MSE 2001 Syllabus

Principles and Applications of Engineering Materials MSE 2001, Section SF2, 3 Credits

Summer 2026

Instructor Information

Instructor: Dr. Sarah Goodman (she/they)

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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

None

Grading Policy:

MSE 2001 will be graded as follows:

Homework – 15%

Participation – 10%

Midterm 1 – 20%

Midterm 2 – 20%

Project – 15%

Final Exam (Comprehensive) – 20%

Your final grade will be assigned as a letter grade according to the following scale:

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: Correct answers: 3 pts; Incorrect answers: 0.5 pts

Homework will be assessed via Canvas quizzes with primarily multiple-choice questions.

- **Dropped homework:** The **two** lowest homework assignments will be dropped per student.
- **Late Homework:** Late submissions will be accepted with a 25% reduction in points.
- If you have a situation that warrants an assignment extension, please contact the instructor to discuss accommodations *as soon as possible*.

Exams

There will be two midterm exams and one final exam. Exams will be multiple choice and questions will be of a similar format to the weekly homework sets. Exams will take place in the classroom during the regular lecture period. Midterms will be allotted 50 minutes to complete, and final exams will be allotted 2 hours and 50 minutes to complete. Exams are taken with paper and pencil/pen.

Midterm Exam Points Back Policy: *For each of the two midterms, you may submit four problem explanations for grading. You can receive up to half-credit per resubmitted problem, for an additional +2 on your exam grade (corresponding to ~4.5% boost). To receive points back, you must 1) identify the correct answer, 2) explain* ***why*** *it is the correct answer. If you missed questions on the exam, you MUST select problems that you missed as your problems to explain. If you missed fewer than four questions, you may choose to explain a question that you got correct and why it was correct.*

Missed Exams and Makeup Exams: *Please contact the instructor as soon as possible if you realize you will miss /have missed an exam. If you miss a test without an approved absence/accommodation, you will earn zero credit for that exam. Tests missed with certified medical excuses or prior instructor approval will be addressed on an individual basis.*

Participation

Participation will include poll questions, short in-class activities, and attendance. You can miss up to 4 participation assignments without an impact on your grade. These 4 missed assignments would include sports absences, travel, illness, etc.

Project

Students will work in groups on a final project related to the core themes of the course.

Course Policies

Attendance and/or Participation

Participation will include poll questions, short in-class activities, and attendance. You can miss up to 4 participation assignments without an impact on your grade. These 4 missed assignments would include sports absences, travel, illness, etc.

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.

Pre- &/or Co-Requisites

D or better in Chem 1310 or Chem 1211K

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)