

USC Viterbi School of Engineering

AME 201 Statics

Units 3
Term Fall 2019 **M Aug 26th – F Dec 6th**
Section 28709R

Location Lecture T/Th 12:30 – 1:50pm THH 208
See the course Blackboard page for updates

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Course Description

Analysis of forces acting on particles and rigid bodies in static equilibrium; equivalent systems of forces; friction; centroids and moments of inertia; introduction to energy methods. (from the USC Course Catalogue)

The subject of Statics deals with forces and moments acting on rigid bodies at rest covering coplanar and non-coplanar forces, concurrent and non-concurrent forces, friction forces, centroid and moments of inertia. Much time will be spent finding resultant forces for a variety of force systems, as well as analyzing forces acting on bodies to find the reacting forces supporting those bodies. Students will develop critical thinking skills necessary to formulate appropriate approaches to problem solutions.

Learning Objectives

Throughout the semester students will develop an understanding of, and demonstrate their proficiency in the following concepts and principles pertaining to vector mechanics, statics:

1. Components of a force and the resultant force for a system of forces
2. The moment caused by a force acting on a rigid body
3. Principle of transmissibility and the line of action
4. Moment due to several concurrent forces
5. Force and moment reactions at the supports and connections of a rigid body
6. Force in members of a truss using the Method of Joints and the Method of Sections
7. Centroid and center of gravity for an area and a rigid body
8. Moment of inertia and radius of gyration of a composite area

Prerequisite(s): MATH 125

Co-Requisite (s): n/a

Concurrent Enrollment: n/a

Recommended Preparation: AME 101, PHYS 151L

Course Content and Discussion Forum

This course will use Piazza for all class discussions. Refrain from emailing questions related to assignments, midterms, etc., and instead **use Piazza**. The TA, myself and even you can answer questions as they arise, thus providing an efficient means for communication. If you have issues accessing the Piazza, contact team@piazza.com directly. Before the semester begins, verify that you have access to these websites; Piazza is accessed from within the Blackboard page. **Recommended download:** Piazza App for phones. It works!

Tentative Course Schedule

| DATE | TOPIC | HW Set Assigned | Quiz/Exam (Topic) |
|-----------|---|-----------------|--------------------|
| Tue 8/27 | Review of Vector Algebra, Systems of Units | HW1 | |
| Thu 8/29 | Statics of Particles | | |
| Tue 9/03 | Rigid Bodies: Equivalent System of Forces | | |
| Thu 9/05 | | HW2 | Q1 (HW1) |
| Tue 9/10 | | | |
| Thu 9/12 | | | |
| Tue 9/17 | Equilibrium of Rigid Bodies | HW3 | Q2 (HW2) |
| Thu 9/19 | | | |
| Tue 9/24 | | HW4 | Q3 (HW3) |
| Thu 9/26 | | | |
| Tue 10/01 | | HW5 | Q4 (HW4) |
| Thu 10/03 | Midterm Exam 1 | | MT1 (HW1-4) |
| Tue 10/08 | | | |
| Thu 10/10 | Centroids and Centers of Gravity | | |
| Tue 10/15 | | HW6 | Q5 (HW5) |
| Thu 10/17 | | | |
| Tue 10/22 | Moments of Inertia | HW7 | Q6 (HW6) |
| Thu 10/24 | | | |
| Tue 10/29 | | HW8 | Q7 (HW7) |
| Thu 10/31 | Analysis of Structures: Trusses | | |
| Tue 11/05 | | | |
| Thu 11/07 | Midterm Exam 2 | | MT2 (HW5-8) |
| Tue 11/12 | Method of Joints/Sections | HW9 | |
| Thu 11/14 | Analysis of Structures: Frames, Machines | | |
| Tue 11/19 | Internal Forces, Shear and Bending Moment | HW10 | Q8 (HW9) |
| Thu 11/21 | | | |
| Tue 11/26 | | HW11 | Q9 (HW10) |
| Thu 11/28 | <i>No Lecture, Thanksgiving</i> | | |
| Tue 12/03 | | | |
| Thu 12/05 | Final Review/Course Summary | | Q10 (HW11) |
| Tue 12/17 | Final Exam (cumulative) | | FINAL EXAM |

Required Materials

The textbook listed below is **required**. For all quizzes and exams, a **basic** scientific calculator is required. Programmable calculators and wireless devices (e.g., cell phones, iPod/Pad, etc.) are **not permitted**.

F. P. Beer, E. R. Johnston Jr. & D. F. Mazurek. *Vector Mechanics for Engineers – Statics*, 11th Edition, McGraw-Hill Publications (2015) ISBN-10: 0077687302; ISBN-13: 978-0077687304

Description and Assessment of Assignments

There will be two Midterm Exams held during the regular lecture time: Thursday, October 3rd and Thursday, November 7th. The final exam will be on December 17th from 11 am to 1 pm. All written exams and quizzes will be closed book and closed notes. Homework sets will be assigned weekly. Homework will not be collected; however, a weekly quiz will be given that covers the material from the assigned homework set.

Thus, it is your responsibility to complete the problem set before each week's quiz or midterm exam (eLearning is used for submission for records). All quizzes and exams are typically administered on Thursday at the start or end of the lecture section unless otherwise noted. Midterms will utilize the entire section-time (12:30-1:50p); quizzes will be much shorter, and the remaining time will be used for a standard lecture session.

In order to receive credit for your work, all quiz and exam problems must be presented in a clear, organized manner. Solutions must show evidence of work; "magic" answers will not be accepted. Partial credit may be given if the solution is presented in a logical fashion. Students are encouraged to study the assigned HW sets together; however, each individual must ensure they obtain an understanding of the material. Between the instructor and the Teaching Assistant, there are office hours throughout the week to help you through the course. This time is best utilized when students come prepared with an attempt at a solution, thus allowing us to help you through your thought process.

All quizzes, the midterm and final exam are to be completed as an individual. Failure to comply with this requirement will result in a failing grade for the course. Read the section titled **Academic Conduct** below.

Grading Breakdown

Subject to change; see Course Schedule for Quiz/Exam dates.

There will be no makeup quizzes or makeup exams. Missing an exam or a quiz or will result in a score of 0. However, note that your lowest scoring quiz will be dropped from the final grade calculation. All exams count towards the final grade.

| Assignment | % of Grade |
|--------------|------------|
| Quizzes (10) | 30 |
| Midterms (2) | 40 |
| Final Exam | 30 |
| Total | 100 |

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/b/11-00-behavior-violating-university-standards-and-appropriate-sanctions/>, and **view the guidelines presented in Appendix A at the end of this document**. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* <http://dsp.usc.edu/> provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Appendix A: Academic Dishonesty Sanction Guidelines

| Violation | USC - Recommended Sanction for Undergraduates* | AME - Recommended Sanction for Undergraduates and Graduates |
|---|--|--|
| Copying answers from other students on any course work.** | F for the course. | First offense: F on assignment. Second offense: F for the course. |
| One person allowing another to cheat from his/her exam or assignment. | F for the course for both persons. | If assignment: First offense: F on assignment. Second offense: F for course. If the exam: F for course. |
| Possessing or using material during an exam (crib sheets, notes, books, etc.) which is not expressly permitted by the instructor. | F for the course. | First offense: F on the exam. Second offense: F for the course. |
| Continuing to write after the exam has ended. | F for the course. | F on exam |
| Taking an exam from room and later claiming that the instructor lost it. | F for the course and recommendation for further disciplinary action (possible suspension). | F for course |
| Changing answers after the exam has been returned. | F for the course and recommendation for further disciplinary action (possible suspension). | F for course |
| Fraudulent possession of exam prior to administration. | F for the course and recommendation for suspension. | F for course |
| Obtaining a copy of an exam or answer key prior to administration. | Suspension or expulsion from the university; F for the course. | F for course |
| Having someone else complete course work for oneself. | Suspension or expulsion from the university for both students; F for the course. | F for course |
| Plagiarism — Submitting other's work as one's own or giving an improper citation. | F for the course. | First offense: F on assignment. Second offense: F for the course. |
| Submission of purchased term papers or papers done by others. | F for the course and recommendation for further disciplinary action (possible suspension). | F for course |
| Submission of the same assignment to more than one instructor, where no previous approval has been given. | F for both courses. | F for both courses |
| Unauthorized collaboration on an assignment. | F for the course for both students. | First offense: F on assignment. Second offense: F for the course. |
| Falsification of information in admission applications (including supporting documentation). | Revocation of university admission without the opportunity to reapply. | Revocation of university admission without the opportunity to reapply. |
| Documentary falsification (e.g., petitions and supporting materials; medical documentation.) | Suspension or expulsion from the university; F for the course when related to a specific course. | Suspension or expulsion from the university; F for the course when related to a specific course. |
| Plagiarism in a graduate thesis or dissertation. | Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.*** | Expulsion from the university when discovered prior to graduation; revocation of degree when discovered subsequent to graduation.*** |

*Assuming first offense

**Exam, quiz, tests, assignments or other course work.

***Applies to graduate students