CE 205 Statics 2 Units

USC | SONNY ASTANI DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

ABET Course Syllabus

Course Information, Textbook and Supplementary Materials

Course Description: This course will present the theory and applications of basic engineering mechanics, including a review of vectors, the computation of resultant forces, the equations for equilibrium of particles and rigid bodies, the computation and diagramming of internal shear and moment forces, and dry friction.

Required for: All Civil and Environmental Engineering undergraduate degree programs

Prerequisite: PHYS 151L Fundamentals of Physics I

Co-requisite: Mechanics and Thermodynamics - 4 units

Required Textbook: *Engineering Mechanics: Statics* (13th ed.), R. C. Hibbeler, Prentice-Hall, 2014.

Reference: None

Topics Covered	Learning Outcomes
Basic knowledge of forces and moments on and between components of a structure. Emphasis on the fundamental steps (e.g., setup, analysis, solution, discussion) of engineering problems.	Students will understand forces and moments and analysis in the following areas of study: 1. Forces and vectors, Cartesian vector notation and operations 2. Particle equilibrium 3. Moments and force system resultants 4. Rigid body equilibrium 5. Structural analysis of trusses and frames/machines 6. Internal forces, shear/moment diagrams 7. Dry friction 8. Express force and position vectors in Cartesian vector form, determine unit vectors, vector sums, dot products, and cross products. 9. Draw and label free-body diagrams 10. Determine the resultant force acting on a particle 11. Determine the forces necessary for a particle to remain static using equations of equilibrium.
Analyzing forces and moments on a static rigid body	12. Determine the moments of forces in two or three dimensions 13. Determine force and moment resultants 14. Determine point loads statically equivalent to distributed loads 15. Replace supports with equivalent reaction forces 16. Write and solve equations of equilibrium of a rigid body
Analyzing forces and moments on/between multiple static rigid bodies	17. Use the methods of joints and sections to analyze truss structures 18. Determine the forces acting between members of frames and machines composed of pin-connected members

Analyzing internal forces/moments in a static rigid body	19. Use the method of sections to determine internal forces 20. Determine internal shear and bending moments using loading equations 21. Understand and draw shear / bending moment diagrams

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Lecture and Lab Schedule			
Lecture		**Lab**	
Sessions per Week	Duration per Session	Sessions per Week	Duration per Session
2	1 hour	1	1 hour

Relation of Course Objectives to Program Outcomes

The Civil Engineering program is designed to teach beyond the technical content of the curriculum and prepare the students to utilize what they learn in a professional setting.

This course contributes to the program outcomes as outlined in the adjacent table.

	Course Contribution to Program Outcomes *(a-k)*	✓ Key
a.	An ability to apply knowledge of mathematics, science, and engineering.	
e.	An ability to identify, formulate and solve engineering problems.	✓

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