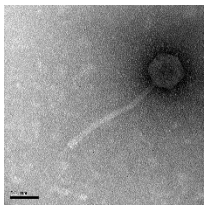
Molecular Microbiology Research Laboratory – Fall 2025
BIOL 3901
Science Education Alliance-Gene-function Exploration by a Network of Emerging Scientists (GENES)



LSC A217, Tuesdays & Thursdays, 10:00 – 11:50 am, and other times as needed

INSTRUCTOR: **Dr. Mauricio Antunes (he/him/his)**
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ONLINE TEXTBOOK: **"GENES Research Guide" – by the Howard Hughes Medical Institute (https://seagenes.helpdocsonline.com/home)**

The ***G****ene-function* ***E****xploration by a* ***N****etwork of* ***E****merging* ***S****cientists (GENES)* experience at UNT is offered in association with the Howard Hughes Medical Institute's Science Education Alliance (SEA). GENES is an undergraduate research experience in molecular biology and microbiology for undergraduate students.

This course is structured to build on the discoveries of the SEA-PHAGES program (BIOL 1750 and BIOL 1755), where you will continue to gain research lab experience by exploring how bacteriophage proteins affect the phenotypes of their bacterial hosts, followed by experiments to elucidate which host proteins these bacteriophage proteins interact with. Experiments will include PCR amplification and cloning of bacteriophage genes, plasmid purification and bacterial transformation, as well as assays for bacterial cytotoxicity and protein-protein interactions. The projects developed in this lab may potentially result in peer-reviewed publications in scientific journals, with authorship attributed to the students involved in the research.

Due to the nature of experimental research, the course syllabus for this laboratory will be more flexible than in a normal course. **Attendance is required** at all scheduled laboratory meetings and **on-time arrival** is critical. Excessive absences or tardies may result in grade

reduction. In addition, students should expect to attend **additional open laboratory times** as needed each week depending on the progress of their particular samples.

Laboratory Goals

The goals for this course are as follows. Each student will:

- Be proficient at microbiological techniques necessary to cultivate bacteria.
- Use Polymerase Chain Reaction (PCR) to amplify bacteriophage genes.
- Clone genes into plasmid vectors for protein expression.
- Transform bacterial hosts with plasmids for expression of bacteriophage proteins.
- Determine the possible toxicity and/or defense effects of bacteriophage proteins expressed on bacterial hosts.
- Based on the cytotoxicity and defense assays, students may discover novel (*i.e.*, previously unidentified) functions of bacteriophage genes, which may result in publishing of a scientific article.

Students with disabilities

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, please see the Office of Disability Access website at http://www.unt.edu/oda. You may also contact them by phone at 940-565-4323.

General Lab Safety

- No eating or drinking.
- No open-toe shoes.
- Never work alone in a lab.
- Tie back long hair.
- Avoid wearing baggy clothing.
- Never leave a lit Bunsen burner unattended.
- Keep workspace clear of clutter.
- Minimize loud talking and distractions.

- Know the location of fire extinguishers, emergency eye-wash stations, and emergency showers.
- Properly dispose of waste generated from an experiment. Not everything can go down the drain or in a garbage can.
- No mouth pipetting!
- Wear gloves at all times when in the lab.
- Face coverings (masks, face shield) are optional.
- Clean your workspace when you come in and before leaving the lab.
- **Wash your hands when you come in and before leaving the lab.**
- **Lab bench seating will be assigned on the first day of class and will be fixed for the entire semester.**
- **If you are not sure, ask first!**

Grading

Your course grade will consist of the following elements:

15%	**Running electronic notes document (Lab Notebook)**
30%	**Data Cards**
10%	**Mid-term Exam**
15%	**Concept Quizzes (3 x 5% each)**
20%	**Final Class Presentation (8-10-minute presentation detailing semester's work)**
10%	**Archiving of samples***
100%	**Overall % Grade** ***(Letter grades will be assigned on a typical scale:*** ***>90 = A; 80-89 = B; 70-79 = C; 60-69 = D; <60 = F)***

*Must be received to obtain passing grade in course

UNT Policies

Academic Integrity Policy: Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

ADA Policy: UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website (https://disability.unt.edu/).

Prohibition of Discrimination, Harassment, and Retaliation (Policy 16.004): The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct, and investigates and takes remedial action when appropriate.

Emergency Notification & Procedures: UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

Tentative Schedule of Labs

The weekly labs will follow the SEA-GENES Course Flowchart posted on Canvas, and the schedule will be dependent on students' progress of individual experiments.