BIOLOGY 111L LABORATORY SECTIONS 01 FALL 2024

PHAGE HUNTERS: INTRODUCTION TO LABORATORY RESEARCH

INSTRUCTORS: Lawrence Blumer, Ph.D.
Office: 302 Hope Hall
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470 639-0283
CRN 50533 Meeting in 201 Hope
Monday and Wednesday 15:00-16:50

COURSE TEXTS: **Phage Discovery Guide**. (pdf on course BlackBoard website)

A Student Handbook for Writing in Biology, 3rd edition (2009) or 4th edition (2013) by Karin Knisely; Sinauer and Freeman Publishers (available on Amazon)

Bound composition notebook
3-ring binder for laboratory handouts

CREDIT HOURS: This laboratory is part of the BIO 111 course and counts for 40% of your grade. You must also be registered for a lecture section of BIO 111 to complete this course.

DESCRIPTION AND ORGANIZATION

This is the laboratory component of BIO 111 Cell and Molecular Biology. In this semester, you will isolate and characterize a bacteriophage (phage) that you isolate from soil. The design and content of this course is based on a Course Based Undergraduate Research Experience model developed by the Howard Hughes Medical Institute in collaboration with colleges and universities around the United States. This method of learning and teaching has been found to yield significant improvements in the learning and performance of students. We look forward to starting each of you on a very successful academic program.

COURSE OBJECTIVES

1. The ability to interpret data and scientific charts, and to create tables and graphs that meaningfully conveys information.
2. Describe and interpret the importance of bacteriophages and their role in bacterial ecology and evolution.
3. Keep detailed and accurate laboratory notes.
4. Prepare and present concise research seminars using PowerPoint slides.
5. The ability to determine appropriate controls to validate the experiment.
6. Produce clear and concise written assignments and a Laboratory Research Paper.
7. The ability to perform the basic techniques of Molecular Biology, such as PCR.

Week	Activities	Readings PRIOR to class
1	Laboratory safety	
	Introduction to phage hunting and phage biology	Introduction, Lab Basics, pages 1-19

	How to navigate laboratory manual How to use a micropipetter Soil sample collection kit Use Google Earth Visit Phagesdb.org	Phage Isolation, Collecting Environmental Samples, pages 56-65 Determine latitude and longitude of Hope Hall or NMM
2	Laboratory Notebook Check Aseptic technique Set-up enrichment cultures Proper notebook protocol Phage biology review Pipet practice and challenge Making serial dilutions Spot tests of enrichment cultures	 Preventing Contamination and Aseptic Technique Exercise, pages 15-19 Enriched Isolation, pages 74-79 Phage Basics and Host Basics, pages 20-32, 52-54 Spot Test, pages 79-83
3 **No lab meeting this week**	Review phage biology Review serial dilution process	Take practice Phage Biology quiz Take practice Serial Dilution quiz
4	Check for plaque development Pick plaques and begin purification by serial dilutions	Plaque Assay and Picking a Plaque, pages 66-74 Plaque Assay for Purification and Serial Dilutions, pages 83-94
5 to 7	Serial dilution purification Three purifications needed	Scientific Method Readings Properties of Life Readings Virus Readings Tuberculosis Readings
8 to 9 **No lab meeting Monday 7 Oct**	Titer Purified Phage Photograph Plaques Prepare Intermediate Lysate	 Collecting Plate Lysates, pages 95-98 Full Plate Titer, pages 104-107 Taking Plaque Photographs, pages 198-200
9 to 10	Prepare High Titer Lysate (HTL) and document titer Submit Phage Name for Review by Instructor Extract Phage DNA once HTL is harvested Begin Archive of HTL	Phage Amplification, pages 108-123 Extracting Phage DNA, pages 138-145 Archiving Phage Sample, pages 121-123

11	Approval of Phage Names Entering Phage information in Phagesdb.org	Actinobacteriophage Database, pages 117-120
12	Characterizing Phage DNA	
13	Characterizing Phage DNA Choose Phage DNA to send for sequencing	
14	Archive phage lysate and genomic DNA samples Prep Time for Presentations	
15	Final Presentation and Final Report	
16	Final Presentation and Final Report	

EVALUATION

Your grade will consist of the following parts:

40% - Class Attendance
25% - Laboratory Notebook Completeness
10% - Oral presentations
15% - Writing Assignments, Homework and Quizzes
10% - Final Laboratory Report

GRADING SYSTEM OUTLINE

A = 90 - 100	C+ = 75 - 77
A- = 88 - 89	C = 70 - 74
B+ = 85 - 87	C- = 68 - 69
B = 80 - 84	D+ = 65 - 67
B- = 78 -79	D = 60 - 64

CLASS ATTENDANCE

Students are expected to attend each class meeting. Students with more than 3 unexcused absences will be referred to the Office of Student Success and may be administratively withdrawn from the course. Failure to meet minimum attendance requirements may result in the loss of the student's financial aid in accordance with federal financial aid requirements. You must inform Dr. Michael Turner (Associate Dean of Students) michael.turner@morehouse.edu if you are unable to attend class due to illness.

If you are absent from class, it is your responsibility to make up scheduled work missed because of an officially excused class absence. Any unexcused absence will result in a reduction of 1 letter grade in the course. Official excuses from Dr. Turner for absences must be presented to your instructor within five days of returning to class.

Inclement Weather Policy

In the event of inclement weather, the College will announce any closures via the emergency notification system and/or through local news outlets. Absent an official closure, students are not excused from attending class due to weather and any absences will be considered unexcused.

WRITING ASSIGNMENTS

There will be frequent short writing assignment in this course that will count for 15% of the course grade. These assignments will typically be assigned in class on Wednesday or Thursday and will be due before class the following Monday or Tuesday each week. Unless otherwise instructed, all writing assignments must be submitted via Blackboard as a typed, double-spaced document using 12pt font.

CLASSROOM ACCOMMODATIONS

Morehouse College is an equal opportunity employer and educational institution. Students with disabilities or those who suspect they have a disability must register with the Office of Disability Services ("ODS") in order to receive accommodations. Students currently registered with the ODS are required to present their Disability Services Accommodation Letter to faculty immediately upon receiving the accommodation. If you have any questions, contact the Office of Disability Services, 104 Sale Hall Annex, Morehouse College, 830 Westview Dr. S.W., Atlanta, GA 30314 (404) 215-2636.

ACADEMIC HONESTY

Morehouse College students are expected to conduct themselves with the highest level of ethics and academic honesty at all times and abide by the terms set forth in the Student Handbook and Code of Conduct. Instances of academic dishonesty, including, but not limited to plagiarism and cheating on examinations and assignments, are taken seriously and may result in a failing grade for the assignment or course and may be reported to the Honor and Conduct Review Board for disciplinary action.

Although much of the work we do in this course may require that we pool data and construct a single class data set, each of you is expected to do your own work on all assignments, in-class quizzes, take-home quizzes, and all writing assignments. You will be expected to make your own figures and tables and write your own prose for these assignments.

Copying or paraphrasing someone else's prose (from a fellow student or a published reference), using someone else's figure or table (even if it is based on the same data as a figure or table you could make) or submitting someone else's work or writing generated by AI as your own is plagiarism. Giving a literature citation is not sufficient. We require that you submit work that you have written yourself in your own words. Papers with long quotations (even if fully referenced) will not be accepted. Leaving your work on a laboratory computer hard-drive so other students may freely copy that work is not advised, as it will result in accusations of plagiarism against both the honest and dishonest students. At a minimum, plagiarism will result in a failing grade and a report to the Dean of Students.

A syllabus is not a contract between instructor and student, but rather a guide to course procedures. The instructor reserves the right to amend the syllabus when conflicts, emergencies or circumstances dictate. Students will be duly notified.