ILLINOIS

The Grainger College of Engineering
Department of Bioengineering
1102 Everitt Laboratory, MC-278
1406 W. Green St.
Urbana, IL 61801

BIOE 589: Biomedical Image Computing Capstone Project

Semester: Fall 2026

Credit hours: 4

Time: TR 3:30-4:50 PM (official time)

Location: 3018 Campus Instructional Facility (CIF)

Prerequisites: BIOE 588, BIOE 484, BIOE 486, and BIOE 580

Co-requisites: BIOE 489

Class meetings: Class will meet at least five times over the course of the semester starting on the first day of instruction. Additional meetings will take place on the first Tuesday of each month during the semester: September 1st, October 6th, November 3rd and December 1st. The instructor will notify students at least two weeks in advance if the class needs to meet on another date outside of those listed here.

Instructor: Will Newman, Ph.D. **(willn2@illinois.edu)**

Office hours: Email appointment

Course description: This course provides students with hands-on experience in applying machine learning and computational methods to real-world bioimaging problems. In each project, experimental bioimage data will be provided by industry or clinical partners, or obtained from open-source repositories. While projects are not required to be publishable or highly novel, they must demonstrate the systematic application, evaluation, and interpretation of machine learning and image computing techniques. By addressing authentic problems posed by sponsors, students will not only strengthen their technical skills but also gain practical experience that is valuable for future research and career opportunities.

Course objectives: By the end of this course, students will be able to:

- Identify and analyze real-world bioimaging problems.
- Explain state-of-the-art machine learning and computational techniques relevant to their project.
- Apply and implement appropriate techniques using open-source tools and libraries.
- Conduct statistical analyses by integrating knowledge from prior coursework.

- Demonstrate professional communication with industry and clinical mentors, as well as faculty mentors.
- Effectively present their investigations and implementations in both written reports and oral formats.

Resources: No textbook is required. Students are expected to have laptop access. Options to use the biomedical image computing server will be discussed at the beginning of the semester.

Grading and Assessment: Grading and assessment will vary by project group and sponsor expectation. All students are expected to attend meetings with sponsors at agreed upon times and be prepared with updates/reports requested by the sponsor. Meeting times and frequency will be discussed at the beginning of the semester.

The following represents a general example of the grade breakdown. This will vary among project groups:

The overall course grade will be based on the following components:

- 60% for weekly reports and meeting documentation,
- 20% for the final deliverable (e.g., report), and
- 20% for the final presentation.

Weekly reports and documentation (60%): Students are expected to attend meetings with sponsor groups to discuss progress on their project. Students *must* come prepared with materials based on discussion with their sponsor. Materials may include slides, data, written reports or code that must be shared with the sponsor at least 12 hours prior to the meeting. After each meeting, students should generate a *short-written summary* of the meeting with notes and action items that are shared with the sponsor within 24 hours of the meeting. A *weekly report* will be a separate written document summarizing findings or progress on the project from that week and outlining a plan for the upcoming week. Students will be evaluated on the clarity, delivery and completeness of their reports and meetings with their sponsor.

Final deliverable (20%): This will involve a report or other highly polished deliverable (e.g., code) requested by the project sponsor. The expectation is that the deliverable is of extremely high quality and demonstrates the culmination of the effort given over the entire semester. If students are working together, a statement of individual contribution will be required. Students will be assessed on clarity and quality of the deliverable by both the project sponsor and the instructor.

Final presentation (20%): Students will present their project findings at the end of the semester to the project sponsor or BIC faculty. Presentations must be logically structured and clearly describe content (problem, methods, and results). They must effectively use visuals (tables, figures) and provide a well-structured professional delivery that includes time management and Q&A responses.

Scale:

A+ >97%	B+ >87%	C+ >77%
A > 93%	B > 83%	C > 73%
A– >89.5%	B– >79.5%	C– >67%

Statement of Accessibility and Accommodation: To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603, e-mail disability@illinois.edu or go to the DRES website. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available on campus that can help diagnosis a previously undiagnosed disability by visiting the DRES website and selecting “Sign-Up for an Academic Screening” at the bottom of the page.