# Introduction to Biomaterials Syllabus

Introduction to Biomaterials, BMED/MSE 4751, 3 credit hours
Fall 2026

## Instructor Information


| Instructor | Email |
|---|---|
| Valeria Tohver Milam | valeria.milam@mse.gatech.edu |


## General Course Information

### Description

This course is a broad-based introduction to undergraduates to different types of biomaterials (metals, ceramics, polymers) and physiological responses to biomaterials. Topics include material properties, host response, and biomaterial characterization techniques.

### Course Learning Outcomes

Upon successful completion of this course, students should be able to do the following:

1. Understand fundamentals of inflammatory response to synthetic biomaterials
2. Understand electrophoretic, colorimetric, and fluorescence characterization of biological species
3. Understand structure-property correlations in metallic, ceramic, & polymeric biomaterials
4. Understand spectroscopic and thermal characterization approaches for biomaterials

### Required Course Materials

J.S. Temenoff & A.G. Mikos. "Biomaterials: The Intersection of Biology and Materials Science." Pearson Education International. 1st (2008) or 2nd (2023) Edition. Available to purchase from the publisher

### Grading Policy:

Course Average Score Range (%) is converted to a Course Letter Grade as follows:
89.5-100% - A
79.5-89% - B
69.5-79% - C
59.5-69% - D
Less than 60% - F

### Description of Graded Components

Course Average Score is weighted as follows:
Participation Score (classes in which no graded activity (e.g., exam) occurs) – **10%**
Homework (1 total worth 5%) and In-class assignments (2 total, each worth 2.5%) – **10%**
Major quizzes (4 total, each worth 5%) – **20%**
Exams (2 midterms, each worth 25% + 1 final exam worth 10%) – **60%**

# USG Required Course Policies

## Attendance and/or Participation

Regular attendance is highly encouraged to help students actively engage in learning, ask questions and participate in discussion during class. To encourage attendance, participation points will be regularly administered during class time.

## 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.

## Core IMPACTS

This elective course falls under the Core area of Technology, Mathematics and Sciences
This course will help develop the following career-ready competencies:
(1) Critical Thinking: An ability to acquire and apply new knowledge as needed, using appropriate learning strategies to produce solutions that meet specified needs with consideration for public and individual health, safety, and welfare.
(2) Inquiry and Analysis: An ability to analyze and interpret data and use engineering judgment to draw conclusions from bio-related assays, experiments and data sets.
(3) Problem Solving: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics to biomaterials-related systems and environments.

# Additional Georgia Tech Required Policies

## 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 (via Canvas) as soon as possible in order to set up a time to discuss your learning needs.

## Student-Faculty Expectations Agreement

As the instructor I believe my central role is to serve as an educator who catalyzes the learning experience of students in my classroom. 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 to foster a positive learning environment. The Student-Faculty Expectations articulate some basic expectations that you can have of me as your instructor and that I have of you as students. 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.

## Optional Course Expectations, Policies, and Resources

To help students actively engage in learning material for this course, I will upload Lecture Outlines and Handouts on Canvas prior to presenting a topic in class. Students are highly encouraged to download and/or print out these posted materials prior to class. Lecture outlines are not intended to serve as a transcript of a lecture, so students should add their own notes during lecture. In addition, I will post problem sets (not to be graded, but answer key provided) to help students prepare for exam-related questions.

Where helpful, I will post additional resources (e.g., video clips) to help students visualize concepts, assays, etc.

In addition to office hours (TBD), I also highly encourage students to approach me after lecture to ask questions, clarify concepts, etc.

## Prerequisites

MSE 2001 is a prerequisite

## Extra Credit Opportunities

No extra credit opportunities will be available.

## Collaboration, Group Work, and Use of Generative AI

I highly encourage students to study together for this course. The use of Generative AI as a study tool should be exercised with caution since AI can provide misleading or erroneous information.

## Extensions, Late Assignments, & Re-Scheduled/Missed Exams

If you miss lecture that does not involve a graded activity, you are always responsible for getting lecture notes from a peer. If you anticipate missing lecture in advance due to extenuating circumstances please reach out to me as soon as possible.

If you have a known legitimate schedule conflict (e.g., institute-approved absence for scheduled event) with a graded activity (e.g., an exam), you must notify me at least one week in advance in order with appropriate documentation of the schedule conflict in order for me to administer a make-up assignment, typically in advance of the scheduled activity date.

If you cannot provide prior notice, but you must miss class involving a graded activity (e.g., an exam) due to a legitimate conflict (e.g., sudden illness; family emergency) that can be documented, you must notify me via email (via Canvas) within 24 hours of the missed graded activity. In order for me to administer a make-up assignment, quiz or exam (generally within 1 week unless extenuating circumstances prevail), you will need to follow-up your notification to me with documentation from the Dean of Students that confirms your absence is excused. I do recognize that circumstances such as

sudden illness may not allow you to visit a medical center in a timely manner, so at a minimum please send me an email (via Canvas) with as much notice as possible that you will miss class and just plan to provide documentation from the Dean of Students as a follow-up. There will be NO makeup in class activities, quizzes or exams after the activity is administered unless a legitimate conflict is provided. If a legitimate schedule conflict is known in advance, the student must provide a documented excuse at least one week in advance and schedule a makeup prior to the official quiz date.

## Inclement Weather and Digital Learning Days

If an unexpected event such as inclement weather affects campus operations, I plan to use live digital instruction (e.g., via Zoom on Canvas) during the normal class time.

## Student Use of Mobile Devices in the Classroom

Students should bring a sufficiently charged laptop to each class to participate in Canvas-based activities. While students are also free to use their laptops or tablets during lecture for note-taking purposes, please refrain from using cell phones for texting, calls, etc. to minimize distractions. In the past, cell phones can be an unreliable means for students to access Canvas (e.g., in class activities posted as "Canvas Quiz") in a timely manner.

## Additional Course Policies

Once grades for an assignment (e.g., Major Quiz, Exam) have been posted, any regrade requests (in writing) must be submitted within one week. Guidelines for a written regrade request will be outlined separately.

# 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 us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us 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)

More resources on supporting student well-being on the syllabus and beyond are available through the Learning Well Initiative.

## Additional Syllabus Components

I am committed to fostering a climate of mutual respect and full participation and create a learning environment that is equitable, inclusive, and welcoming. My lectures involved a mixture of PowerPoint slides, “white board”, and Q&A to keep students engaged and to prepare students for each graded assignment. Thus, attending and engaging in lectures is the first step to your success as a student in my course. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify me as soon as possible.