Schedule: Prerecorded Lectures; discussion F 2-2:50 via Zoom.

Course websites:
- Class schedule, announcements, lecture slides, gradebook, and written report deposit: compass2g.illinois.edu
- Online homework: prairielearn.engr.illinois.edu
- Online discussion forums: piazza.com/illinois/fall2020/mse206/home

Scope: Statics and mechanics of materials concepts pertinent to the fields of materials science and engineering: force resultants; stresses and strains produced in elastic bodies; microscopic effects of different loading states (tension, compression, torsion, and bending) on deformable bodies; beam stresses and deflections; three-dimensional stresses and strains.

Objectives: Students will be able to (a) apply concepts of static equilibrium to determine internal loads due to external forces on structures; (b) compute internal states of stress due to loads; (c) determine the deformation of materials from states of stress; and (d) analyze a variety of two- and three-dimensional engineering problems.

Prerequisites: Math 241 (Calculus III), Physics 211 (Mechanics); credit or concurrent registration in Math 225 (Introductory Matrix Theory) or Math 415 (Applied Linear Algebra), MSE 201 (Phases and Phase Relations) and CS 101 (Introduction to Computing for Science and Engineering) or CS125 (Intro to Computer Science).

Instructor: Matthew Goodman (mgoodman@illinois.edu; 168 MRL)

Teaching Assistants: Computational TA: Kisung Kang, (kkang14@illinois.edu)


Special accommodations: To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact their lecturer and the Disability Resources and Educational Services (DRES, disability.illinois.edu) as soon as possible.

Course evaluation:
15% Online Homework
15% Engineering Report
70% Quizzes & Exams
Guidelines for correlation between numerical total score and the following final grades:

- A+ (98–100)
- B+ (88–90)
- C+ (78–80)
- D+ (68–70)
- A (94–97)
- B (84–87)
- C (74–77)
- D (64–67)
- F (0–60)
- A– (91–93)
- B– (81–83)
- C– (71–73)
- D– (61–63)

PrairieLearn: Your online homework assignments and your computerized based quizzes will use the PrairieLearn online problem system. PrairieLearn can be accessed via prairielearn.engr.illinois.edu.

Online Homework (15%): Assignments on PrairieLearn.
- Online homework assignments are due on Mondays at 11:59 pm. Late submissions will be penalized by 50% for each day late.
- Homework assignments will operate in “game mode,” where you can receive additional credit for repeatedly answering a question correctly. This is easier (and more fun) if you first solve the problem symbolically (see below).
- You can rework completed items after the due date. This work will not be saved and will not affect your grades.
- You will receive a grade for ALL assigned online homework problems. Your HW score will also appear on the Compass2g grade book.
- The online homework problems give explicit values and units to the relevant lengths, material properties, forces, etc., and therefore you should give your final answer with an explicit numerical value. Nevertheless, when solving a homework problem you should (to the utmost extent possible) assign symbols to all the relevant lengths, forces, material properties, etc., and then solve the problem symbolically. As a last step, you should substitute the value and units of each of the symbols in the symbolic formula. You are encouraged to solve all problems symbolically.
- This symbolic form of working out the problems will be used in the lectures, in written reports, worksheets and exams.
- You are encouraged to print out each homework problem and derive your symbolic solution on this printout. Store these solutions for your future reference.
- You should come to office hours with the symbolic solution for your online assignment. We will be able to check your work better if you have that in hand.
- Solutions will not be posted.
- The “zeroth” online homework is optional. It will familiarize you with PrairieLearn, and includes questions regarding the syllabus, MatLab and vector math. You can earn up to 0.5 of extra points to be added to your final grade.
- The first online homework covers the material of Chapter 3.
- If you need help accessing MatLab on your personal computer, follow this link to learn more about connecting to an EWS workstation remotely:
  it.engineering.illinois.edu/ews/lab-information/remote-connections
Discussion Sections: Prompt and regular attendance at your discussion section is expected. These sessions will consist of a design or an analysis problem, which is a high-energy and efficient 50-minute learning experience. For each session, students will work in their group of three to four people. The group will work on the analysis together, and each will write out their analysis on the provided sheets, but the group will be graded as a unit. If you are more than 5 minutes late to a discussion session, then you will not be permitted to complete the discussion that week. There are two main goals for the engineering discussion:

- Gain experience in teamwork. This skill is critical in all engineering disciplines, from large-scale industrial projects to academic research. To work productively in teams is a skill that must be learned just like math or physics, and regular practice is essential. Often you will have to work with people who you do not especially like, or who you find it difficult to work with. It is important to learn how to manage these situations so that the important work is still accomplished.
- Apply engineering concepts to real-world problems. Each discussion focuses on a real-world problem that you will have to use your engineering skills to solve, including the material from class and also knowledge from previous engineering, math, and science classes. You will also have to think like an engineer and understand when to make approximations, how to judge the appropriateness of different models, and which mathematics and physics is most useful for a given engineering problem.

We also hope that these engineering discussions will help you to meet your classmates, and we encourage you to get together outside of lectures and discussions to work collaboratively on homeworks and exam study.

Engineering Reports (15%): Each week a report must be submitted, consisting of a full write-up of a problem related to the group worksheet that was assigned in that week’s engineering discussion. The report will be available online and must be submitted (via Compass2g) the following Friday at 11:59pm. The only format that will be accepted for report submission is a single, properly ordered PDF, in portrait format; your name and discussion section must be printed legibly on the top of the first page. The TAs will grade the report. You may submit each report a maximum of two times; only the latest submission will be graded.

Engineering reports are assigned to practice the communication of engineering concepts in writing. They will be graded based on presentation, neatness, correct use of symbols, quality of drawings and diagrams, and clarity of explanation (80%). Reports should be neat and organized, hand-written or typed. Tables and graphical representations of results should be generated using some software program such as Excel, TecPlot, MatLab, etc., rather than being hand-drawn. Correct interpretation of the problem and correct final answers are important but not the focus (20%). Late reports will not be accepted. An example of a good report can be found on the class website. Point breakdown for the engineering report:

- 1: Correct interpretation of the problem
- 1: Correct final answer
- 2: Presentation quality
Quizzes / Exams (70%): There are regular quizzes roughly every two weeks. The quizzes will give you an immediate assessment and feedback on your understanding of the material since the previous quiz. As the material in the course is cumulative, the assessments assume that you understand previous material. The final exam is optional. It is cumulative over the entire course.

Total score: Your total score of 70% is calculated from your six quizzes as: 20% × (highest quiz score) + 10% × (remaining quiz scores). If you take the final exam and your score exceeds your lowest quiz score, the exam score will replace the lowest quiz in the total calculation; if your score exceeds your lowest two quiz scores, the exam score will replace your two lowest quizzes in the total calculation.

Grade Reporting: All assessment scores are stored on the Compass2g website. Any errors in grade reporting appearing on Compass2g must be reported within 2 weeks of the due date of the assessment item or by the last day of class, whichever is earlier.

Expectations: To succeed in this class, you will need to
- read the chapter and formulate questions;
- watch the prerecorded lectures;
- attend discussion and participate;
- make sure you understand the homework problems and solutions;
- seek out help when you have trouble.

Obtaining help: The main way to obtain help is online at Piazza. Please do not send email directly to TAs or professors for routine help or absences. In cases of emergencies related to exams (e.g., illness) you should email your professor at the earliest possible opportunity.

Online Forum (Piazza): This class uses Piazza for all communication between the instructor, TAs, and students. Please visit piazza.com/illinois/fall2020/mse206/home to register. The class link will take you to the current class page at any time. Official class announcements will be sent via Piazza, so you must register with an email address that you regularly check. If you desire, you can post anonymously on Piazza or make a private post just to the instructors (this should be done rather than emailing the professor directly). You can also use the “Search for Teammates” feature on Piazza to help find a study group. Note that Piazza should be used to communicate with your instructors, rather than email.

Academic Integrity, Harassment, and Discrimination: You are bound by the University Honor Code in this course. Any violation of the Honor Code will result in disciplinary action. In
addition, harassment or discrimination of any kind will not be tolerated. Please report any concerns immediately to your professor.

Changes to syllabus: may occur as deemed necessary by the professor; they will be announced.