CEE101A: Mechanics of Materials

Tuesday and Thursday, 9:00 - 10:50 am
Room 200-205
Course website: *http://coursework.stanford.edu*

Instructor	Jack Baker	Office hours: T, Th 1:00 – 2:30pm or by appointment
Course Assistants	Anthony Alvarado Danielle Rubin Elijah Turner Building 540, room 106	Office hours: M, W 11:00 am – 12:30 pm M, W 1:00 – 2:30pm

Required Text Mechanics of Materials (Eighth Edition) by James Gere and Barry Goodno. Cengage Learning.

A "Selected Chapters" version of this book is available in the bookstore and contains all of the chapters needed for this course. The full version can be purchased from an online bookstore.

Course Content

Mechanics of Materials is an introductory course to the field of structural engineering. In particular, the course develops the theory behind the fundamental topics of mechanics of materials and demonstrates how this theory is put into practice to analyze and design structural elements. The only prerequisite is a basic course in Statics (E14).

The topics covered include: (1) the principles of stress and strain, (2) axial forces, shear forces and bending moments in statically determinate beams, (3) normal and compound stresses in beams, (4) analysis of composite beams, (5) plastic bending, (6) deflections of statically determinate beams, (7) method of superposition, (8) deflections and internal stresses in statically indeterminate beams, (9) elastic column buckling and (10) shear stress, shear flow and shear center.

Course Objectives

Upon completing CEE 101A, students are expected to be able to

(1) derive the fundamental equations that govern the behavior of beams and columns
(2) compute the internal axial forces, shear forces, bending moments and corresponding stresses acting in statically determinate beams
(3) compute the deflected shapes of statically determinate beams
(4) apply the principle of superposition to compute the deflected shape and internal stresses in simple statically indeterminate beams
(5) compute the buckling loads of columns with various end conditions
(6) determine the required sizes of beams and columns to support prescribed sets of loads
(7) apply the procedures developed in the course to the analysis and design of simple structures.

Course Schedule

Date	Topic	Suggested reading
1/8	Introduction. Review of equilibrium.	
1/10	Stresses and strains in materials	1.1 – 1.6
1/15	Shear stress and strain	1.7 – 1.8
1/17	Torsion	3.1 – 3.3
1/22	Shear forces and bending moments	4.1 – 4.5
1/24	Shear forces and bending moments	
1/29	Normal stresses in beams	5.1 – 5.5
1/31	Normal stresses in beams	12.1 – 12.5
2/5	Shear stresses in beams	5.8 – 5.10
2/7	Mohr's circle	7.1 – 7.3
2/12	Mohr's circle	7.4 – 7.5
2/14	**Midterm**	
2/19	Plastic bending	6.10
2/21	Deflections of beams	9.1 – 9.5
2/26	Deflections of beams	
2/28	Statically indeterminate beams	10.1 – 10.4
3/4	Statically indeterminate beams	
3/6	Column buckling	11.1 – 11.3
3/11	Column buckling	11.4
3/13	Review	
3/22	**Final Exam, 12:15 - 3:15 pm**	

Grading

Homework Assignments	25%
Lab Reports	10%
Midterm	25%
Final Exam	40%

Homework assignments and laboratory reports are to be submitted at the beginning of the lecture period on the date due. Late homework and laboratory reports will be penalized at a rate of 10% per day late. Homework submitted after the solutions have been provided will not be accepted.

The lab reports will be completed in teams, to be determined later in the quarter. For your homework, you are encouraged to work with others on understanding to perform calculations, but your write-up must be done by yourself and must be your work alone.

The midterm and final exam will be given in class. The format will be very similar to the homework assignments, so successful completion of the homework will be a good indicator of your success on the exams. The final exam will cover all material presented in the course. ***If you are not able to attend on either of the exam dates, please speak with me immediately.***