

Special Problems BIOL/BIOC 4900

Instructor(s):

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Objectives:

Special Problems (BIOL/BIOC 4900) is an individual laboratory research project in biological science. Special Problems provides personal experience in research laboratories and training in diverse techniques while working on an individualized research project. Projects are established through consultation with a faculty member who will serve as the major advisor and instructor of record. Training, supervision, and consultation may be provided by other experienced laboratory personnel (e.g., a graduate student or postdoctoral scholar). Once sufficient training and instruction are provided by senior personnel, proficient, independent, and self-motivated progress toward the project goals is expected.

Pre-requisites:

Students enrolling in Special Problems will generally be Juniors or Seniors in a Biology major or related field. Prior or concurrent enrollment in courses offering University-level instruction in genetics, molecular biology, cell biology, biochemistry, etc., is expected. Enrollment is on a case-by-case basis with the instructor of record (*i.e.*, the faculty member).

Expectations and Assessment:

A maximum of 3 credit hours may be applied toward advanced Biology or Biochemistry electives in the Bachelor of Science degree. Special Problems does not count as an advanced elective for the Bachelors of Arts degree.

For each semester credit hour of Special Problems, a minimum of 3 hours of effort per week or 45 hours for the semester should be expected in the long semester and a minimum of 8 hours a week or 40 hours for the semester in the summer terms. More than the minimum time commitment is welcome and demonstrates enthusiasm and ambition. Students are expected to establish and maintain a regular, “work-day” schedule for coming to the laboratory to conduct research. This schedule must be coordinated with supervising research personnel to ensure proper training and laboratory safety. Working alone in the evenings or on weekends must be authorized by the supervising faculty member and is generally discouraged. This is to ensure proper equipment use, laboratory safety, and professional standards of research conduct are maintained. Regular commitments of three to four (or more) hours at a time are encouraged since it is very difficult to get quality work done in shorter periods.

Students are required to complete all requirements to receive Special Problems credit, including the “ePortfolio” submission. The requirements and expectations for Special Problems credit are determined by the supervising faculty member.

All aspects of laboratory behavior that contribute to a productive work environment will be considered when assessing performance. These include the level of active engagement in laboratory activities, general laboratory acumen and working practices, the ability to follow directions and work cooperatively with others, the practice of safe behaviors, cleanliness, and general attitude.

The laboratory will have weekly group meetings to discuss research progress and literature related

to subjects pursued in the group. Special Problems students are expected to attend these meetings if possible. The faculty supervisor will try to schedule these meetings to accommodate all laboratory members.

Recording and communicating research results is central to scientific productivity. Special Problems students will be trained and will be expected to maintain a lab book to record their activities and generate data results suitable for public dissemination. As part of this, students will prepare (at a minimum) a research poster and an oral research presentation. These will be presented to the research group and ideally will also be suitable for public events such as the weekly seminar series in the BioDiscovery Institute, “Research Days” in the department or college, and off-campus professional meetings.

Laboratory Safety Compliance:

Laboratory safety compliance is critical. Special Problems students must first complete the online safety training provided by the Office of Risk Management (<https://riskmanagement.unt.edu/rm-training>). The specific modules that all research personnel should complete are **General Biosafety BSL-1 and BSL-2, Chemical Fume Hood Safety, Chemical Lab Safety, Gas Cylinder Handling Safety, and Hazard Communication and the Globally Harmonized System.** Additional training will be provided in the laboratory by the mentoring supervisor. Appropriate personal protective equipment will be provided by the laboratory and must be used when appropriate.

The following is text from a biology teaching laboratory and are minimum requirements for both teaching laboratories and research laboratories:

Safety Rules and Laboratory Practices:

Safety is of foremost concern in any laboratory. It is imperative to behave responsibly, always being cautious and employing safe lab practices – even innocuous everyday items can be dangerous when used improperly or recklessly. The following regulations must be observed at all times without exception. Failure to do so may result in an accident, injury, and/or a reduced overall lab performance score. Even during remote synchronous offerings, full knowledge of safety procedures is required and expected as if you were present in the physical laboratory.

- **No food or drinks are allowed in the lab at any time.**
- **Personal Protective Equipment (PPE) is “REQUIRED” once you enter the laboratory. If you do not have the proper PPE, you will be asked to leave the lab to obtain required items.**
- **PPE: Laboratory coat that is below the knees, safety goggles, laboratory gloves.**
- **Items you will not be allowed to wear to the laboratory: shorts, open toed shoes, and sandals.**

Students in the Department of Biological Sciences are required to use proper safety procedures and guidelines. While working in laboratory sessions, students are expected and required to identify and properly use safety guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions and hot and cold products. Students should be aware that the University of North Texas is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider obtaining Student Health Insurance for this insurance

program. Brochures for this insurance are available in the UNT Health and Wellness Center on campus. Students who are injured during class activities may seek medical attention at the UNT Health and Wellness Center at rates that are reduced compared to other medical facilities. If you have an insurance plan other than Student Health Insurance at UNT, please be sure that your plan covers treatment at this facility. If you choose not to go to the UNT Health and Wellness Center, you may be transported to an emergency room at a local hospital. You are responsible for all expenses incurred.

Safety rules:

- Do not eat, drink, smoke, vape, chew gum, or apply cosmetics in the lab. The storage or handling of food and beverages is also prohibited due to risk of contamination and later consumption.
- Notify your instructor of any relevant physical conditions, sensitivities, or allergies (such as to latex) that may pose a safety concern so that individual-specific accommodations can be made.
- Know where to find and how to use emergency equipment such as the eyewash station, fire extinguisher, emergency shower, and first aid kit. Remember when using a fire extinguisher to point the nozzle toward the base of the flame.
- In case of fire, burst water pipes, accident, medical emergency, etc., immediately notify the instructor and take appropriate measures. If you or another student is cut or injured in any way during the lab, you must inform the instructor immediately. All incidents, even apparently minor ones, must be reported!
- Wear proper protection, such as safety glasses and gloves, in order to limit exposure to chemicals as appropriate. Gloves in particular should be worn at all times, even when not working directly with hazardous materials.
- Dress appropriately. Shoes must fully enclose your feet (no sandals, open-toed shoes, etc.), and avoid loose-fitting clothing.
- Never leave an experiment unattended.
- Work in the exhaust hood when handling volatile or otherwise dangerous materials and organic solvents, and as directed by your instructor.
- If chemicals or other materials get in your eyes, immediately call for help and use the eyewash to flush your eyes thoroughly for at least 15 minutes. If chemicals get on your skin, immediately flush the exposed area thoroughly with water and notify the instructor. If biohazardous material contacts your skin, immediately wash the affected area with warm soap and water and notify the instructor.
- Chemical or biohazard spills should be immediately contained and reported. Spill kits are available in the laboratory.
- Handle hot glassware with appropriate tongs or test tube clamps. Use caution when heating chemicals, and never look into the opening of a container that is being heated or otherwise point the opening toward your eyes or those of others.
- Do not directly smell chemicals or inhale fumes. Instead, use the “wafting” technique.
- Use extra care when working with scalpels, razor blades, glass pipettes, etc. Use all equipment as instructed. Never allow any equipment to come in contact with your mouth (don’t mouth pipet!).
- Be aware of any potential hazards, including those posed by physical, chemical, and biological materials as well as by activities and behaviors. Pay attention to all warnings present

in the lab manual, posted in the lab, and given by the instructor. Immediately alert your instructor to any hazardous conditions or situations you encounter.

- Broken glassware, microscope slides, or any other glass materials must be disposed of in the glass disposal receptacle located in the lab. This receptacle is for glass only.
- Biohazardous material should be disposed of in the biohazard waste container. This receptacle is for biohazardous waste only.
- Turn all instruments off when the laboratory is over unless directed otherwise by your instructor.
- Do not bring children or friends to the lab.
- Wash your hands before leaving the laboratory.
- Behave professionally and responsibly!

Important Laboratory Practices:

- Make sure you know how to properly dispose of any chemicals used in the lab – do not just pour things down the sink. Labeled waste containers will be present for different chemicals as appropriate.
- Make sure all chemical and reagent containers are closed tightly after use.
- Keep the laboratory clean and organized.
- Be familiar with the experimental procedures you will be performing before coming to the lab.
- Follow instructions carefully, and ask when in doubt.
- Behave conscientiously and fastidiously: be aware of your surroundings and cautious and deliberate in your actions.
- Be careful not to contaminate reagent stocks. Do not dip equipment directly into the main reagent bottles.
- Think before you act.