BIOL 3900: Advanced Research in Life Sciences
iCURE:Systems and Synthetic Biology

Spring 2026 LIFE A217/218; Tues/Thurs 12:30-3:20PM

Instructor: Dr. Calvin A. Henard, Office SRB 132, 940-565-3280, calvin.henard@unt.edu

Teaching: Spencer Lee, BMB Ph.D. candidate, SpencerLee@my.unt.edu
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Objective

The objective of this course is to provide undergraduate students the opportunity to conduct research in the areas of molecular microbiology and synthetic biology. The research course this semester will be focused on optimizing previously developed CRISPR interference genomics tools for use in non-model bacteria, with a focus on methanotrophic bacteria. The optimization will entail iteratively building a synthetic promoter library to drive expression of (d)Cas9 and the sgRNA, which will be tested in the methanotroph Methylococcus capsulatus to identify optimal (d)Cas9/sgRNA expression for gene editing or transcription inhibition by Cas9 or dCas9, respectively, in this microbe.

This course is based on real-world experimentation and will provide first-hand knowledge of the process of scientific discovery **with its triumphs and frustrations**. Students will be part of research teams and responsible for their own experimental results. It is expected that findings from student research will be of the highest quality and suitable for research publication.

Preferred Prerequisites: Elementary biochemistry, Cell Biology, Genetics, Biosafety training, two semesters of Organic Chemistry and/ or approval by the Instructor.

Expectations:

1. Attendance and participation are required.
2. Keep accurate, detailed lab notebook- Will be checked periodically for accuracy and completeness.
3. Read assigned papers and protocols (KEEP UP WITH READING)
4. Conduct experiments and collect data and record detailed observations
5. Complete deliverables on time throughout the semester including safety training and forms, project promotional video, and an end of project video presentation and poster.

Grade will be based on:

1. Attendance and participation- 20%
2. Lab Notebook - 15%
3. Safety training and safety form (15%)
4. Project promo video (15%)
5. Final project presentation video (15%)
6. Final project poster (20%)

Canvas will be used for all communication, instructional materials, and uploading deliverables.

Safety: Observe proper laboratory safety and techniques at all times. Students will need to complete appropriate trainings before starting lab work. A certificate(s) of completion needs to be uploaded to canvas.

General safety guidelines-
No food or drink in the lab. No sandals, no gum, minimize jewelry and accessories.
Wear gloves, safety glasses when handling toxic/harmful chemicals.
Stay alert and be aware of your surroundings.
Dispose of biohazard and other hazardous wastes in appropriate containers.
Observe aseptic techniques and conditions when appropriate.
Wash hands with soap and water often.
Always ask if you have any questions.

Attendance: This is a research course and classes cannot be made up. Students are expected to attend every class meeting on time. It is important that you communicate with the instructional team (email Spencer and cc Dr. Henard) prior to being absent, so you and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals as well as those of your classmates.

Acknowledgements: We are indebted to Henard laboratory members for preparing molecular tools for this 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

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable 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 a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodation at any time; however, ODA notices of reasonable 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 reasonable 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 reasonable 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, refer to the Office of Disability Access website (http://www.unt.edu/oda). You may also contact ODA by phone at (940) 565-4323.

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.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's Code of Student Conduct (https://deanofstudents.unt.edu/conduct) to learn more.