

UATX CSTEM
Special Topics in Bioastronautics (1.5 credits)
Spring Term AY24-25

Instructor: Professor Eliah Overbey

Meeting Time: Fridays, 2:00-3:15pm

Texts: Scientific texts and papers provided weekly by the instructor.

Pre-requisites: None

Course description: Special topics in bioastronautics is a project-based course that immerses students in real-world challenges in bioastronautics. This term, students will contribute to research initiatives stemming from [UATX's partnership with the Space Exploration and Research Agency \(SERA\)](#). Through hands-on experience, they will design and prototype spaceflight-ready plasticware for molecular biology experiments using 3D printing and submit their designs in the SERA Fluid Dynamics Competition. Additionally, students will explore the fundamentals of cell culture in spaceflight environments, gaining critical skills for conducting biological research beyond Earth.

Student learning outcomes

Upon successful completion of this course, students will understand the fundamentals of fluid behavior and cell culture principles in microgravity, and how it differs from Earth. In particular students will:

- Explain how surface tension, capillary action, and other fluid properties change in microgravity.
- Compare and contrast fluid behavior in Earth gravity vs. microgravity.
- Use CAD software and 3D printing to design plasticware for fluid experiments in spaceflight.
- Understand the principles of cell culture and how it is modified for spaceflight.
- Define a morphological marker and explain how cells can be visualized with immunofluorescence staining.

Course policies

- Class attendance is mandatory.
- You are expected to read supporting material. The section readings are designed to reinforce the material presented in class.
- Your instructor will specify all examination and assignment due dates. If you have an excused absence the day an assignment is due, then the assignment is due on your next day in class.
- Grading for this course will be consistent with university policy; specifics will be provided by the course instructor.
- Collaboration on homework is encouraged. Document any such collaboration.
- You may refer to outside sources to assist with homework. Document any such assistance.
- Cheating will not be tolerated. In particular, exchanging electronic files containing work you have done for a graded assignment is prohibited unless stated otherwise. Cheating also includes but is not limited to looking at another student's quiz or exam, copying someone else's homework, and using unauthorized material during a quiz or exam.
- The use of computing technology is permitted in support of all work unless otherwise stated.
- Please see the Student Handbook for policies regarding support for special needs or disabilities.

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Grading Policy

50% Project Performance

50% Readings, Reflections, Quizzes, Essays

Course Requirements

- All students must have a laptop available for use outside of class. Laptops will be used periodically in class at the instructor's discretion.
- You are expected to read supporting material provided by the instructor.
- No makeup exams will be given unless you have a prior excusal or are sick-in-quarters. It is your responsibility to arrange for a makeup exam if required.