

BMED3500 Syllabus

Sensors and Instrumentation

Fall 2026

Instructor Information

Instructor: Aniruddh Sarkar

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General Course Information

Description

In this course, you will have the opportunity to learn – via lectures, hands-on class projects and an open-ended design project – the basic principles and design issues of biomedical sensors and instrumentation, including: physical principles of biomedical sensors, analysis of biomedical instrumentation systems and application-specific biomedical sensor and instrumentation design.

Course Learning Outcomes

Upon successful completion you will be able to:

1. Classify systems modeling biomedical sensors and instrumentation
2. Analyze the static and dynamic characteristics of bioinstrumentation systems
3. Design simple analog circuits (e.g. instrumentation amplifiers and active filters) used in bioinstrumentation
4. Apply sampling theorem fundamentals to design and implement A/D conversion processes for biomedical signal acquisition
5. Design and conduct experiments involving biomedical sensors and instrumentation as well as to measure and interpret experimental data from living systems
6. Complete an open-ended team-based design project that will culminate in a presentation

Required Course Materials

All lecture slides and occasional additional reading and practice material will be posted on the class Canvas site. No textbook is required. The following are optional reference texts:

1. *Medical Instrumentation: Application and Design*, 5th Edition, Webster, John Wiley & Sons

2. *Medical Device Technologies*, 2nd Edition, Baura, Elsevier
3. *The Art of Electronics*, Horowitz and Hill, 3rd Edition, Cambridge University Press

All students will need access to a computer with a webcam, microphone, and reliable internet connection to participate in some lectures or office hours.

Grading Policy:

Class Projects	30%
Design Project	40%
Quizzes	25%
Class Participation	5%

Description of Graded Components

Class projects will be team-based and will include in-class work and a report. Design project will be team based and include a proposal, design document, in-class presentations, reports and weekly team meeting notes. Quizzes will be held on a regular basis to evaluate mastery of content taught. Class participation is based on attendance and participation in class.

Course Policies

Attendance and/or Participation

You are expected to attend all the lecture sessions unless specifically excused via timely communication with the instructor. Attendance will be a part of the class participation grade as described above. Absences due to illness require an excused letter from dean of students living office and should be communicated to the instructor in a timely manner.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review [Georgia Tech's Honor Code](#) and the student [Code of Conduct](#).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- A list of resources for undergraduate students' academic success and information about advising can be found at [Success at Tech](#).
- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or see them at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A [comprehensive list](#) of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being ([student-resource-guide \(gatech.edu\)](#)).