Professor
Professor Mathieu Bauchy
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5731 Boelter Hall
Office hours: M 10am–12pm

Teaching Assistant
Han Liu
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TR 4pm–6pm

Course Meeting Schedule
Lecture 1: TR 2:00pm-3:50pm
Discussion 1A: F 2:00pm-3:50pm
Room BH 5249
Room BH 5249

Assignments and Exams
Homework will be due one week from the assigned date. Late submissions will
be admitted the next lecture or discussion after the due date, but with a 20%
penalty. Later submission will not be admitted. Quizzes are not announced. All
exams and quizzes are closed book.

Policies
Regular class attendance is expected. Homework needs to be done neatly and
orderly. It is expected that you uphold the highest ethical standards, be honest,
and practice academic integrity. You need to work out your homework and
exams independently. Any form of copying from other’s work is prohibited. If
you have any special needs or concerns for this course, please contact me in
person or by e-mail.

Miscellaneous
Handouts, homework assignments, homework solutions, and announcements
are distributed during the class and will also be posted on the CEE 108 course
web site through CCLE.

Textbook
Mechanics of Materials
(9th or 10th edition)
R.C. Hibbeler, 2013 (required)

Grading
Homework: 25%
Due one week from assigned date
Quizzes: 15%
Unannounced (during class)
Midterm: 25%
Friday, Feb. 9 (Tentative date)
Final exam: 35%
Exam code: XX
TBA
Participation: up to 5%
Additional credit based on active
participation in class
Course description

This course will introduce the fundamentals of elementary solid mechanics for deformable bodies. Main focus will be on three fundamental concepts of solid mechanics: equilibrium, force-temperature-deformation behavior of materials and geometry of deformation. Topics include: equilibrium principles, forces and moments transmitted by slender members, concepts of stress and strain, linear stress-strain relationship, transformation of stress and strain, deformation and stress caused by tension, compression, bending, shear and torsion of slender members, structural applications to trusses, beams, shafts and columns, and buckling of columns. Enforced Prequisite: CEE 91 Statics

Detailed Course Outline

- Introduction (2 lectures)
  Mechanics of materials; Equilibrium of deformable bodies (fundamental equations and solution methods); Stress, normal stress and shear stress.

- Mechanical Properties of Materials (1 lecture)
  Strain; Stress-strain diagram; Stress-strain behavior of ductile and brittle materials; Hooke’s law; Poisson’s ratio.

- Axial Load (2 lectures)
  Elastic deformation of axially loaded member; Statically indeterminate axially-loaded member; Thermal stress.

- Torsion (2 lectures)
  Torsional deformation of circular shaft; Stress distribution in circular torsion bars; Torsion formula; Angle of twist; Statically indeterminate torque-loaded members.

- Midterm Review Session (1 lecture)

- Bending (3 lectures)
  Equilibrium of beams; Shear and moment diagrams; Bending deformation of straight member; Flexural stress in linearly elastic beams and flexure formula.

- Transverse Shear (2 lectures)
  Shear stress and shear flow in beams; Shear formula; Shear stress and shear flow in thin-walled beams.

- Stress Transformations (2 lectures)
  Plane stress; Plane stress transformation; Principal stresses and maximum shear stress; Mohr’s circle in plane stress; Absolute maximum shear stress.

- Deflection of Beams and Shafts (1 lecture)
  Differential equation of the deflection curve; Slope and deflection by integration for statically determinate beams; slope and deflection by integration for statically indeterminate beams; Superposition method; Moment-area method.

- Buckling of Columns (1 lecture)
  Critical load; Ideal column with pin supports; Columns with different end conditions.

- Final Review Session (2 lectures)
Grade Descriptions

35% Final Exam, 25% Midterm, 25% Homework Assignments, 15% Quizzes + up to additional 5% for participation. It should be noted that this distribution could be changed as may be appropriate at the discretion of the instructor. The course will not be graded on a curve. Final grades will be assigned based on the total number of percentage points accumulated by the student. As a sample guide, letter grades will generally be assigned as follows: Total percentage in the 90s: A+ and A-, 80s: B+ and B-, 70s: C+ and C-, 60s: D+ and D-, below 60s: F. Students are encouraged and welcome to discuss any grade with the instructor. For homework, it is important that this is done within one class of when the graded work is returned to the class. Students are free to contest homework and exam grades; however, this must be done in writing and submitted in person to the instructor. The item in dispute must be submitted before the end of the first lecture following the return of the graded homework assignment or exam answer sheet.

Homework Exercises

All homework is to be prepared in a format consistent with professional engineering practice. This should include preparation on engineering paper with the problem worked on one side and all sheets should contain the student’s name, assignment and problem numbers. Homework not received in this manner will receive: (a) negative points or (b) in case of repetitive action or exceptional cases not be graded and the student will receive an incomplete for the assignment. Free body diagrams should always be drawn at the beginning of a problem. Axis should be defined. The name and direction of the unknown forces and moments should be clearly specified. The sign conventions that are used should be given. The solution should be provided with all possible intermediate steps and the answer (with units) should be “boxed” at the end. All answers involving numbers requires units, in case of incomplete or incorrect units the answer will be deemed to be incorrect. Each problem should begin on a new page and answers should be provided with a suitable number of significant figures. All problems will be graded for correctness and completeness independent of the solution approach used; at the sole discretion of the Instructor. Students are encouraged to consult with each other on homework assignments. However, all submitted work should be of an individual nature. If there is reason to believe that work has been copied or completed in collaboration with another student, university regulations will be followed regarding application and enforcement of punitive action including immediate failure of the homework or the course as warranted by the circumstances. Further measures may be applied at the discretion of the instructor and University Staff.

Exam

The exam will be based on a closed book-and-notes model. Relevant formulas will be provided with the exam and a sample of provided equations will be made available before the exam. While calculators (four-function, scientific, and graphing) are permitted, grading credit will be based only upon information provided in the exam answer sheet; as such, show all work. Free body diagrams should always be drawn at the beginning of a problem. Axis should be defined. The name and direction of the unknown forces and moments should be clearly specified. The sign conventions that are used should be given. The solution should be provided with all possible intermediate steps and the answer (with units) should be “boxed” at the end. All answers involving numbers requires units, in case of incomplete or incorrect units the answer will be deemed to be incorrect. In case of “propagating errors”, partial grading (up to 50%) can be attributed if the method is correct. Examination answer sheets must reflect work that is based purely on individual effort. Make-up exams will not be provided except in exceptional cases and then too only upon submission of relevant documentation that substantiates the circumstances of the absence. In case of reason to believe that exam work has been copied or done in collaboration with another student, university regulations will be followed regarding application and enforcement of punitive action including immediate failure of the exam and-or the course as warranted by the circumstances. Further measures may then be applied at the discretion of the instructor and University Staff.