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, copy and paste to the discussion board.

COVID-19 Campus Safety Measures
To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, PVAMU has adopted policies and practices to limit virus transmission.

- **Self-monitoring** - Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.

- **Face Coverings** - Face coverings (cloth face covering, surgical mask, etc.) are recommended in classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource, and support offices, and outdoor spaces where 6 feet of physical distancing is challenging to maintain reliably.
• **Physical Distancing** - Physical distancing should be maintained between students, instructors, and others in course and course-related activities where possible.

• **Personal Illness and Quarantine** - Students required to quarantine are to participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence. To receive an excused absence, students must provide appropriate documentation to the Office for Student Conduct, studentconduct@pvamu.edu.

Biosafety Level 1
Standard Operating Procedures

(Lab Room O’Banion Science 308)
I. Lab Practices and Safety Rules

1. Wash your hands with disinfectant soap when you arrive at the lab, after working with any potentially hazardous materials, and again before you leave.

2. Absolutely no food, drinks, chewing gum, application of cosmetics or contacts is allowed in the lab. Absolutely no smoking is allowed in the laboratory. Do not put anything in your mouth such as pencils, pens, labels, or fingers. Do not store food in areas where microorganisms are stored.

3. Purchase a lab coat and safety glasses, bring them to lab, and use them. Alternatively, a long-sleeved shirt that buttons or snaps closed is acceptable protective clothing. This garment must cover your arms and be able to be removed without pulling it over your head. Leave protective clothing in the lab and do not wear it to other non-lab areas.

4. Avoid loose fitting items of clothing. Wear appropriate shoes (sandals are not allowed) in the laboratory.

5. Keep your workspace free of all unnecessary materials. Backpacks, purses, and coats should be placed in the cubbyholes by the front door of the lab. Place needed items on the floor near your feet, but not in the aisle.

6. Disinfect work areas before and after use with 70% ethanol or fresh 10% bleach. Laboratory equipment and work surfaces should be decontaminated with an appropriate disinfectant on a routine basis, and especially after spills, splashes, or other contamination.

7. Label everything clearly.

8. Replace caps on reagents, solution bottles, and bacterial cultures. Do not open Petri dishes in the lab unless necessary.

9. Inoculating loops should be flame sterilized in a Bunsen burner before you lay them down.

10. Turn off Bunsen burners when not in use. Long hair must be restrained if Bunsen burners are in use.

11. Treat all microorganisms as potential pathogens. Use appropriate care and do not take cultures out of the laboratory.

12. Wear disposable gloves when working with potentially infectious microbes or samples (e.g., sewage). If you are working with a sample that may contain a pathogen, then be extremely careful to use good bacteriological technique. Do not wash or reuse gloves. Dispose of used gloves in the appropriate biosafety bag.

13. Sterilize equipment and materials.


15. Consider everything a biohazard. Do not pour anything down the sink. Autoclave liquids and broth cultures to sterilize them before discarding.

16. Dispose of all solid waste material in a biohazard bag and autoclave it before discarding in the regular trash.

17. Familiarize yourself with the location of safety equipment in the lab (e.g., eye-wash station, shower, sinks, fire extinguisher, biological safety cabinet, first aid kit, emergency gas valve).

18. Dispose of broken glass in the broken glass container.

19. No razor blades, syringe needles, or sharp metal objects will be used in this laboratory.

20. Report spills and accidents immediately to your instructor. Clean small spills with care (see instructions below). Seek help for large spills.

21. Report all injuries or accidents immediately to the instructor, no matter how small they seem.

Cleaning Spills

When a spill occurs, first, contact your instructor. If it is a small spill of a low hazard microorganism or sample, then you should clean the spill yourself.
The proper procedures for cleaning small spills of microorganisms or samples (BSL I):

1. Wear a lab coat, disposable gloves, safety glasses or a face shield, and if needed, approved respiratory equipment.
2. Soak a paper towel(s) in an appropriate disinfectant (70% ethanol or fresh 10% bleach solution) and place around the spill area.
3. Working from the outer edges into the center, clean the spill area with fresh towels soaked in the disinfectant. Be sure to decontaminate any areas or surfaces that you suspect may have been affected by the spill. Allow 10 minutes contact time.
4. Place the paper towels and gloves into a biohazard bag and autoclave these materials to sterilize them.
5. Dispose of any contaminated clothing properly.
6. Wash your hands with a soap.

If it is a large spill and your instructor is not available, then call Risk Management and Safety (RMS). Each lab should come equipped with a spill response kit.

II. Laboratory Specific Biosafety Policies
Biosafety Level 1 (BLI)

Good Microbial Practices:

1. All bacteria and chemicals in the laboratory are to be considered dangerous. Do not touch, taste or smell any bacterial culture or chemical unless specifically told to do so.
2. For bacteria or chemicals ingested, see the lab instructor immediately.
3. Check the label on cultures and chemical bottles twice before removing any of the contents. Take only as much of the bacterial culture or chemical as you need.
4. Never return unused chemicals to their original containers.
5. Never use mouth suction to fill a pipet. Use a rubber bulb or pipet pump. Always keep the pipet pointed away from your body.
6. Never dispense flammable liquids such as ethanol anywhere near an open flame or source of heat.
7. Perform all procedures to minimize the creation of splashes and/or aerosols.
8. Never remove bacteria, chemicals or other equipment from the laboratory.
9. Take great care when transporting cultures and chemicals from one part of the laboratory to other. Hold them securely and walk carefully. All cultures should be in a test tube rack.

Spill Response and Decontamination Procedures:

Use the guidelines below for response to spills of biological materials outside of the biosafety cabinet. The laboratory will be equipped with a spill kit containing necessary materials for cleaning up a spill. All lab personnel will know where it is stored so that it can be retrieved quickly. Spill kit components will be replaced as they are used to prepare for the next incident.

Spill kit contents:

- Gloves
- Safety glasses or goggles
- Paper towels or pads to absorb contaminated liquids
- Biohazard waste bag
- Outline of the spill response SOP
Surface contamination:
1. Notify everyone else working in the room that there has been a spill and not to walk through the contaminated area. Notify your Principal Investigator (PI) as soon as possible.
2. Put on necessary protective equipment: gloves and lab coat at a minimum.
3. Cover the spill with paper towels and pour 10% freshly diluted bleach or other effective disinfectant over spill. Do not spray.
4. Allow to sit for at least 10 minutes or the recommended contact time depending on the disinfectant.
5. Wipe with paper towels, and discard towels into autoclave bag.
6. Decontaminate surrounding floor and work surface areas where splashes or larger aerosols may have settled around the spill.
7. Repeat the decontamination procedure.
8. Remove contaminated clothing and place in autoclave bag.
9. Remove gloves and put in autoclave bag.
10. Wash your hands thoroughly.

Personal contamination:
1. Notify everyone else who is working in the room of the exposure. Notify your Principal Investigator (PI) as soon as possible.
2. Flush the exposed surface (eyes, mouth, nose or skin) with water for 15 minutes
3. Apply first aid if necessary and treat as an emergency
4. Notify supervisor or Police/RMS if after hours
5. Report to a medical clinic for treatment or counseling

Waste Disposal Procedures:
All personnel are responsible for maintaining a clean work area. Only trained individuals should operate the autoclave.

1. Solid materials
   Solid infectious materials (used pipettes, flasks, Petri dishes, etc.) must be disposed of in autoclave waste bags. Waste should be placed in a plastic or metal pan to contain any leaks. The autoclave should be run for one hour or sufficient time to fully decontaminate the waste. To request a biological indicator to test the autoclave's effectiveness, contact the biosafety officer.

2. Liquid waste
   Liquid infectious wastes, such as spent media, can be autoclaved and poured down the sink or decontaminated by adding household bleach to a final concentration of 10%, allowed to sit for at least 30 minutes, then poured down the sink in the laboratory.

3. Uncontaminated waste
   Uncontaminated non-sharp waste should be disposed of in the general lab waste stream. Uncontaminated broken glass is disposed of in a sturdy cardboard box, preferably lined with a plastic bag. When full, the box should be taped closed and disposed of in the dumpster. Housekeeping will not dispose of broken glass.

4. Sharps disposal
   Sharps are items which pose a puncture or cutting hazard, such as glass, needles, and razors. No sharps will be used in this lab.
5. **Disposal of waste into dumpsters**
Lab staff is responsible for transporting autoclaved waste to the dumpsters in a timely manner. Waste bags should not be left sitting in the laboratory or autoclave room for more than a few hours. If the dumpster is full, trash bags may NOT be discarded outside the dumpster. Bags must be returned to the lab and disposed of when the dumpster has been emptied.

### III. Use of the Centrifuge

Aerosol containment for procedures done outside of the BSC is important. Centrifugation is a common type of lab procedures with a risk of generating aerosols. Aerosols may be generated if liquid leaks from the tube or container while the centrifuge is running, since this liquid will get splattered around the rotor and/or chamber. Leaks often happen if a tube or container cracks or breaks during the run. They can also happen if the cap is not secured to the container properly. Unfortunately, there is no way to know if such accidents have occurred during the run, until after you open the centrifuge and see the leaks. At that point, exposure to infectious aerosols has already occurred. To prevent exposures to infectious aerosols, it is expected that lab personnel use the following precautions:

- Always use a sealed rotor lid with fixed-angle rotors. These are typically screw-on lids, rather than snap-on lids, and they have an O-ring to ensure an airtight seal on the rotor. Note, the centrifuge lid is not the same as the rotor lid and does not provide the necessary personal protection from aerosols.
- For swinging bucket rotors, use safety cups or buckets. These are the same type of tube holder or multi-well plate holder that are typically used in tabletop centrifuges, except they have lids fitted with O-rings to ensure an airtight seal.
- Always inspect the O-rings for integrity prior to use. Replace any that are showing signs of wear.
- Whenever possible, use tubes with screw-on caps. Those with O-rings are an even better option.
- Never overfill the containers, and always be sure to balance your samples before starting the centrifuge.

Vortexing will be done with a capped or closed container.

**Accidental Spills in the Centrifuge:**

Spills or breakage of containers inside of an operating centrifuge poses a serious potential for exposure due to the creation of aerosols. If a primary container has broken in a centrifuge without a closed rotor or bucket, immediately suspend use, notify lab staff and Instructor.

For suspected or confirmed spills/breakage in any centrifuge, wait at least 30 minutes after the centrifuge has stopped operating to initiate clean up.

1. Put on lab coat and gloves prior to opening centrifuge. Open carefully to assess the damage.
2. If the spill is contained within a closed cup, bucket or rotor, spray the exterior with disinfectant (bleach) and allow at least 10 minutes of contact time. Remove the carrier to the nearest biosafety cabinet (BSC). If a biosafety cabinet is not available, close the centrifuge, post a sign to indicate it cannot be used. Notify the Instructor.
3. If a BSC is available, gather supplies needed, such as a sharps container for broken glass and bins filled with disinfectant and place into the BSC. Use forceps to remove broken glass and place directly into sharps container. Carefully remove any unbroken tubes and place into a bin filled with disinfectant for 20 minutes. Wipe carrier/bucket with disinfectant.
4. After disinfection, carrier, bucket or rotor should be washed with a mild soap and water.
5. Spray the interior of the centrifuge chamber with a disinfectant, let sit for 20 minutes and then wipe down
6. Remove protective clothing and wash hands.
IV. Emergency Procedures

1. Fire evacuation procedures
   During a fire emergency, lab staff should prioritize life safety. Walk to the nearest exit. Pull the fire alarm if necessary and call 911 once outside the building.

2. Power outage
   In the event of a power outage, put away cultures. Remove PPE and exit the lab normally. Emergency lighting within the buildings should provide adequate visibility to exit the building. Notify the PI immediately.

3. Medical emergency
   In the event of a medical emergency in the lab, follow appropriate procedures depending on the hazards present. If the emergency involves a spill of hazardous materials onto the clothing or body, assist the victim to the shower or eyewash station. If the victim requires medical attention, call 911.

4. Accidental exposure
   For splashes to the eyes, rinse the eyes under the eyewash for 15 minutes. If the victim requires medical attention, call 911. Report to Risk Management Safety and follow up by contacting Occupational Health Partners.

5. Potential Health Risks
   Personnel must receive annual updates or additional training when procedural or policy changes occur. Personal health status may impact an individual's susceptibility to infection, ability to receive immunizations or prophylactic interventions. Therefore, all laboratory personnel and particularly women of child-bearing age should be provided with information regarding immune competence and conditions that may predispose them to infection. Individuals having these conditions should be encouraged to self-identify to their healthcare provider for appropriate counseling and guidance.
Immune-compromised students can be infected by the agents used in this class and these individuals should consult their doctors.

List of the (possible) biological agents being used in the teaching laboratory activities in the chart below:

<table>
<thead>
<tr>
<th>Name of Biological Material¹</th>
<th>Type of Biological Material²</th>
<th>Original Source³</th>
<th>Strain (if applicable)</th>
<th>Risk Group (RG)⁴</th>
<th>Biosafety Level (BSL)⁴</th>
<th>Where will the agent be handled and/or stored?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacillus subtilis</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Micrococcus luteus</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Staphylococcus epidermidis</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Rhodospirillum rubrum</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Escherichia coli K12</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Pseudomonas fluorescens</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Lactobacillus acidophilus</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
<tr>
<td>Bacillus thuringiensis</td>
<td>Bacteria</td>
<td>Carolina Biological</td>
<td>RG-1</td>
<td>BSL-1</td>
<td>Room 308/Room 405</td>
<td></td>
</tr>
</tbody>
</table>