

Advanced Microbiology Laboratory – Virology (Online)

MCB 4034L – 1 credit hour

Summer A 2024

Course Summary

This is an upper division laboratory course covering basic virology methods, including propagation and enumeration of bacterial viruses, classification via genetic assays, and both forward and reverse genetic experiments to explore virus-host interactions at the cell surface. Experiments are designed to be done at home using a kit constructed and assembled by the Microbiology and Cell Science department. There are some computational components, but most experiments require the hands-on use of tools, reagents, and microbial organisms. Good sterile technique is essential to avoid contamination and skewed results. Although MCB3020L or MCB3023L is not required, it is assumed that you know some basic lab techniques.

Learning Objectives and Outcomes

After successful completion of this course, students will be able to:

1. Identify and handle bacterial colonies, lawns, and cultures; and bacteriophage plaques and lysates
2. Propagate and enumerate both temperate and lytic bacteriophages in addition to bacteria
3. Extract bacteriophage genomic DNA and perform restriction fragment length polymorphism analyses for classification
4. Perform plaque assays, antibiograms, and forward genetic screens to explore trade-offs involved in phage resistance and susceptibility
5. Implement proper experimental controls, analyze data (via appropriate software if necessary), and interpret and compare results

Course Overview

This course will be exclusively online and asynchronous, meaning there are no required standard meeting times and all material and communications will be on Canvas. The course is organized into modules, with each module being “open” for 5-10 days depending on the duration and number of experiments. The activities and experiments may be completed at any time during the open window, but *it is up to the student to plan their time accordingly* to complete everything by the due date. Most hands-on experiments will take multiple days.

Each module consists of background information, a written guide to the experiments, videos explaining and demonstrating the techniques, and a quiz. The quiz should be taken *before* beginning the module’s activities. After completion, students will upload the corresponding section of their ELN for grading and feedback, and post a summary of their results to the discussion board. As a final assessment, students will write a research paper describing the rationale and methodology for the experiments, along with their results and interpretations. Both a first draft and a final draft will be graded. There are no exams.

Instructor

Dr. Sarah Doore
Office: Microbiology 1003
Phone: 352-846-0953
Email: sdoore@ufl.edu – but *Canvas messages are preferred*

Prerequisites

MCB3020L or MCB3023L are strongly recommended
MCB4503 is not required but strongly recommended

Canvas

All resources will be made available on Canvas. Modules will unlock at 12:01 AM Eastern time on the start date referenced in the schedule below, with assignments due at 11:59 PM on the end date. *Please check Canvas regularly for updates.* Communication will also be done primarily through Canvas announcements or the discussion board. Use the discussion board for any questions about the lab: rationale, background information, techniques, weird results, etc. Each module will have a corresponding discussion board post for compiling results. Part of the fun of labs is comparing your results to your peers' – even (or especially) if you found something different! Replying to other comments is not required but is strongly encouraged.

Note: You will need to complete the module “START HERE” before the rest of the course unlocks. This includes uploading biosafety training certificates and going through the introductory information.

Office Hours

Dr. Doore will be available from *12-2 PM Eastern time on Wednesdays* in the Zoom room. If an appointment is needed, send a Canvas message with three suggested times and Dr. Doore will pick one.

Scheduled office hours are held here:

<https://ufl.zoom.us/j/94002872481> PW: Phage

Textbook

There is no required textbook for this course.

THE BOX

Problems

If there is an issue with the box you receive (contamination, missing or broken items, etc), please email Dr. Doore (sdoore@ufl.edu) and/or Robbie Stinson (rjstinson@ufl.edu) to request a replacement *as soon as possible*.

Return Policy

Please return all items marked in **bold** on the packing list and materials list at the end of the course. You can also return any extra materials (plastics, media, etc.) if you wish. Your grade will not be released until we have evidence that your box is in the mail.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Each student will need MS Office (Mac or PC) installed on their computers or be able to access these programs. Similar graphing programs are available for iPads and tablets. There will also be several activities requiring an active internet connection.

Microsoft Software for UF students can be downloaded at <http://www.software.ufl.edu/>
To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392- HELP(4357). Once the media is available, you can get it at the UF Computing Help Desk or at the UF Bookstore.

Software training opportunities are available at <http://www.lynda.com/member.aspx>

Assessments

There will be 3 types of assessments in this course.

1. Each module will be accompanied by a quiz that should be taken *before* you conduct the experiment to ensure you understand the rationale, methods, and potential outcomes. You can take these quizzes up to five times; only the highest score will be counted. The main purpose of these quizzes is just to make sure you have all the background information.
2. Once you have completed the module's activities, you will upload the relevant sections of your electronic lab notebook (ELN), which include your results and interpretations. Your results should also be posted to the discussion board so the class can share and compare results.
3. There will be a final research paper that describes your findings from the first several weeks of the course. Both a first draft and the final draft will be graded.

In terms of points, the breakdown for each of these assessments is:

Assessment	Points
Intro assignments	10 points
Quizzes	60 (10 points each)
ELNs	240 (40 points each)
Discussion board – results	60 (10 points each)
Research paper – first draft	40
Research paper – final draft	90
Total available points	500

Grading Scale

A	465 points or above (93% or above)	D+	320-339 (64.0 – 67.9%)
A-	445-464 (89.0 – 92.9%)	D	300-319 (60.0 – 63.9%)
B+	425-444 (85.0 – 88.9%)	D-	285-299 (57.0 – 59.9%)
B	405-424 (81.0 – 84.9%)	E	284 or below (56.9% or below)

B-	390-404 (78.0 – 80.9%)
C+	375-389 (75.0 - 77.9%)
C	355-374 (71.0 – 74.9%)
C-	340-354 (68.0 – 70.9%)

Grades and Grade Points

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Attendance Policy

Excused absences and extensions or make-up of missed work will follow UF policy. Further information regarding class attendance and make-up exams, assignments and other work can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

The Honor Code

The university honor code states: “By becoming a member of the University of Florida community, a Student agrees to adhere to its Student Honor Code and its Student Conduct Code. ... The University principles address our respect for people and property, for fairness, for Laws and Regulations, and for

academic integrity.” The honor code requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior. Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court.

(Source: The Orange Book, Accountability Expected; Undergraduate Catalog)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor. This policy will be vigorously upheld at all times in this course.

Campus Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. Both the Counseling Center and Student Mental Health Services provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health Services is located on the second floor of the Student Health Care Center in the Infirmary.

- University Counseling Center, 301 Peabody Hall, 392-1575, www.counsel.ufl.edu
- Career Resource Center, CR-100 JWRU, 392-1602, www.crc.ufl.edu/
- Student Mental Health Services, Rm. 245 Student Health Care Center, 392-1171, www.shcc.ufl.edu/smhs/

Alcohol and Substance Abuse Program (ASAP)

Center for Sexual Assault / Abuse Recovery & Education (CARE) Eating Disorders Program

Employee Assistance Program

Suicide Prevention Program

Accommodations

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. 0001 Reid Hall, 392-8565, www.dso.ufl.edu/drc/

Course Schedule

Module	Start	End	Description	Assignments
1	5/10	5/17	Introduction*, working with bacteria and phage	ELN and results post #1 due 5/19
2	5/15	5/22	Growth curves of bacteria and phage, lysogeny and induction	ELN and results post #2 due 5/23
3	5/17	5/27	Mystery phage characterization: growth and genome extraction	ELN and results post #3 due 5/29
4	5/24	6/3	Mystery phage characterization: genetics and restriction fragment length polymorphisms	ELN and results post #4 due 6/5
	5/27	6/3	Research Paper: First Draft	First draft due 6/3 11:59 PM
5	5/31	6/10	Host membranes and virus receptors	ELN and results post #5 due 6/12
6	6/7	6/17	Selective pressures and evolution in action	ELN and results post #6 due 6/19
	6/10	6/19	Research Paper: Final Draft	Final draft due 6/19 11:59 PM

Modules open at 12:01 AM Eastern time on the Start date

Modules close at 11:59 PM Eastern time on the End date

For example, Week 1 activities will unlock as soon as registration closes, on 5/10 at 12:01 AM and the associated assignments will be considered “on time” until 5/17 at 11:59 PM. Late submissions will receive a penalty of 10% for each missed day, up to a maximum of 50%.

* You will need to complete the module “START HERE” before the rest of the course unlocks. This includes uploading biosafety training certificates and going through the introductory information.