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
- 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 or 257(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 CS124 (Introduction to Computer Science I) or CS125 (Intro to Computer Science).

Instructor: Dr. Ibnaj Anni (anniib27@illinois.edu; 201c MSEB)

Teaching Assistants: Grace Lu (graceml2@illinois.edu)
Office hours: Monday-Wednesday 4–6pm in 305 MSEB; Thursday 4–6pm in 4101 MSEB

Discussion Sections: *You may only attend your registered section*
AD1, F 1:00–1:50pm, 3038 Campus Instructional Facility, AD2, F 2:00–2:50pm, 3038 Campus Instructional Facility, AD3, F 3:00–3:50pm, 3038 Campus Instructional Facility

Text: *Statics & Mechanics of Materials*, R. C. Hibbeler, 6th ed. (Pearson, 2023). If you prefer to purchase the electronic version of the book, you're more than welcome to do so. You'll need to register with pearson.com. Then enter the courseID: krogstad21471.

Alternative Text: *Statics and Mechanics of Materials: An Integrated Approach*, William F. Riley, Leroy D. Sturges, and Don H. Morris (Wiley 2002). Available at Engineering Reserves in Grainger.

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 3.

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: TRUP). 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:

12%×(Online Homework) + 8%×(Participation) + 10%×(Engineering Discussion) + 70%×(Quizzes / Final Exam) = 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 (12%): 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. 29*, 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. 5 and covers the material of Chapter 3.

Lectures (8%): Prompt and regular attendance at lectures is required to obtain credit for iClicker: 75% participation, 25% correctness. You may miss upto 5 lectures without excuse or penalty. In the case of illness or anticipated absences, please watch the live lecture capture. You do not need to request an excuse unless the illness becomes extended (3 or more sequential lectures).

Discussion Sections (10%): Prompt and regular attendance at your discussion section is required. You must attend only the discussion section in which you are enrolled. 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. 24.

Engineering Reports (0%): Each week an optional exercise will be made available. These are called Engineering Reports and provide an opportunity to deepen your understanding of the content. These exercises are entirely optional but highly encouraged.

Engineering reports are made available to allow you to practice the communication of engineering concepts in writing. Consider the following when completing these exercises: presentation, neatness, correct use of symbols, quality of drawings and diagrams, and clarity of explanation. Correct interpretation of the problem and correct final answers are important but not the focus. Students who complete and submit 8 out of the 11 available reports may be considered for extra credit on the instructors discretion. TAs will be available to discuss and help with reports during regular office hours.

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. 7–10** (optional), **Feb. 14–17**, **Feb. 28–Mar. 3**, **Mar. 28–31**, **Apr. 4–7**, **Apr. 18–21**, and **May 2–5**. The final exam will take place during exam week (**May 8–16**). 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 —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 www.prairietest.org/ 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 1 hour and 50 minutes.

Total score: Your total score of 70% is calculated from your six quizzes as: 20%×(highest quiz score)+ 10%×$\sum$(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/students.

Virtual or cancelled classes: Throughout the term there may be occasions when the lecture will be delivered virtually in a synchronous or asynchronous mode. Please check for updates to the course schedule via Canvas and campuswire.com. Furthermore, there will not be any discussion sections on Friday Apr. 4 (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: 5693* 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 Monday-Wednesday from 4–6PM in 305 MSEB and Thursday from 4–6PM in 4101 MSEB. 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. 27). 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 7). 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.

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, can be found here: wecare.illinois.edu.

Other information about resources and reporting is available here: wecare.illinois.edu.

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.

		Assignments		Reading Assignment	
	Quiz	*Available*	*Due*	*Chapter*	*Description*
M Jan 20					*no instruction* MLK Jr Day
W Jan 22		HW0		1, 2	Forces as vectors
F Jan 24					Engineering analysis 0
M Jan 27				3	(3.1–3.5) Force system resultants
W Jan 29		HW1	HW0		(3.6–3.8)
F Jan 31		RP1			Engineering analysis 1
M Feb 03				4	(4.1–4.4) Rigid body equilibrium
W Feb 05		HW2	HW1		(4.5–4.8)
F Feb 07	**0**	RP2	RP1		Engineering analysis 2
M Feb 10	**0**			5	(5.1–5.3) Structural analysis
W Feb 12		HW3	HW2		(5.4–5.5)
F Feb 14	**1**	RP3	RP2		Engineering analysis 3
M Feb 17	**1**			6	(6.1–6.3) Center of gravity
W Feb 19		HW4	HW3		(6.4–6.6) Moment of inertia
F Feb 21		RP4	RP3		Engineering analysis 4
M Feb 24				7	(7.1–7.4) Stress and strain
W Feb 26		HW5	HW4		(7.5–7.9)
F Feb 28	**2**	RP5	RP4		Engineering analysis 5
M Mar 03	**2**			14	(14.1–14.5) Coordinate transformation
W Mar 05		HW6	HW5		(14.6–11)
F Mar 07		RP6	RP5		Engineering analysis 6
M Mar 10				8	(8.1–8.4, 14.9) Mechanical properties
W Mar 12		HW7	HW6		(8.5–8.7, 14.10)
F Mar 14			RP6		Engineering analysis 7
— Spring Break —					
M Mar 24				9	(9.1–9.3) Axial Load
W Mar 26		HW8	HW7		(9.4–9.6)
F Mar 28	**3**	RP8	RP7		Engineering analysis 8
M Mar 31	**3**			10	(10.1–10.2) Torsion
W Apr 02		HW9	HW8		(10.4–10.5)
F Apr 04	**4**				*no discussion* EOH
M Apr 07	**4**			11	(11.1–11.2) Bending
W Apr 09		HW10	HW9		(11.3–11.4)
F Apr 11			RP8		Engineering analysis 9
M Apr 14				12	(12.1–12.2) Transverse shear
W Apr 16		HW11	HW10	16	(12.1–12.2)
F Apr 18	**5**	RP10	RP9		Engineering analysis 10
M Apr 21	**5**			16	(16.1–16.2) Deflection of beams
W Apr 23		HW12	HW11		(16.4–16.5)
F Apr 25		RP11	RP10		Engineering analysis 11
M Apr 28				13	(13.1–13.2) Combined Loading
W Apr 30		HW13	HW12	17	(17.1-17.2) Buckling
F May 02	**6**		RP11		Engineering analysis 12
M May 05	**6**			17	(17.3) Buckling
W May 07			HW13		Review
F May09	**F**	—		—	*no discussion* EXAM WEEK