Schedule: MW 2:00pm–3:50pm in Transportation 103; discussion F, see below for times and locations.

Course websites:
- Class schedule, lecture slides, gradebook, written report deposit and links to everything else: canvas.illinois.edu
- Online homework, asynchronous lectures and practice quizzes: prairielearn.engr.illinois.edu
- Announcements, online Q&A and asynchronous discussion boards: campuswire.com
- Synchronous virtual lectures (as needed, e.g. Week 1): MSE206 Lecture Zoom
- Virtual office hours (M & W): MSE206 Multipurpose Zoom Space
- Live lecture capture (lecture recordings): mediaspace.illinois.edu

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: Jessica Krogstad (jakrogst@illinois.edu; 168 MRL)

Teaching Assistants: Justine Paul (jepaul2@illinois.edu), John Chen (yuchang3@illinois.edu), Sara Pfeil (sopfeil2@illinois.edu), Cole BenVau (benvau2@illinois.edu), Computational TA: Yang Dan (yangdan2@illinois.edu)

Office hours: Monday, Wednesday via Zoom 5–6PM; Tuesday, Thursday in person 4–6PM, TAs will be present from 5–6PM, Location will be posted to Campuswire after the first week of classes.

Discussion Sections: You may only attend your registered section
AD1, F 1:00–1:50pm, 2036 Campus Instructional Facility, Justine Paul & John Chen
AD2, F 2:00–2:50pm, 2036 Campus Instructional Facility, Justine Paul & Sara Pfeil
AD3, F 3:00–3:50pm, 2036 Campus Instructional Facility,


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, and no later than Feb 2.

iClickers: The lectures will use iClickers for in-class participation. You may either use the web browser or app-based iClicker Cloud or the physical iClicker remote, which may be purchased at any of the book stores. Either way you must create or update an iClicker account by visiting
iClicker.com and adding this course (Join code: EXAXA). When you create or update your account you’ll have the opportunity to add an 8 digit iClicker ID (found on the back of your remote) if you’d prefer to use the physical remote. You are encouraged to use the Cloud based system if possible to allow for the greatest flexibility if you cannot attend the lecture in person. **You need to join the iClicker course following the steps above by Feb 2, when the iClicker roster will be synced for the last time.**

Course evaluation:

\[
10\% \times \text{Online Homework} + 4\% \times \text{(Participation)} + 8\% \times \text{(Engineering Discussion)} + 8\% \times \text{(Engineering Reports)} + 70\% \times \text{(Quizzes / Final Exam)} = \text{Total}
\]

*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 (10%):** Assignments on PrairieLearn.

- Online homework assignments are due on **Wednesdays at 11:59 pm**. Late submissions will be penalized by 50% for each day late.
- The lowest two homework scores for the semester will not be included in your final grade. Dropping two grades is intended to provide you with some flexibility in the case of illness or other extenuating circumstances.
- 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.
- 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 (or sketch the schematic in a notebook) and derive your symbolic solution on this print out. 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, and due on **Wednesday Jan. 26**, but you are encouraged to complete this earlier if possible to allow time to focus on HW1. It will familiarize you with PrairieLearn, and includes questions regarding the syllabus, Python and vector math. You can earn up to 0.5 of extra points to be added to your final grade.
• The first online homework (HW1) is also due on Wednesday Feb. 2 and covers the material of Chapter 3.

Lectures (4%): Prompt and regular attendance at lectures is required to obtain credit for iClicker: 75% participation, 25% correctness. In the case of illness or required isolate, you may also listen to the lectures via Zoom or you may complete the asynchronous lectures available via PrairieLearn.

• Your participation grade will be based on a combination of attendance and participation in in-class polling or based on your completion of embedded questions in PrairieLearn.
• You may not receive credit for both formats of the same lecture. You do not need to receive permission to complete the lecture via PrairieLearn.
• Note that credit for PrairieLearn lectures is only available during the week that they are first posted. The lecture material will remain live on PrairieLearn for the duration of the semester, but no additional credit may be gained (much like online homework assignments).
• The videos embedded in the PrairieLearn lectures may be from previous offerings of the course. You are welcome to review the recording of the live lecture for comparison, especially for announcements, new examples, etc. Live lecture capture recordings are available via MediaSpace.

Discussion Sections (8%): Prompt and regular attendance at your discussion section is required. You must attend only the discussion section in which you are enrolled. In the case of illness or (potential) exposure to COVID-19, arrangements can be made for virtual participation in the discussion sections. You must contact the teaching staff no later than 12PM on the day of the discussion section if you need this option.

Engineering discussion sessions will consist of either 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 team-work.** 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.

Discussion sections start Friday Jan. 28.

Engineering Reports (8%): 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 after discussion and must be submitted (via Canvas) 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. As with online homeworks, the lowest two engineering report scores for the semester will not be included in your final grade to provide you with some flexibility in the case of illness or other extenuating circumstances.

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, handwritten 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.** The first reports will be assigned Friday Jan. 28 during your discussion section, and due Friday Feb. 04. 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
- 1: Clarity of explanation
- 2: Clear drawings and diagrams
- 2: Use of symbolic work
- 1: Use of units on numerical answers

**Quizzes / Final Exam (70%):** Dates and policies: There are regular quizzes roughly every two weeks; they will take place in the Computer-Based Testing Facility. The seven quizzes are scheduled for **Feb. 4–7 (optional), Feb. 11–14, Feb. 25–28, Mar. 21–23, Apr. 1–4, Apr. 15–18, and Apr. 29–May 2.** The final exam will take place during exam week (**May 6–13**). For each quiz, and for the final, you will be responsible for signing up for a time slot to take the quiz, showing up on time, and taking the quiz. Because you will be given several days in order to schedule the quiz, there will not be any conflict or makeup arrangements (with the exception of COVID related issues, which will be handled on a case by case basis)—you are responsible for finding the time to take the assessment. If you are unable to attend an exam then you must inform your professor by email at the earliest possible opportunity. For non-emergency absences this notification must be at least **one week in advance.** Exams are closed to all electronics (no calculators, no laptops, no phones, etc), a Jupyter notebook will be available in the browser for calculations, and a formula sheet will be provided online. **Bring your student ID to the exam, and arrive five minutes before your scheduled time to sign in.** You will be able to sign up for your quizzes at cbtf.engr.illinois.edu/sched and you can find more information, including the test center policies, at cbtf.illinois.edu/students.

### Content:

The quizzes last fifty minutes, and 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, and lasts three hours.

**Total score:** Your total score of 70% is calculated from your six quizzes as: $20\% \times \text{highest quiz score} + 10\% \times \sum (\text{remaining quiz scores})$. 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.

**CBTF Policies:**

- The policies of the CBTF are the policies of this course, and academic integrity infractions related to the CBTF are infractions in this course.
- If you have accommodations identified by the Division of Rehabilitation-Education Services (DRES) for exams, please please email your Letter of Accommodations (LOA) to cbtf@illinois.edu before you make your first exam reservation.
- If you have any issue during an exam, inform the proctor immediately. Work with the proctor to resolve the issue at the time before logging off. If you do not inform a proctor of a problem during the test then you forfeit all rights to redress.
- Review all instructions on the CBTF website before your first exam: cbtf.illinois.edu

**Virtual or cancelled classes:** Throughout the term there may be occasions when the lecture will be delivered virtually in a synchronous or asynchronous mode. Synchronous virtual lectures will be delivered via Zoom on Jan. 19, Feb. 09, Feb. 28 and Mar. 02. These dates are subject to change. Please check for updates to the course schedule via Canvas and campuswire.com. Furthermore, there will not be any discussion sections on Friday, Jan. 21 and Apr. 08 (Engineering Open House). Be aware that despite the virtual lectures or canceled discussions, online homework assignments or engineering reports may still be due on those days.

**Grade Reporting:** All assessment scores are stored on the Canvas website. Any errors in grade reporting appearing on Canvas must be reported within 2 weeks of the due date of the assessment item or by the last day of class, whichever is earlier. If you have a missing grade for discussion section or a written report, contact the first listed TA in your section. If you have a missing grade from online homework, an exam, or participation, contact the instructor.

**Expectations:** To succeed in this class, you will need to

- read the chapter before coming to class, and formulate questions;
- participate in the class;
- make sure you understand the homework problems and solutions;
- seek out help when you have trouble.

**Obtaining help:** The main two ways to obtain help are online at campuswire.com or during office hours. You can also speak with your professor briefly after lecture. 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 (Campuswire):** This class uses Campuswire for all communication between the instructor and students. Campuswire is a FERPA compliant discussion board. Please visit campuswire.com to register with your @illinois.edu email address. You may need the Join Class Code: 3038 the first time. If you desire, you can post anonymously on Campuswire or make a private post just to the instructors (this should be done rather than emailing the professor directly). You can also use the chat rooms feature on Campuswire study groups etc. Note that Campuswire should be used to communicate with your instructors, rather than email.

**Office Hours (Study Hall):** Office hours will be offered in two formats: Mondays and Wednesdays from 5–6PM via the MSE206 Multipurpose Zoom Space and Tuesdays and Thursdays 4–6PM in person (location TBD, will be announced via campuswire.com prior to Jan. 24). For the in person office hours, the first hour (4–5pm) will be a time to meet up with fellow MSE206 students to work on homework and written reports together, and the second hour (5–6pm) will be staffed by TAs.
Office hours will start in week 2 (Jan. 24). Do not ask TAs to work the homework problems before they are due; it is fine to ask specific questions on the details of your attempted solutions, or to work out problems that are similar to homework problems. All class policies, including academic integrity, harassment, discrimination policies still apply in this classroom space (see below). Abuse of the study hall space should be reported directly to the instructor immediately (you are welcome to do so using the anonymous features in Campuswire).

**Absences:** Excused Absence Request Form: forms.illinois.edu/sec/8097747

1. Excuses from assessments will only be given in the following circumstances:
   (a) Illness, including required quarantines or while waiting for COVID-19 test results.
   (b) Personal crisis (e.g., car accident, required court appearance, death of a close relative).
   (c) Religious observance.
   (d) Required attendance at an official UIUC activity (e.g., varsity athletics, band concert).

2. In all cases you must complete the online Excused Absence Request Form and upload a scan of the official written documentation explaining your absence.

3. In cases (a) or (b) please provide some form of documentation via the online form within 2 weeks of the due date of the missed assessment, but no later than reading day (May 6). In cases of extended or unusual illness, late submission of excuse documentation will be considered. See Student Assistance Center.

4. In case (c) please notify the instructor by completing an Excused Absence Request form at least one week prior to the due date of the missed assessment.

5. In case (d) an official letter from the designated university official must be submitted via the online form at least one week prior to the due date of the missed assessment.

6. If you will not be able to take a quiz due to illness or any other reason, you must send email to your professor at the earliest possible opportunity. Excused exams will be replaced by a weighted average of the other exam scores at the end of semester.

7. Notwithstanding the above, at the professor’s discretion you may be required to make up any excused work or attend substitute instruction or assessment.

**COVID-19 Specific Policies:** Following University policy, all students are required to engage in appropriate behavior to protect the health and safety of the community. Students are also required to follow the campus COVID-19 protocols. This includes following all policies regarding face coverings, building access and quarantine procedures. All students, faculty, staff, and visitors are required to wear face coverings in classrooms and university spaces. This is in accordance with CDC guidance and University policy and expected in this class.

Students who feel ill *must not* come to class. In addition, students who test positive for COVID-19 or have had an exposure that requires testing and/or quarantine must not attend class. The University will provide information to the instructor, in a manner that complies with privacy laws, about students in these latter categories. These students are judged to have excused absences for the class period and should contact the instructor via campuswire.com about making up the work.

Students who fail to abide by these rules will first be asked to comply; if they refuse, they will be required to leave the classroom immediately. If a student is asked to leave the classroom, the non-compliant student will be judged to have an unexcused absence and reported to the Office for Student Conflict Resolution for disciplinary action. Accumulation of non-compliance complaints against a student may result in dismissal from the University.

**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. Every student is expected to review and abide by the Academic Integrity Policy: studentcode.illinois.edu/article1. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Support resources and supporting fellow students in distress: As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (333-0050) or online at odos.illinois.edu/community-of-care/referral/. Based upon your report, staff in the Student Assistance Center reaches out to students to make sure they have the support they need to be healthy and safe.

Further, as a Community of Care, we want to support you in your overall wellness. We know that students sometimes face challenges that can impact academic performance (examples include mental health concerns, food insecurity, homelessness, personal emergencies). Should you find that you are managing such a challenge and that it is interfering with your coursework, you are encouraged to contact the Student Assistance Center (SAC) in the Office of the Dean of Students for support and referrals to campus and/or community resources.

Anti-Racism and Inclusivity Statement:

The Grainger College of Engineering is committed to the creation of an anti-racist, inclusive community that welcomes diversity along a number of dimensions, including, but not limited to, race, ethnicity and national origins, gender and gender identity, sexuality, disability status, class, age, or religious beliefs. The College recognizes that we are learning together in the midst of the Black Lives Matter movement, that Black, Hispanic, and Indigenous voices and contributions have largely either been excluded from, or not recognized in, science and engineering, and that both overt racism and micro-aggressions threaten the well-being of our students and our university community.

The effectiveness of this course is dependent upon each of us to create a safe and encouraging learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all of us. Everyone is expected to help establish and maintain an environment where students, staff, and faculty can contribute without fear of personal ridicule, or intolerant or offensive language. If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of the course director if you feel comfortable. You can also report these behaviors to the Bias Assessment and Response Team (BART). Based on your report, BART members will follow up and reach out to students to make sure they have the support they need to be healthy and safe. If the reported behavior also violates university policy, staff in the Office for Student Conflict Resolution may respond as well and will take appropriate action.

Sexual Misconduct Reporting Obligation: The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University’s Title IX Office. In turn, an individual with the Title IX Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality,
Religious Observances: Illinois law requires the University to reasonably accommodate its students’ religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements. You should examine the syllabus at the beginning of the semester for potential conflicts between course deadlines and any of your religious observances. If a conflict exists, you should notify your instructor of the conflict and follow the procedures outlined in the Absences section.

Family Educational Rights and Privacy Act (FERPA): Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See registrar.illinois.edu for more information on FERPA.

Changes to syllabus: may occur as deemed necessary by the professor; they will be announced.
**Calendar and Topics**: Changes to schedule will be announced; see Canvas calendar for specific reading assignment and to remain up to date.

<table>
<thead>
<tr>
<th>Quiz</th>
<th>Assignments Avail.</th>
<th>Due</th>
<th>Reading Assignment Chapter</th>
<th>Description</th>
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<td></td>
<td></td>
<td>no instruction MLK Jr Day</td>
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<tr>
<td>W Jan 19</td>
<td>HW0</td>
<td>1, 2</td>
<td>Forces as vectors</td>
<td>(Virtual Lecture)</td>
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<tr>
<td>F Jan 21</td>
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<td>M Jan 24</td>
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<tr>
<td>W Jan 26</td>
<td>HW1</td>
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<td>(3.1–3.5) Force system resultants</td>
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<td>F Jan 28</td>
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<td>(3.6–3.8)</td>
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<td>W Feb 02</td>
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<td>(5.4–5.5) Virtual Lecture</td>
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<td>HW5</td>
<td>HW4</td>
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<td>F Feb 25</td>
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<td>RP5</td>
<td>RP4</td>
<td>(7.5–7.9)</td>
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<td>M Feb 28</td>
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<td>W Mar 02</td>
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<td>HW5</td>
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<td>W Mar 09</td>
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<td>— Spring Break —</td>
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<td>M Mar 21</td>
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<td>W Mar 23</td>
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<td>W Mar 30</td>
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<td>W Apr 06</td>
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<td>F Apr 08</td>
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<td>M Apr 11</td>
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<td>RP9</td>
<td>(12.1–12.2)</td>
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