

EVPP 306 - Environmental Microbiology Essentials Laboratory

Spring 2022

(Updated January 21, 2022)

COURSE INFORMATION

Section:	201	202	203
Day:	Tuesday	Tuesday	Thursday
Time:	1:30 - 4:10 PM	4:30 - 7:10 PM	4:30 - 7:10 PM
Instructor:	Lex Berger	Lex Berger	Lex Berger
Email:	aberge2@gmu.edu	aberge2@gmu.edu	aberge2@gmu.edu
Office Hours:	Thursday 10 AM – 12 PM Or by e-mail	Thursday 10 AM – 12 PM Or by e-mail	Thursday 10 AM – 12 PM Or by e-mail

Lab Location: David King 3021

Course Materials: Lab exercise modules provided in a downloadable format on Blackboard

Prerequisite: EVPP 210 and 30 credit hours

Co-requisite: EVPP 305

COURSE DESCRIPTION AND LEARNING OUTCOMES

EVPP 306 is a 1-credit course that introduces field and laboratory microbiological techniques to environmental science and other environmentally focused students (it is a separate course from EVPP 305, but is a complimentary co-requisite). **In the study of the environment, microbiology plays a central role.** For example, secondary wastewater treatment is essentially a microbial reactor designed to metabolize organic matter. Our current standards for drinking water quality and shellfish sanitation is based on detection and quantification of coliform bacteria (*E. coli* in Virginia). Even swimming in the Potomac River as part of a triathlon is dependent on *E. coli* abundance in the water. Elimination of many xenobiotics from the environment is by microbial metabolism. Zoonoses, disease transmission between animals and humans, are quite common. **The principles and practices of environmental microbiology learned in this course will provide a path to enhanced understanding of environmental processes in general.**

The laboratory portion of the course emphasizes the methods by which various microorganisms can be safely handled, cultured, identified, observed, and enumerated. This is likely your first practical experience with the laboratory study of microbes. The lab will introduce an entirely new class of organisms, a new vocabulary, and new techniques. **At the completion of the laboratory, students should understand and be proficient in aseptic technique, light microscopy, and in the basic techniques used to isolate, maintain, observe, and identify microorganisms.** Although you will not become practicing microbiologists from a one semester course, the course will provide a

framework to better appreciate the importance of microorganisms and the techniques employed in their study, and to go on to more advanced courses in microbiology.

We constantly adapt EVPP306 to take advantage of changing opportunities (and ahem, unique challenges) and methodology, updating our lab manual each time we teach the lab. This semester, the lab manual will be in the form of modules with individual downloadable exercises on Blackboard. These modules will provide you with procedural directions that can be easily followed, data entry forms, and questions to be answered. You will be answering the questions and submitting them online via Blackboard. **You should also read the background and procedures for planned activities prior to each lab session as there will be a weekly pre-lab quiz combined with the post-lab quiz.**

Below, is a summary of the topics we plan to cover this semester (may be subject to change if extenuating circumstances arise), but please refer to the course Blackboard site for the course calendar (containing due dates for assignments, reports, quizzes, and tests), as well as background materials and resources needed to complete the lab exercises and associated assignments.

<u>WEEK/DATE</u>	<u>LAB MODULES</u>
Week 1: Jan 25/27	Introduction to the Microbiology Laboratory/Safety in the Laboratory and Field
Week 2: Feb 1/3	Hand washing Environmental Microbiology and Enrichment Cultures
Week 3: Feb 8/10	Obtaining Pure Cultures (Streak plate method) Using Microscopy to View Microorganisms (begin)
Week 4: Feb 15/17	Using Microscopy to View Microorganisms (continue)
Week 5: Feb 22/24	Using Stains to Differentiate Microorganisms (Gram Stain and Spore Stain)
Week 6: Mar 1/3	Microbial Growth
Week 7: Mar 8/10	Using Traditional Microbiological Tests to Characterize Bacteria (Oxidase test, motility, oxygen requirements)
Week 8: Mar 15/17	NO LABS – Spring Break
Week 9: Mar 22/24	Identifying Unknown Bacteria Using Molecular Techniques

Week 10: Mar 29/31	Microbial Symbiosis - Lichen Scavenger Hunt
Week 11: Apr 5/7	DNA Sequence Analysis
Week 12: Apr 12/14	Epidemiology Virtual Lab
Week 13: Apr 19/22	Presentations
Week 14: Apr 26/28	Review Session
Week 15: May 3/5	Lab Final Exam: during class time

LABORATORY AND SAFETY RULES

Laboratory and safety rules are listed in Module 1 and Exercise 1 on Blackboard. These rules are designed for your safety. Please make yourself familiar with these rules and follow them. **We will go over the additional safety rules pertaining to working in the field and at home on the first day of class.** Although we do not work with virulent pathogens in this laboratory, any microbe is potentially hazardous when present in high concentrations and must be handled with care. If you have any questions about procedures in the laboratory, do not hesitate to discuss your concerns with your lab instructor(s).

PARTICIPATION AND MAKE-UP WORK

Participation is part of your grade. This will be determined based on attendance, in class discussion, and the discussion board. **Attendance at synchronous laboratory sessions is necessary because we will use this time to provide important safety information, instructions, demonstrations, and to discuss experimental results.** If a schedule conflict arises preventing you from attending class, or you anticipate being unable to turn in an assignment on time, please contact your instructor as soon as possible. We recognize that “life happens” and with ample notice, can offer flexible solutions that are reasonable and within our limits.

ASSIGNMENTS AND GRADING

Weekly Quizzes	25% (11x10 pts/quiz – drop quiz with lowest score)
Lab Exercise Questions	25%
Participation/Attendance	10%
Scientific journal article presentation and discussion	15%
Final Exam	25%

There will be weekly quizzes throughout the semester. Each quiz will cover materials from the previous, as well as upcoming, laboratory exercises (see course calendar on Blackboard for scheduled quizzes). The schedule allows one week for review and clarification. They will cover both conceptual and applied aspects of the exercises. You will be required to record data, analyses, and observations, as well as answer questions for each weekly module and associated exercises. You will be using the pages provided to you via Blackboard or will submit answers directly via Blackboard, depending on the particular exercise. These pages will be graded (see course calendar on Blackboard for due dates). Finally, you will choose a paper from the primary literature on a topic relevant to environmental microbiology. You will present the paper to the class and come prepared to lead the class in a discussion. The specifics of the assignment will be covered in class and a detailed rubric will be provided on Blackboard.

Undergraduate Regular Grading Scale:

A+	97-100%
A	93-96%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D	60-69%
F	<60%

ACADEMIC INTEGRITY

Mason is an Honor Code university; please see the Office for Academic Integrity (<https://oai.gmu.edu/>) for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. The main concern is that you act as professionally as possible and do not mistakenly act in manner that could be interpreted negatively. The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using the appropriate format for this class. A simple listing of books or articles is not sufficient.

Plagiarism is the equivalent of intellectual theft and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

What does academic integrity mean in this course specifically? When you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that **all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions.** When in doubt (of any kind) please ask for guidance and clarification.

Sharing of instructor-created materials, particularly materials relevant to assignments or exams, to public online "study" sites is considered a violation of Mason's Honor Code. Some kinds of participation in online study sites violate the Mason Honor code: these include accessing exam or quiz questions for this class; accessing exam, quiz, or assignment answers for this class; uploading of any of the instructor's materials or exams; and uploading any of your own answers or finished work. Always consult your syllabus and your professor before using these sites.

BASIC COURSE TECHNOLOGY REQUIREMENTS

Activities and assignments in this course will regularly use the Blackboard learning system (<https://mymason.gmu.edu>) as well as web-conferencing software (Blackboard Collaborate / Zoom). Therefore, a desktop or laptop computer with a functional camera, microphone, and reliable internet access (consistent 1.5 megabits per second download speed or higher) are required to participate in this course. In an emergency, students can connect through a telephone call, but video connection is the expected norm. A mobile phone with a camera may also enhance student learning in terms of photographing lab activities and sharing them with the class.

STUDENT USE OF ELECTRONIC DEVICES

Please be respectful of your peers and your instructor and do not engage in activities that are unrelated to the class during synchronous meeting times.

COURSE RECORDINGS

All of our synchronous meetings in this class will be recorded to provide necessary information for students in this class. Recordings will be stored on Blackboard and will only be accessible to students taking this course during this semester.

PRIVACY

[Student privacy](#) is governed by the [Family Educational Rights and Privacy Act \(FERPA\)](#). Students must use their MasonLive email account to receive important University information, including communications related to this class. I will not be able to respond to messages sent from or send messages to a non-Mason email address.

<https://registrar.gmu.edu/ferpa/>

DIVERSITY AND INCLUSION

Diversity is one of George Mason University's core values (Mason Diversity Statement: <https://stearnscenter.gmu.edu/knowledge-center/general-teaching-resources/mason-diversity-statement/>). As instructors of this course, we seek to create a learning environment that fosters respect for all people. We welcome and value individuals and their differences, including gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, age and ability. We encourage all members of the learning environment to engage with the material personally, but to also be open to exploring and learning from experiences different than their own.

GENDER IDENTITY AND PRONOUN USE

If you wish, please share your name and gender pronouns with us and how best to address you in class and via email. You may also choose to update your chosen name and pronouns here: <https://registrar.gmu.edu/updating-chosen-name-pronouns/>

DISABILITY ACCOMMODATIONS

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit <http://ds.gmu.edu/> for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with your instructor. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474

SEXUAL HARASSMENT, SEXUAL MISCONDUCT, AND INTERPERSONAL VIOLENCE

Clearly, none of the above will be tolerated in this course. George Mason University is committed to providing a learning, living and working environment that is free from discrimination and a campus that is free of sexual misconduct and other acts of interpersonal violence in order to promote community well-being and student success. We encourage students who have been sexually harassed, assaulted or subjected to sexual misconduct to seek assistance and support. [University Policy 1202: Sexual Harassment and Misconduct](#) speaks to the specifics of Mason's process, the resources, and the options available to students.

As a faculty member and designated "Responsible Employee," I am required to report all disclosures of sexual assault, interpersonal violence, and stalking to Mason's [Title IX Coordinator](#) per [university policy 1412](#). If you wish to speak with someone confidentially, please contact the [Student Support and Advocacy Center](#) (703-380-1434) or [Counseling and Psychological Services](#) (703-993-2380). You may also seek assistance from [Mason's Title IX Coordinator](#) (703-993-8730; titleix@gmu.edu).

SAFE RETURN TO CAMPUS STATEMENT

All students taking courses with a face-to-face component are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (<https://www2.gmu.edu/safe-return-campus>). Similarly, all students in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. **Only students who receive a "green" notification are permitted to attend courses with a face-to-face component.** If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.

Students are required to follow Mason's current policy about facemask-wearing. As of August 11, 2021, **all community members are required to wear a facemask in all indoor settings**, including classrooms. An [appropriate facemask](#) must cover your nose and mouth at all times in our classroom. If this policy changes, you will be informed; however, students who prefer to wear masks either temporarily or consistently will always be welcome in the classroom.

OTHER USEFUL GMU RESOURCES:

ACADEMIC ADVISING

<https://advising.gmu.edu/>

ASSISTIVE TECHNOLOGY INITIATIVE

<https://ati.gmu.edu/>

CAMPUS POLICE SAFETY ESCORT: (703) 993-2810

<https://police.gmu.edu/programs-and-services/police-cadets/escorts/>

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): (703) 993-2380

<https://caps.gmu.edu/>

DISABILITY SERVICES

<https://ds.gmu.edu/>

PATRIOT LIFT

<https://transportation.gmu.edu/patriot-lift/>

INTERNATIONAL PROGRAMS AND SERVICES

<https://oips.gmu.edu/>

LEARNING SERVICES

<https://learningservices.gmu.edu/>

LESBIAN, GAY, BISEXUAL, TRANSGENDER, QUEER, AND QUESTIONING RESOURCES

<https://lgbtq.gmu.edu/>

OFFICE OF DIVERSITY, INCLUSION, AND MULTICULTURAL EDUCATION

<https://odime.gmu.edu/>

OFFICE OF THE OMBUDSMAN: (703) 993-3306

<https://diversity.gmu.edu/>

The Office of the Ombudsman is a confidential, impartial, informal and independent problem-solving and conflict resolution resource for all students of the George Mason University community.

STUDENT HEALTH SERVICES

<https://shs.gmu.edu/>

STUDENT SUPPORT AND ADVOCACY CENTER

<https://ssac.gmu.edu/>

UNIVERSITY CAREER SERVICES

<https://careers.gmu.edu/>

UNIVERSITY LIBRARIES “Ask a Librarian”

<https://library.gmu.edu/ask>

UNIVERSITY WRITING CENTER: (703) 993-1200

<https://writingcenter.gmu.edu/>

UNIVERSITY POLICIES

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university affairs.

MASON NON-DISCRIMINATION POLICY

<https://universitypolicy.gmu.edu/policies/non-discrimination-policy/>

ADDITIONAL STUDENT SUPPORT RESOURCES

<https://stearnscenter.gmu.edu/knowledge-center/knowning-mason-students/student-support-resources-on-campus/>