

USC Viterbi School of Engineering

AME 201 Statics

Units: 3

Term: Fall 2015

M Aug 24th – F Dec 4th

Location: Lecture T/Th 11am – 12:20pm GFS 222
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 systems of forces
2. 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 Webpage

AME 201 will rely on the USC Blackboard webpage for all course communications. Use the Discussion Forums to ask questions related to homework assignments, or to ask general questions pertaining to the class. You can create new forums as needed, and it is recommended that you enable Blackboard notifications to alert you of any new Discussion Forum activity. Before the semester begins, students should verify they have access to this webpage.

Course Schedule

DATE	TOPICS COVERED	HW Set Assigned	Quiz/Exam (Topic)
Tue 8/25	Review of Vector Algebra, Systems of Units	HW1	
Thu 8/27	Statics of Particles		
Tue 9/01	Equivalent System of Forces		
Thu 9/03		HW2	Quiz1 (HW1)
Tue 9/08			
Thu 9/10		HW3	Quiz2 (HW2)
Tue 9/15	Equilibrium of Rigid Bodies		
Thu 9/17		HW4	Quiz3 (HW3)
Tue 9/22			
Thu 9/24		HW5	Quiz4 (HW4)
Tue 9/29			
Thu 10/01	Midterm Exam 1		MT1 (HW's 1-5)
Tue 10/06	Centroids and Centers of Gravity		
Thu 10/08		HW6	
Tue 10/13			
Thu 10/15	Moments of Inertia	HW7	Quiz5 (HW6)
Tue 10/20			
Thu 10/22		HW8	Quiz6 (HW7)
Tue 10/27			
Thu 10/29		HW9	Quiz7 (HW8)
Tue 11/03			
Thu 11/05	Midterm Exam 2		MT2 (HW's 6-9)
Tue 11/10	Analysis of Structures: Trusses	HW10	
Thu 11/12	Method of Joints, Method of Sections		
Tue 11/17	Analysis of Structures: Frames, Machines	HW11	Quiz8 (HW10)
Thu 11/19			
Tue 11/24	Beams: Shear and Bending Moment Diagrams	HW12	Quiz9 (HW11)
Thu 11/26	<i>No Lecture, Thanksgiving</i>		
Tue 12/01			
Thu 12/03	Final Review/Course Summary		Quiz10 (HW12)
Tue 12/15	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 1st and Thursday November 5th. The Final Exam will be Tuesday December 15th from 8-10am. 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. All quizzes and exams are typically administered on Thursday at the start of the lecture section, unless otherwise noted. Midterms will utilize the entire section time (11a-12:20p); 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 homework, 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. There are office hours Monday through Thursday 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. All students should read and understand the USC Student Code of Conduct, in particular, **Appendix A: Academic Dishonesty Sanction Guidelines** (http://www.usc.edu/student-affairs/SJACS/forms/sjacs_appa.pdf).

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)	20
Midterms (2)	50
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/>. **All forms of academic dishonesty are 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.