

Fall 2025

Millyard Scholars Program, Dept. of Life Sciences,  
University of New Hampshire, Manchester



# BIOL 413.LM1:

## PHAGE DISCOVERY LAB

**Instructor:** Dr. [Kyle MacLea](#)\*

**Office:** Room 559 (right across the hall from lab!)

**Office Hours:** Fridays 1pm-2 pm and always by appointment. From time to time these office hours may move online; also, drop in to my office anytime!

**Lab (Rm 560):** M/W, 1:10pm-3pm

**Teaching Assistant:** [Brilia Foo](#)

## COURSE DESCRIPTION

This course is the **first Millyard Scholars laboratory experience** in the **Principles of Biology course**! It is the (0-credit) co-requisite course for students taking BIOL 413 that are in the Millyard Scholars program. It aims to give you a REAL scientific experience, making real scientific discoveries, and practicing not only your technical skills but also your scientific communication skills!

This course has been developed to implement SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science), the first of a two-semester, **discovery-based undergraduate research course** that begins with simple digging in the soil to find new bacterial viruses but progresses through a variety of microbiology techniques to purify and characterize the viruses and eventually to complex genome annotation and bioinformatic analyses. By finding and naming their own bacteriophages, students develop a sense of **project ownership** and carry out a **personal research project**.

## COURSE OBJECTIVES: *Students will...*

- (1) Describe the biology and genetics of phage and their lifecycles.
- (2) Explain the experimental processes associated with isolating and characterizing phage.
- (3) Develop microbiology lab and research skills to study phage.
- (4) Evaluate and analyze data generated from experiments and make hypotheses about these results.
- (5) Develop written and oral presentation skills and distill their results into a final poster presentation.

## REQUIRED MATERIALS

### LAB MANUAL:

<https://seaphagesphagediscoveryguide.helpdocsonline.com/home>

## COURSE PAGE

<https://mycourses.unh.edu/courses/137363>

### Modules contain:

- All course materials, including:
  - Syllabus
  - PowerPoint or other presentations
  - Handouts
  - Lab content
  - Useful websites and videos

## LAB ESSENTIALS

**Lab Coat** (Micro Lab Only)

**Protective Eyewear** (Provided)

**Paper Notebook** (Provided)

**Laptop Computer or Tablet**

### \* CONTACT INFO

[kyle.maclea@unh.edu](mailto:kyle.maclea@unh.edu)  
603-641-4129 (office)  
603-815-1556 (cell)

*Email is best, text next!  
Allow some time for response, especially when school is closed!*

## COURSE REQUIREMENTS and ASSESSMENTS OVERVIEW:

The lab grade is a total of **135 points** made up of the categories shown at the right.

The lab grade is incorporated into your **overall BIOL 413 grade** by the instructor of that course, Dr. Halpin.

10 points are deducted for each missed lab that is not for an excused absence. Missing more than two labs may result in failure of the lab.

### **Daily Preparation**

It is expected that students will read (or view videos) of all background information, lab introductions and protocols prior to the beginning of each lab. In addition, lab notebook entries should be started for each day prior to entry into lab.

Method of Evaluation	Point Value
Homework: Math Packet	10
Lab Citizenship and Demonstration of Benchmarks	25
Quizzes (5 pts ea)	15
Lab Notebook Upkeep	25
2 Journal Club Article Annotations, Questions, and Discussion (10 pts ea)	20
Attendance and Biosafety Training	10
1-2 Lab Meeting Presentations	10
Final Poster / Presentation	20

### **Homework: Math Packet**

At the start of the semester, you will work on math problems that are important to your research in this lab course. It is expected that you complete the packet on your own to optimize your learning. A math quiz will follow.

### **Lab Meeting Presentations**

Once or twice during the semester, you will prepare an informal 3-5 minute class presentation of your research progress by describing your clearly labeled data on a couple of PowerPoint or similar slides or by describing your science poster.

### **Lab Benchmarks / Library Session / Lab Citizenship & Surveys**

Each class, I will take lab attendance. Throughout your time in lab, I will also take note of your engagement with your classmates, your completion of lab jobs (be an integral team player, not a sideline observer; there are many roles that one can take in each stage of the process), and your overall improvement in skills as the semester progresses. I will also follow your progress through your lab notebook upkeep throughout the semester.

### **Journal Clubs**

Two phase biology research articles will be read by the class. Student assignments associated with the readings will include article annotations, figure annotations, discussion questions, and data presentation.

**Final Lab Poster & Presentation:** *poster due for printing by 11/24, Winter Symposium presentation is 12/4, usually 4-6pm*  
Projects will be presented at the Winter Symposium through a poster and through an in class Powerpoint Presentation in which each student must present scientific content.

## LEARNING AND HELPFUL RESOURCES

### **Knack Peer Tutoring**

Knack is a peer-to-peer tutoring platform available to all enrolled students for all undergraduate courses in Durham and Manchester and is offered at no charge to students. Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. UNH has partnered with Knack to provide students with access to verified tutors who have successfully completed your course. To view available tutors, visit: [unh.joinknack.com](http://unh.joinknack.com). Sign in with your student account. *Questions about Knack Tutoring can be sent to Stephanie Kirylych, Director of Advising, at [stephanie.kirylych@unh.edu](mailto:stephanie.kirylych@unh.edu).*

### **Student Accessibility Services (SAS) – Manchester**

According to the Americans with Disabilities Act (as amended, 2008), each student with a disability has the right to request services from UNH to accommodate his/her/their disability. If you are a student with a documented disability or

believe you may have a disability that requires accommodations, please contact Student Accessibility Services (SAS) located on the Manchester campus in the Student Services Suite (Office 405A). Accommodation letters are created by SAS with the student. Please follow-up with your instructor as soon as possible to ensure timely implementation of the identified accommodations in the letter. Faculty have an obligation to respond once they receive official notice of accommodations from SAS but are under no obligation to provide retroactive accommodations. For more information refer to [www.unh.edu/sas](http://www.unh.edu/sas) or contact SAS at 603.862.2607, 711 (Relay NH) or [sas.office@unh.edu](mailto:sas.office@unh.edu).

### **Student Wellness Support- Mental Health Services**

In partnership with The Mental Health Center of Greater Manchester, UNH Manchester offers consultation visits on campus and virtually during the academic year with a mental health counselor Monday-Thursday. Students can make counseling appointments directly through an online scheduling system located on the [UNH Manchester Wellness page](#).

Services include:

- Free confidential screening & consultation with a licensed mental health therapist.
- Referrals to mental health or substance misuse treatment.
- And assistance in understanding how to afford additional treatment (with or without insurance!) or find free services.

### **Basic Needs Resources:**

UNH has many resources that can help students who are experiencing food insecurity, housing or other financial concerns. All enrolled students are eligible for Basic Needs resources and services. A complete listing of university and local basic needs resources can be found on the [UNH Manchester Basic Needs webpage](#). The following UNH resources students are referred to most frequently are listed below:

**The Student Emergency Financial Assistance Fund (SEFA)** provides UNH undergraduate and graduate students unable to meet essential expenses due to a temporary or unexpected hardship with short-term financial assistance once per academic year. *Please note that funding is currently limited due to high demand and UNH had to **pause funding for graduate students at this time**.* We encourage graduate students to schedule a time to meet with the Basic Needs team to discuss their options and connect them to additional resources at [basic.needs@unh.edu](mailto:basic.needs@unh.edu).

UNH received a grant from Granite Edvance to support our Student Emergency Financial Assistance program specifically for undergraduate students.

To request SEFA students must complete the [Student Emergency Financial Assistance Request Form](#).

**UNH Manchester Wildcat Cupboard**, located on the second floor, Room 290, is available to all UNH Manchester undergraduate and graduate students, staff or faculty who need access to free, nourishing food. There are an assortment of items including pasta, canned food, cereal, milk, eggs, fresh fruits and vegetables, which are purchased from the NH Food Bank through a grant or donated by members of the community. The Cupboard is open Tuesdays and Thursdays from 12:30-3:30 pm and Wednesdays from 3:00-6:00 pm. Walk ins are welcomed and no appointments are needed.

**The UNH Manchester Wildcat Wardrobe** provides students with access to new and gently used professional attire for interviews, career fairs, networking events, and the workplace. Students can visit the Wildcat Wardrobe, located on the second floor in Room 288 (next to the Wildcat Cupboard) Monday-Friday from 9-5 pm. Items are completely free.

**Confidentiality and Mandatory Reporting.** The University of New Hampshire and its faculty are committed to assuring a safe and productive educational environment for all students and for the university as a whole. To this end, the university requires faculty members to report to the university's Title IX Coordinator (Bo Zarycky, [Bo.Zarycky@unh.edu](mailto:Bo.Zarycky@unh.edu), 603-862-2930/1527 TTY) any incidents of sexual violence and harassment shared by students. All employees are subject to this mandatory reporting. If faculty or staff wish report an incident while on campus they can speak with Manchester's Title IX Deputy Intake Coordinator and Assistant Dean Lisa Enright 603-641-4336. Lisa's office is located on the second floor in the Library and Engagement Center, Room 236.

If a student wishes to speak to a confidential support service provider who does not have this reporting responsibility because their discussions with clients are subject to legal privilege, here is a list of confidential service providers. Including a statement of confidentiality and mandatory reporting along with links of supports for students is important for helping our community stay in compliance with Title IX, as well as living up to our commitment of building a safe community for everyone:

[The SHARPP Center for Interpersonal Violence Awareness, Prevention, and Advocacy](#) at (603) 862-7233/TTY (800) 735-2964. SHARPP's Expanded Services Coordinator, Caroline Young, is available to meet virtually year-round Mondays-Fridays 9am-4pm and is on Manchester's campus Mondays during the Fall and Spring semesters (in Room 471). If you'd like to book a confidential appointment with her [schedule an appointment here](#). SHARPP Advocates are also available 24/7 via our Crisis Line: 603-862-SAFE (7233).

[REACH Crisis Services](#): 24/7 Support Line: 603-668-2299. SMS/Text (M-F 8:30 AM-5:00 PM): 603-836-9620.

For more information about what happens when a student reports, how the university treats your information once a report is made to the Title IX Coordinator, your rights and reporting options at UNH (including anonymous reporting options) [please visit student reporting options](#).

The [uSafeUS](#) app is also available for students to keep reporting options and resources easily accessible on their phones.

Help us improve our campus and community climate. If you have observed or experienced an incident of bias, discrimination or harassment, please report the incident by contacting the Civil Rights & Equity Office at [UNH.civilrights@unh.edu](mailto:UNH.civilrights@unh.edu) or TEL # (603) 862-2930 voice/ (603) 862-1527 TTY /

**Library:** The UNH Manchester librarians are available to assist you with the research process. Visit our website at <https://cps.unh.edu/library> to explore library services and search for reliable academic sources. You can also contact the library at 603-641-4173 or [unhm.library@unh.edu](mailto:unhm.library@unh.edu).

Helpful links for students:

- **Make a Research Appointment:** <https://libraryguides.unh.edu/remotearchive/researchhelp>
- **Library Search Box:** [https://libraryguides.unh.edu/librarysearchbox\\_unhmanchester](https://libraryguides.unh.edu/librarysearchbox_unhmanchester)
- **Reserve a Study Room:** <https://cps.unh.edu/library/support-services>
- **Citing Sources:** <https://libraryguides.unh.edu/unhmcitingsources>
- **Evaluating Sources:** <https://libraryguides.unh.edu/ENGL401UNHManchester/evaluatingresources>

### **Connors Writing Center (CWC)**

The [Connors Writing Center](#) offers one-on-one writing conferences to current UNH students (undergraduate and graduate). They work with writers from all disciplines on many kinds of writing. Our conferences are conducted by trained writing assistants who are UNH undergraduate and graduate students. The CWC offers both in-person and virtual appointments, available to any current UNH student. The online sessions are synchronous (real-time) appointments designed to help students have one-on-one conversations about their writing at any stage of the process, mirroring what we do during in-person appointments. [Students can schedule an appointment](#) any time during the semester.

### **Online Writing Lab (OWL)**

The [Online Writing Lab \(OWL\)](#) assists students via asynchronous remote collaboration with qualified writing assistants. The OWL is not an editing or manuscript preparation service. Feedback may include reference to mechanics on the submitted paper, but it will be targeted to bring attention to patterns and issues to help the writer self-correct the paper and carry forward lessons to improve future writing. Students in all fields of study can submit up to 20 double-spaced pages of any form of writing, including course papers, resumes, creative essays, or personal statements. Within 3 business days, writing assistants provide feedback that can be printed or viewed on screen. The OWL is accessible through any computer that has an Internet connection and Microsoft Word.

To submit a paper, students can sign in at [unh.mywconline.com](http://unh.mywconline.com) and select the "Online Writing Lab" schedule.

### **Academic Honesty:**

The Biology/Biotechnology Programs at UNH Manchester will strictly adhere to the [University policy on academic honesty](#), as published in the UNH Student Rights, Rules, and Responsibilities Handbook. It is imperative that you review this policy to understand the rules and responsibilities about honest, academic integrity, plagiarism, and cheating. By turning in any piece of work in this course, you declare that you have read and understand the policy, and that you did not engage in any form of academic dishonesty as defined in the Handbook.

*Plagiarism* can take many forms, such as: submitting someone else's work - in whole or in part - as your own; collaborating on answers for individual homework assignments or allowing your own work to be used by another student; copying information from a web site or other text without proper documentation; buying a pre-written paper or lab report. Computer-generated content may be helpful in preparing drafts, but should be used with caution. (See AI policy, below.)

Your assignments submitted through Canvas will be routinely screened for plagiarism using sophisticated software. It is strongly recommended that you complete the [Tutorial on Plagiarism in order to fully understand the definition\(s\) and all forms of it.](#)

*Cheating* is mainly concerned with copying on quizzes, exams or in lab, bringing crib notes into an exam or referring to notes or the textbook or any other source such as a programmable calculator, tablet, or cell phone during an exam. All electronic devices must be turned off and placed upside down on the table in front of you for the duration of any exams or quizzes. Ear buds are not permitted.

Any instances of cheating or plagiarism will result in consequences that can range from a failing grade on the assignment for all students involved to dismissal from the University, as defined in the UNH Student Rights, Rules, and Responsibilities Handbook.

AI/LLM (ChatGPT, Gemini, etc.) use is allowed for preliminary research or brainstorming within the Program. However, it is important to note that academic citation and source generation by AI tools is particularly problematic given evidence that these tools often invent citations even when they claim they are not doing so.

We highly value independent critical thinking and problem-solving skills and thus AI/LLM use is not allowed within the Program to generate answers or complete assignments. All use of AI/LLMs must be disclosed, including grammar polishing. In that case, the original unpolished version of the assignment must also be submitted along with the final version. Use of AI without disclosure is considered plagiarism.

## Attendance

Class attendance is important for your learning. Attendance in this course is mandatory. You are responsible for all course assignments and meeting all deadlines unless exceptions are agreed upon with the instructor ahead of time. If you need to miss class for a planned activity, let the instructor know ahead of time by email.

- Attendance will be noted during every lab section. If you must miss a lecture class for a valid reason (e.g., illness), please contact me (by email in advance) to let me know. Excessive absences (two or more) from the laboratory will result in a reduction in your lab final grade.
- It is your responsibility to get all lecture and lab material to make up what you have missed during any absence. Also, be sure to check MyCourses/Canvas for relevant PowerPoints, handouts, assignments, etc.
- See the [Attendance and Class Requirements policy](#) in the SRRR.
- If a student needs accommodation for a religious or cultural holiday/observance, that student is encouraged to make that request as early in the semester as possible.

## Classroom Conduct

- o *Cell phones:* Please silence and put away your cell phone before you enter the lab classroom. For this lab, in some cases, you can use your phone to document your results. Thus, you may bring it into the lab, but keep it in a secure (CLEAN) location, until you are ready to take the pictures – *i.e.*, you don't want to spill bacteria or soil samples on it! Thus, keeping it in a zip lock bag is a good idea.
- o *Computer Use:* You may want your laptop in the lab to document your lab progress or reference protocols for your written lab notebook. Be sure that you are careful to have it off to the side of your working area and that you wipe down computer surfaces prior to leaving the lab!

## Lab Conduct

- o *Food:* There is a strict policy of **NO** food or drinks in the laboratory.
- o You must wear close-toed and closed-heel shoes, long pants (or long skirt), a lab coat and protective eye wear/goggles at **all times** while we are doing experiments in the lab. Tie back long-hair as well.

**Credit Hour Policy:** This syllabus reflects the federal definition of a credit hour, which entails a minimum 3 hours of engaged time per week per credit over a 15-week semester. Examples of engaged time include class time, assignments, examinations, laboratories, participation in course-related experiences (attending a talk or performance, speakers and events, fieldwork, etc.), conferences, and office hours. Student work reflects intended learning outcomes and is verified through evidence of student achievement. For more information, please see [NECHE's Policy on Credits and Degrees](#).

**Types of Assessments Used:** Writing reflections and technical reports (turned in online), In-class participation in Winter Symposium and lab meetings including giving in-class presentations and peer review, evaluation of work in the academic laboratory, in-class participation, laboratory notebook writing, and worksheets of math and scientific communication.