

**Schedule:** TTh 12:30pm–2:20pm in 124 Burrill Hall; discussion F in MSEB 4101, see below for times.

**Course websites:**

- Class schedule, announcements, lecture slides, gradebook, and written report deposit: [compass2g.illinois.edu](http://compass2g.illinois.edu)
- Online homework: [masteringengineering.com](http://masteringengineering.com)
- Online discussion forums: <https://piazza.com/illinois/spring2015/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 225 (Linear Algebra), Math 241 (Calculus III), Physics 211 (Mechanics); credit or concurrent registration in MSE 201 (Phases and Phase Relations).

**Instructor:** Jessica Krogstad ([jakrogst@illinois.edu](mailto:jakrogst@illinois.edu); 168 MRL); co-instructor Laura Nagel ([lj-nagel@illinois.edu](mailto:lj-nagel@illinois.edu); 201A MSEB in the main hallway).

**Teaching Assistants:** Michael Darrow ([mcdarro2@illinois.edu](mailto:mcdarro2@illinois.edu)), Derek Kwok ([dkwok2@illinois.edu](mailto:dkwok2@illinois.edu)), and Connor Bailey ([csbaile2@illinois.edu](mailto:csbaile2@illinois.edu))

*Office hours:* M 1:00–2:00pm, Th 11:00am–12:00pm, 433 Grainger.

**Discussion Sections:** *You may only attend your registered section;* first TA is responsible for grading:  
 AD1, F 1:00–1:50pm, 4101 MSEB, Laura Nagel and Michael Darrow  
 AD2, F 2:00–2:50pm, 4101 MSEB, Derek Kwok/Connor Bailey and Laura Nagel  
 AD3, F 3:00–3:50pm, 4101 MSEB, Michael Darrow and Derek Kwok/Connor Bailey

**Text:** *Statics & Mechanics of Materials*, R. C. Hibbeler, 4th ed. (Pearson, 2014); see *MasteringEngineering* below for more information.

**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](http://disability.illinois.edu)) as soon as possible, and no later than Feb. 14.

**i>clickers:** Quizzes will be administered in lectures using the i>clickers. The i>clicker remote may be purchased at any of the book stores and must be registered on COMPASS2G, under the tab “i>clicker Remote Registration.” **You need to register your i>clicker by February 2, when the i>clicker roster will be synced for the last time.**

**Course evaluation:**

$$10\% \times (\text{Online Homework}) + 4\% \times (\text{In-lecture i>clicker}) + 8\% \times (\text{Discussion Worksheets}) + 8\% \times (\text{Written Reports}) + 20\% \times (\text{Exam 1}) + 20\% \times (\text{Exam 2}) + 30\% \times (\text{Final Exam}) = \text{Total}$$

**Numerical total score corresponds to 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)	

**MasteringEngineering:** Your online homework assignments will be available from the website [www.masteringengineering.com](http://www.masteringengineering.com). You should consider one of the following options to obtain access to MasteringEngineering:

1. Purchase textbook from the bookstore (\$242.50): MasteringEngineering + eText + printed version of the textbook
2. Purchase MasteringEngineering + eText (\$110.55)
3. Purchase MasteringEngineering only (\$60.50); in this case, you may borrow a book from a friend or library, or buy a used (earlier edition) textbook.

Please follow the steps below to start using MasteringEngineering:

- Go to the website [masteringengineering.com](http://masteringengineering.com)
- Select “Register Now” as a student on the right side of the page; after selecting your location “In US or Canada” . . .
  - “Yes, I have an access code”—if you purchased the printed version of the textbook from the bookstore (option 1 above)
  - “No, I need to buy access” (options 2 and 3 above); you will be asked if you wish to purchase the eText next.
- You will need to create a Login Name and Password.
- After you login for the first time, you will receive a Welcome Message. You will be asked to enter the Course ID: MEKROGSTAD20566
- You will also be asked to enter your UIUC NetID (which is the first part of your email address: NetID@illinois.edu). Make sure you type this information correctly, since it will be used to upload your grades into COMPASS2G.

**Online Homework (10%):** Assignments on MasteringEngineering.

- Online homework assignments are due on **Mondays at 11:59 pm**. Late submissions will be penalized by 50% for each day late.
- Some problems will have a hint; you can get 1% bonus if you choose not to open the hint. To encourage you to work through the problems and to obtain the correct solution you may revise and resubmit your solutions numerous times until the due date.
- 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 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 *Friday Jan. 30*. It will familiarize you with MasteringEngineering, and includes multiple choice questions regarding the syllabus. *You will only have one attempt for each multiple choice item*. You can earn up to 0.5 of extra points to be added to your final grade.
- The first online homework is due on Monday Feb. 2 and covers the material of Chapter 3.

**Lectures (4%):** Prompt and regular attendance at lectures is required to obtain credit for i>clicker quizzes: 75% participation, 25% correctness.

**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.

Most discussion sessions will consist of a group worksheet exercise, which is a high-energy and efficient 50-minute learning experience. In each session, students are randomly assigned to a group of three to four people. Each student must submit a completed worksheet, but only one randomly-chosen worksheet will be scored from each group, and every student in that group will be given that score. If you are more than 5 minutes late to a discussion session, then you will not be permitted attend the discussion section. There are two main goals for the discussion worksheets:

- **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 worksheet 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 discussion worksheets 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. 23.

**Written 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 discussion section. The report will be handed out during the discussion 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. Please note that this is an independent assignment and while you are encouraged to work with your classmates, your final submission must comply with the University Honor Code.

Written 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 written reports will not be accepted. The first reports will be assigned Friday Jan. 30 during your discussion section, and due Friday Feb. 6. An example of a good report can be found on the class website. Point breakdown for the written 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

**Midterm Exams (20% + 20%) and Final Exam (30%):** There are two midterm exams; they will take place in class (12:30–2:20pm) on Thursday Feb. 26 and Thursday Apr. 9. The final exam will take place on 7:00–10:00pm on Thursday May 14. 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*. Conflict-exam arrangements will be announced in the week before the final exam, and will be scheduled for students with a legitimate scheduled conflict according to the final exam policies. Exams are closed to all electronics (no calculators, no laptops, no phones, etc), and a formula sheet will be provided at the exam. **Bring your student ID to the exam, and arrive with sufficient time to sign in.**

*Canceled classes:* There will be no lecture on Tuesday, January 27; however the rest of the week will remain normal. The Tuesday classes immediately prior to the two midterm exams (Feb. 24 and Apr. 7) will be an optional review class. There will be no i>clicker questions on these days. Attendance is not required, but you may find it beneficial to attend. The final week of class (Tuesday May 5) will also be an optional review class. There will not be any discussion sections on the Friday immediately after the two midterm exams (Feb. 27 and Apr. 10). Finally, there will not be any discussion sections on Friday Mar. 13 (Engineering Open House). Be aware that despite the canceled discussions, **written reports are still due on those Fridays.**

**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. 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 i>clicker, 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 Piazza or in person at the Grainger 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 (Piazza):** This class uses Piazza for all communication between the instructor, TAs, and students. Please visit [piazza.com/illinois/spring2015/mse206/home](http://piazza.com/illinois/spring2015/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. TAs are scheduled to be checking Piazza during the week 11am–12pm, 5–6pm, and 9–10pm. *Note that Piazza should be used to communicate with your instructors, rather than email.*

**Office Hours (Study Hall):** Study hall and TA office hours will be held in 433 Grainger, Mondays 12–2pm and Thursday 10:00am–12:00pm. The first hour (12–1pm and 10:00–11:00pm) will be a time to meet up with fellow MSE206 students to work on homework and written reports together, and the second hour (1–2pm and 11:00am–12:00pm) will be staffed by TAs. Office hours will start in week 2 (Jan. 26). 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.

**Absences:** Excused Absence Request Form: [illinois.edu/fb/sec/3162259](http://illinois.edu/fb/sec/3162259)

- Excuses from assessments will only be given in the following circumstances:
  - Illness.
  - Personal crisis (e.g., car accident, required court appearance, death of a close relative).
  - Required attendance at an official UIUC activity (e.g., varsity athletics, band concert).
- In all cases you must complete the online Excused Absence Request Form and upload a scan of the official written documentation explaining your absence.
- In cases (a) or (b) an official excuse letter from the Dean on Duty must be submitted 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](#).
- In case (c) 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.
- If you will not be able to take an exam 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.
- 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.

**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 COMPASS2G calendar for specific reading assignment and to remain up to date.

	Assignments		Chapter	Description
	available	due		
T Jan 20	HW0		1, 2	Forces as vectors
Th Jan 22			3	Force system resultants
F Jan 23	WS0			
M Jan 26	HW1			
T Jan 27				<i>no lecture</i>
Th Jan 29			3	Force system resultants
F Jan 30	WS1	HW0		
M Feb 02	HW2	HW1		
T Feb 03			4	Rigid body equilibrium
Th Feb 05				
F Feb 06	WS2	RP1		
M Feb 09	HW3	HW2		
T Feb 10			5	Structural analysis
Th Feb 12				
F Feb 13	WS3	RP2		
M Feb 16	HW4	HW3		
T Feb 17			6	Center of gravity, moment of inertia
Th Feb 19				
F Feb 20	WS4	RP3		
M Feb 23		HW4		
T Feb 24			—	<i>review ch. 1–6</i>
Th Feb 26	EXAM1		1–6	
F Feb 27	—	RP4	—	<i>no discussion</i>
M Mar 02	HW5			
T Mar 03			7	Stress and strain
Th Mar 05				
F Mar 06	WS5			
M Mar 09	HW6	HW5		
T Mar 10			14	Coordinate transformation
Th Mar 12				
F Mar 13	—	RP5	—	<i>no discussion</i> ENGINEERING OPEN HOUSE
M Mar 16	HW7	HW6		
T Mar 17			8	Mechanical properties
Th Mar 19				
F Mar 20	WS6			
— spring break —				
M Mar 30	HW8	HW7		
T Mar 31			9	Axial load
Th Apr 02			10	Torsion
F Apr 03	WS7	RP6		
M Apr 06		HW8		
T Apr 07			—	<i>review ch. 7–10, 14</i>
Th Apr 09	EXAM2		7–10, 14	
F Apr 10	—	RP7	—	<i>no discussion</i>

M Apr 13	HW9			
T Apr 14			11	Bending
Th Apr 16			12	Transverse shear
F Apr 17	WS8			
M Apr 20	HW10	HW9		
T Apr 21			16	Deflection of beams
Th Apr 23				
F Apr 24	WS9	RP8		
M Apr 27	HW11	HW10		
T Apr 28			13	Combined loading
Th Apr 30			17	Buckling of columns
F May 01	WS10	RP9		
M May 04		HW11		
T May 05			—	<i>review ch. 11–13, 16–17</i>
Th May 14	FINAL	RP10	1–14, 16–17	7:00-10:00pm, final exam