

Syllabus for MCB

Microbiology Labs Spring 2024

MCB2000L, MCB3020L, MCB3023L

CONTACT INFORMATION – LAB COORDINATOR

Monika W. Oli, PhD

e-Mail: moli@ufl.edu

(DO NOT CONTACT ME THROUGH CANVAS)

Office: Room 1049, MCS (Microbiology and Cell Science) Building

Office Hours: by appointment

TAs (TEACHING ASSISTANT) FOR EACH SECTION WILL BE ANNOUNCED ON THE FIRST DAY OF CLASS.

Please contact your TAs for any section specific questions! Contact me any time if you have an unresolvable problem with your TAs or specific concerns.

COURSE TIME AND LOCATION

Synchronous during scheduled class times

Labs start during the first week of classes. Labs usually last for all 3 periods! Spring 2023 labs will start the week of Monday January 8th.

MANDATORY PERSONAL PROTECTIVE EQUIPMENT

During each in person lab period, students are required to always wear a lab coat and optional face mask. Both will be provided to the student and will be stored in a personal contained Ziplock bag to be used all semester. You also must wear gloves for many experiments, closed-toed shoes are mandatory, and we strongly recommend wearing long pants or long sweatpants. NO eating, drinking, chewing gum etc. is allowed in the laboratories. Not following these instructions will result in dismissal from class.

Please contact your instructor and Dr. Oli (moli@ufl.edu) or the DRC (Disability Resource Center) if you have any concerns about your health and wellbeing in the microbiology lab

DRC@ufsa.ufl.edu

Textbooks and Required readings

NO LABMANUAL is required. All information, modules and procedures will be posted in CANVAS

WELCOME!

Welcome to the Microbiology Laboratory. In this course, you will learn techniques used in (micro)biology labs and you will realize how microbes affect all aspects of our lives, every day. Many of you will be familiar with some of the topics covered in the lab exercises, but hands-on experience is invaluable to really understand many of the techniques taught. Your TAs and I will work closely with you to ensure that you have a good grasp of the topics and methods covered.

We have incorporated several projects and student-initiated activities into the syllabus as well as student presentations to provide you with a variety of learning experiences. Our ultimate goal is for you to complete the semester with the feeling that microbes are important in every aspect of our lives – and with the notion that you have learned something you can train use for the rest of your life and not just to get an A!

I would like to emphasize that we are here to help you. Your TAs and I hope to see you all during open lab or our office hours (or by appointment), especially if you have questions or need assistance.

Disclaimer: during the semester we may have to adjust the syllabus, grading, deadlines, or protocols. This is done for the benefit of the students to improve learning and adapting to the current situation. Please check with me or your GTA (Graduate Teaching Assistant) if you feel there is a discrepancy between the syllabus and your expectations.

Course Overview

This is an undergraduate laboratory course to learn and explore a variety of microbiological techniques, skills, and concepts. Topics that will be covered include visualization and enumeration of microbes, traditional, molecular, and immunological diagnostic techniques, basic techniques used in parasitology, virology, and mycology. Students will generate, analyze, and interpret data, design, and conduct a small research project and gain experience in technical writing and presentation skills. You will gain awareness about the ubiquity and diversity of microbes and the good and bad roles they play in your everyday life.

Skills & Tools		
ART OF MICROSCOPY	Diagnostic microbiology	
LIFE IN A DROP OF WATER		
GROWING MICROBES	TRADITIONAL DIAGNOSTIC	Global Microbial Issues
YOUR MICROBIOME	MOLECULAR DIAGNOSTICS	
ISOLATING MICROBES	BIOINFORMATICS	
VISUALIZING MICROBES	IMMUNOLOGICAL DIAGNOSTICS	
PIPETTING AND GRAPHING		
DATA ANALYSIS AND BASIC STATISTICAL VISUALIZATION		
ENUMERATION OF MICROBES		
LABMATH		
REFERENCE MANAGEMENT		
		VIROLOGY - THE CURRENT COVID-19 PANDEMIC - VACCINES
		MYCOLOGY - FUNGUS AMONG US
		PARASITOLOGY - MONSTERS INSIDE ME
		CLEAN WATER CRISIS - THE GLOBAL TRAVELER - GLOBAL HEALTH
		FOOD LAB - FERMENTATION REVIVAL
Microbes in the News – Public Health Project – Journal Club - Research project		

WHAT YOU WILL KNOW AT THE END OF THE COURSE

A student successfully completing basic microbiology lab course will demonstrate ability to use, explain and practice...

LABORATORY SAFETY

- 1. Microbiological procedure**, including, proper lab etiquette (hand washing, disinfecting lab Vhes and equipment), follow methods for aseptic transfer, reporting all spills, understanding OSHA’s Blood borne Pathogen Standard, proper disposal of different types of waste, following good lab practice, including returning materials to proper locations, proper care, and handling of equipment
- 2. Protective procedures**, including tying long hair back, wearing personal protective equipment (lab coats, gloves when needed, closed toed shoes); No eating or drinking in the laboratory
- 3. Emergency procedures**, including, locating and safely using emergency equipment, reporting all injuries immediately to the instructor

LABORATORY SKILLS

You will actively perform several important laboratory skills and activities. We try to keep labs current to help you learn skills you can use in industry and research positions.

- 1. Use a compound bright field light microscope to view and interpret slides, properly prepare slides and various stains to visualize microbes and** follow experimental protocols
- 2. Use pipettes** and understand the correct volume and pipette tips to use for each experiment, comprehend accuracy and precision to have a good pipetting technique and understand dilutions
- 3. Safely use aseptic techniques**, to obtain and maintain a pure culture
- 4. Safely use aseptic techniques**, to obtain and maintain a pure culture
- 5. Estimate the number of microbes using dilution techniques, predict how various growth conditions affect the number of life cells, interpret growth curves**

6. Perform and interpret a disk diffusion assay and understand how to test for the effectiveness of variety antimicrobial agents
7. Simulate and interpret an ELISA assay and know techniques how to determine antibody prevalence in a patient's immune response to pathogens;
8. Be able to describe the problem of global water contamination, and understand the prevalence of global occurrence of parasites, perform and interpret a fecal float and conduct water purification methods to prevent water born infections
9. Get a taste how microbes contribute to the production of various foods and drinks and be aware of the importance of a healthy microbiome

And more :)

LABORATORY THINKING SKILLS

1. **Understand and apply the scientific method**, including formulation of a clear, answerable question and hypothesis; research of peer reviewed scientific literature, conduct and execute appropriate experiments with correct controls, evaluate, analyze, and interpret results
2. **Analytical skills**, including collection and organizing data in a spreadsheet, analyze and presenting data in an appropriate form (graphs, tables, figures, or descriptive paragraphs), assessing the validity of the data (means, standard deviation, significance) and drawing appropriate conclusions based on the results
3. **Communication skills**, including preparation of presentations of current topics in microbiology, developing educational materials and presenting lab results or findings to your peers
4. **“Big picture” skills**, including understanding how microbes play a beneficial and detrimental role in our lives and the environment. Students should be able to read and interpret current news and popular literature relating to microbiology and evaluate the scientific merit of the information presented. All students should comprehend that science is not “black and white” and that new scientific findings may alter the interpretation of older dogmas. Finally, students should get a glimpse of how microbes have always shaped history and affect our everyday life in a myriad of ways.

VIMEO VIDEO CHANNEL

Over the years we have created numerous videos in-house that will help you significantly to perform the techniques you are learning in the lab. The UF Microbiology channel is a collection of tutorials, visual aids and educational videos to help spark the interest in microbiology and to teach students the basic skills. All videos were produced in-house and are copy-written by Dr. Monika Oli, faculty at UF.

The videos are used to teach MCB2000L, 3020L and 3023L in the Department of Microbiology and Cell Science at UF. <https://vimeo.com/channels/859405>

Videos for home lab experiments are also available [Microbio home kits and online labs](#)

QUIZLET FLASH CARDS

To help you learn this new language of “microbiology” we created a Quizlet for each module.

<https://quizlet.com/class/2282683/>

You will be prompted for each set of definitions in the different modules. We hope that helps you learn! Quizzes are based on the Quizlets terms and definitions.

GETTING STARTED

Course Correspondence as well as lab exercises, assignments and exams will be available via eLearning Canvas Website <http://lss.at.ufl.edu/>. If you need any help with the eLearning system, please visit the eLearning Help page at <https://lss.at.ufl.edu/help.shtml>. You may also contact the UF help desk at 352-392-HELP, Option 2.

Your section specific site is maintained and administered by your TAs. You are responsible for the material posted in your section. I do not check email in the individual sections!

Furthermore:

1. All students should **check out the “Science Daily – Infectious Disease”** website http://www.sciencedaily.com/news/health_medicine/infectious_diseases/. Some class discussions will be based on current news, and you may use the topics for your public health projects
2. Like the UF Microbiology and Cell Science & ASM (American Society for Microbiology) Gators [@UFMicrobiology](https://www.facebook.com/UFMicrobiology) page for interesting news and current updates; the postings can be part of the class material! <http://www.facebook.com/UFMicrobiology> you can use the topics for your public health projects
3. Please Remember to check the **Announcements** and **Mail** each day in Canvas. “I did not know about the assignment, deadline...” is NOT an accepted excuse. For this course there are two Canvas sites for the course. Your instructor will have his/her own Canvas webpage where section specific information will be posted.
4. Make sure you have a functional **laptop or computer**. We will often do computer-based exercises. Have your cell-phone camera to take pictures of results and observations and your lab results. You will need MS office with Word, Excel and PPT or equivalent. Make sure you have VPN (Virtual Private Network) installed: <http://www.uflib.ufl.edu/login/vpn.html>.
5. All assignments, projects and reports are expected to be submitted electronically through Canvas. Each assignment is processed through **Turnitin.com** and as such is checked for plagiarism.
7. **Attendance is mandatory for the whole class period**. Each day new techniques are taught, and it is easy to fall behind!
8. Got a Question? Please come see us - we are here to help!

Expectations of the students

- **Come to EACH Lab session (unless you are in the UFO section or if you are sick!)** – classes start the first week of the semester

- Read the **Syllabus** to know your deadlines and exam schedules. Your TA however will announce
- specific days for your own section so **PAY ATTENTION!**
- As student, you are expected to fully **engage yourself** in all aspects of the class – take learning in your own hands and do not be a passive participant
- You are expected to **COME PREPARED** to class and have read the assigned reading material and especially watched the introductory videos.
- You are expected to **FOLLOW OUR LAB ETIQUETTE** at all times. Safety First!
- We expect you to **be creative and come up with your own ideas** for many of the activities and projects. Enjoy the opportunity!
- These are **not cookie-cutter labs** and there may not be one correct answer, most of the time you do not lose points if you do not get the exact result!
- Most importantly: **ENJOY THE LAB and appreciate your microbes!**

STUDENT EVALUATION

Student grades consist of a variety of activities, including quizzes, exams, presentations, projects, attendance, and participation. FOLLOWING INSTRUCTIONS - IS A MUST as well as CREATIVITY WILL BE REWARDED. This breakdown may be subject to change by your instructor!

Learning evaluation for labs2

- Attendance and submission of training certificates (10%)
- Electronic Lab Notebook ELN (15%)
- Quizzes (10%) - based on corresponding Quizlets unless otherwise indicated by your instructor
- Discussions (10%)`
- Assignments (5%)
 - Data analysis
 - Quantitative skills
 - Bioinformatics
 - Endnote – reference management
 - Etc.
- Public health project (10%) - teams
- Student research projects (10%) - teams
- Midterm exam – practical exam some oral exam parts, ‘hands on activity’ of skills you learned, interpretation of results, data interpretation and analysis (graphing, lab- & medical math), bioinformatics etc. – case study (you can use a cheat sheet for the exam) (20%). Please note, lab exams CANNOT be taken at the DRC.
- Final knowledge assessment (10%)
- Special class projects and extra credit opportunities (TBD)

Extra credit (no more than 5%)

With the discretion of your TA, you may get some extra credit which can include

- Participation in in class or online discussion
- Bringing/sharing environmental samples for wet mount examination

- Bringing/sharing fecal samples with potential parasite eggs for the fecal float (parasitology) lab
- Bringing/sharing fermented food products for the food lab
- Sharing interesting news and articles about microbiology with your class

Extra Credit Opportunities will be available throughout the semester at the discretion of your TA.

Final Exam - optional

Your optional final exam is determined by your TA and may replace certain % points from another category

GRADING AND FINAL GRADES

We do not curve, and the grading scale will not be adjusted based on class performance. After the registrar allows you to view your final grade. You have 2 weeks to challenge your grade and request a change of grade by contacting Dr. Oli (moli@ufl.edu)

For the course will be based on this grading scale. *For more information, see:* See the [current UF grading policies](#) for more information.

Grading Scale

Percent	Grade	Grade Points
92	A	4.00
90	A-	3.67
88	B+	3.33
82	B	3.00
80	B-	2.67
78	C+	2.33
72	C	2.00
70	C-	1.67
68	D+	1.33
62	D	1.00
60	D-	0.67
<60	E	0.00

Makeup Policy – Late Work

We will work with you if you provide us with a UF accepted excuse for your absence during labs or the exam.

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

We DO accept school and career interviews and tests (MCAT, GRE, DAT) as excused absence - if you provide a written note or invitation BEFORE your absence. You will work with your TA to make up for the missed work.

10% will be deducted for every 24h of late work submission.

Biosafety in the Microbiology Laboratory

We are regulated and inspected annually by the UF Environmental Health and Safety Department, all activities in the microbiology lab are approved by UF EH&S (Environmental Health and Safety). We follow their guidelines - and you follow our instructions - to prevent any accidents and problems with contamination. For more information about the regulations go to:

<http://www.ehs.ufl.edu/Lab/EHSintro.htm>

Safety training is mandatory for the class and more information is provided in your canvas section.

GENERIC WEEKLY SCHEDULE

Depending on which class you are taking your schedule may vary slightly. A detailed schedule for home lab activities will be provided to you by your TA.

Module	INDIVIDUAL LAB MODULES - OVERVIEW	Week
Bioterrorism	UNKNOWN PROJECT - BIOTERRORISM	
Module A	LAB SAFETY AND ASEPTIC TECHNIQUES	
Module B	HISTORY OF MICROBIOLOGY - GREETINGS FROM.....	
Module C	ELECTRONIC LAB NOTEBOOK (ELN)	
Module D	ADOPT A MICROBE - (MY FAVORITE PATHOGEN)	
Module E	PUBLIC HEALTH PROJECT	
Module F	STUDENT INITIATED INDEPENDENT RESARCH PROJECT (SIRP)	
Module 1	ART OF MICROSCOPY	
Module 2	LIFE IN A DROP OF WATER	
Module 3	GROWING MICROBES – FINDING THE CULPRIT	
Module 4	YOUR MICROBIOME	
Module 5	ISOLATING MICROBES	
Module 6	VISUALIZING MICROBES	
Module 7a	PIPETTING AND GRAPHING	
Module 7b	DATA ANALYSIS AND BASIC STATISTICAL ANALYSIS	
Module 8	ENUMERATION OF MICROBES	
Module 9a	LABMATH	
Module 9b	REFERENCE MANAGEMENT	
Module 10	TRADITIONAL DIAGNOSTIC METHODS	
Module 11	MOLECULAR DIAGNOSTICS	
Module 12	BIOINFORMATICS	
Module 13	COMBATING MICROBES – THE POST ANTIBIOTIC ERA	
Module 14	IMMUNOLOGY – DID YOU GET INFECTED?	

Module 15	VIROLOGY - THE CURRENT COVID-19 PANDEMIC	
Module 16	MYCOLOGY - FUNGUS AMONG US	
Module 17	PARASITOLOGY - MONSTERS INSIDE ME	
Module 18	CLEAN WATER CRISIS - THE GLOBAL TRAVELER	
Module 19	FOOD LAB - FERMENTATION REVIVAL	

