

## ME 104: Engineering Mechanics II

**Instructor:** Prof. D.J. Steigmann, 6133 Etcheverry Hall (dsteigmann@; ph. 643-3165)

**GSIs:**

Alex Garcia (g.alex215@)

Javid Hamidov (javid\_hamidov@)

**Readers:**

Angel Hernandez (angel.hern5@)

Thomas Yu (thomaszy@)

**Locations/Times:**

Lectures:

Tuesdays and Thursdays, 12:30 - 2 pm, A1 Hearst Field Annex

Discussion Sections:

Mondays (with Alex), 9-10 am, 101 Barker

Wednesdays (with Javid), 12-1 pm, 247 Cory

Wednesdays (with Javid), 3-4 pm, 247 Cory

Fridays (with Alex), 12-1 pm, 1165 Etcheverry

**Course objectives:** The purpose of ME 104 is to learn how to describe and predict the motion of objects and systems of objects subject to various kinds of forces and constraints. The emphasis is on the development of theory and its use in problem solving.

**Prerequisite:** ME C85.

**Text:** D. Gross, W. Hauger, J. Schröder, W.A. Wall and S. Govindjee, *Engineering Mechanics 3: Dynamics (2nd edn)*. Springer, 2014.

This is a comprehensive, inexpensive text suitable for background reading. It includes many worked examples. We won't follow it exactly, but it's definitely worth having.

**Office Hours:**

Steigmann: 11-12 am, Tuesdays and Thursdays, 6133 Etcheverry Hall

Hamidov: 3-4 pm, Mondays and Thursdays, 1171 Etcheverry Hall

Garcia: 2-3 pm, Tuesdays and Thursdays, Hesse Hall

**Exams:**

Midterm 1: Thursday, March 13, at regular lecture time/location.

Midterm 2: Thursday, April 24, at regular lecture time/location.

Final: Thursday, May 15, 3-6 pm (location TBA).

All exams will be **closed-book**. **One page** (2 sides) of handwritten notes will be permitted for Midterm 1, **two pages** (4 sides) for Midterm 2, and **three pages** (6 sides) for the Final.

If you must miss an exam, you must request and receive permission in advance from Prof. Steigmann. Permission will be granted only for significant and verifiable reasons. Medical excuses require a note from a medical doctor (exception: If you have a special DSP accommodation concerning a medical reason for missing an exam, contact Prof. Steigmann directly). If you are excused from an exam, you must contact Prof. Steigmann to schedule an **oral exam** to replace your missed exam. A grade of **zero** will be assigned for unexcused missed exams.

**Homework:**

Six or seven problem sets will be assigned, spaced at semi-regular intervals throughout the semester. **No late homework will be accepted.** To receive credit, you must submit your solutions by the due date/time (unless you have a DSP accommodation for extension of the due date). Your homework should be submitted in .pdf format on Gradescope. Solutions will be posted on bCourses soon after the due date.

We will drop your problem set with the lowest grade when calculating your overall course grade.

**Drop-in Tutoring:**

Angel (angel.hern5@) is offering drop-in tutoring in room 325 Davis Hall at 2-4 pm on Tuesdays and Thursdays, and 3-5 pm on Wednesdays.

**Grading:**

Homework: 20%

Midterm 1: 20%

Midterm 2: 20%

Final: 40%

**Discussion Forum:**

We will use Ed Discussion (accessible from the bCourses web page) for answering questions outside of lectures and discussion sections. We will not answer technical questions over email - these should all be posted on Ed Discussion so everyone can put in their thoughts and see the answer. We will respond as quickly as possible.

**Topics:** The following is a **tentative** list of weekly topics.

Week 1: Single particle kinematics

Week 2: Single particle kinematics and dynamics: Non-Cartesian coordinates

Week 3: Single particle dynamics: Friction and kinematic constraints

Week 4: Single particle dynamics: Power, work and energy

Week 5: Single particle dynamics: Linear and angular momentum, orbital mechanics

Week 6: Systems of particles: Mechanical balance laws

Week 7: Systems of particles: Collisions

Week 8: Rigid body kinematics

Week 9: Rigid body kinematics

Week 10: Rigid body dynamics

Week 11: Rigid body dynamics: Change of frame

Week 12: Systems of rigid bodies and particles

Week 13: Systems of rigid bodies and particles

Week 14: Virtual work principles