MSE 2001 Syllabus

Principles and Applications of Engineering Materials, ALL sections, 3 credits

Fall 2026

Instructor Information

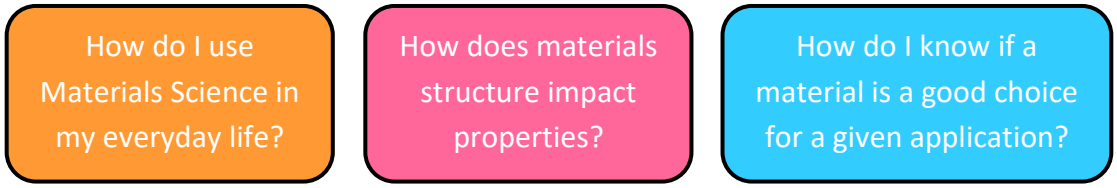
Instructor: TBA

Email: TBA

General Course Information

Description

MSE 2001 will teach students the fundamental principles of process-structure-property relations to design engineering materials, including metals, ceramics, polymers, semiconductors, and composites. Students will learn the "vocabulary" of materials science and engineering to facilitate technical communication, broaden design vision, and establish a foundation for further study of the subject area (if desired).



Course Learning Outcomes

By the end of this course, students should be able to:

- Use an understanding of material properties to discuss and predict material performance upon subjection to external stimuli including mechanical stress, heat, electrical voltage, electrochemical potentials, magnetic fields, and/or optical illumination.
- Describe the structure of materials at the atomic and microstructural levels and explain how different structural features impact material properties.
- Describe and predict how defects will alter the properties of a material.
- Apply thermodynamic and kinetic principles to design materials processing schemes to achieve desired materials structures using tools such as phase diagrams and TTT diagrams.

Required Course Materials

There is no required textbook.

Free Supplementary Texts (optional reading to enhance your learning):

- *Materials: Engineering, Science, Processing, and Design* by Ashby, *et al.* (2009).
  E-Book: https://learning.oreilly.com/library/view/materials-2nd-edition/9781856177436/
- *Engineering Materials Science* by Ohring (1995).
  E-Book: https://www.sciencedirect.com/book/9780125249959/engineering-materials-science
  (Sign in with your GT Email and verify with SSO)

Other Free Required Tools:

- Canvas – Course announcements, class notes, and HW assignments will be posted on Canvas
- Point Solutions – All students must be able to use Point Solutions responseware for this course to participate in in-class polling for participation credit. Please refer to the guide on Canvas "getting started with PointSolutions" to get set up.

Grading Policy:

Components of course grade:

- Homework: 15%
- Participation: 10%
- Exam 1: 25%
- Exam 2: 25%
- Final Exam (Comprehensive): 25%

Course Grades

Score	89.5% - 100%	79.5% - 89.4%	69.5% - 79.4%	59.5% - 69.4%	≤ 59.5%
Grade	A	B	C	D	F

Description of Graded Components

- Homework: will be administered online through Canvas.
- Participation: measured via in-class assessments.
- All exams will be in class, on paper, closed-note, closed-book. An equation sheet will be provided. The final exam is cumulative.

Course Policies

Attendance and/or Participation

Attendance is required in this course and is measured via participation grade, which comprises 10% of the overall grade. Attendance is measured via active participation in class, which may include responses to clicker questions, interacting in course discussions, or completing in-class worksheets.

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

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

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.

Pre-Requisite:

D or better in Chem 1310 or Chem 1211K

Student Expectations:

Classes will involve active engagement; all students are expected to participate and will be actively called upon for discussions and responses. Attendance without engagement will not receive participation credit. *Listening to music, etc on headphones/earbuds is NOT allowed during class as it inhibits active participation.*

Polling software will be used to determine attendance grades and to facilitate whole-class engagement in practice questions.

Electronic devices (laptops, cell phones, etc.) are allowed as long as they do not audibly or visually disrupt the class and do not inhibit active involvement. (Policy subject to change.) Using such devices is encouraged for taking notes. ***All of these devices are banned during exams.***

During all course interactions, students are expected to act in a professional manner that is courteous to the instructor and their fellow classmates.

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

Late homework will be penalized accordingly. Students with approved accommodations may request extensions as reasonable. Make-up exams will be allowed for illness, approved Institute activities or religious observances. The student should notify the instructor as soon as possible to request a makeup exam.

Inclement Weather and Digital Learning Days

If a weather-related event affects campus operations, the course will pivot to asynchronous digital instruction for the affected day(s) and students will receive further instructions via Canvas announcement.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- 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)