ENGR 34 Course Outline as of Fall 2004

CATALOG INFORMATION

Dept and Nbr: ENGR 34 Title: STATICS
Full Title: Statics
Last Reviewed: 2/24/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
A vectorial treatment of the principles of statics with application to engineering problems and an emphasis on common engineering computational tools. Students are required to have a graphing calculator.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: A vectorial treatment of the principles of statics with application to engineering problems and an emphasis on common engineering computational tools. (Grade Only)
Prerequisites/Corequisites:
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;UC. (CAN ENGR8)

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:	
UC Transfer:	Transferable	Effective:	Fall 1981	Inactive:	

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course, the students should be able to perform the following tasks using spreadsheets and scientific calculators when appropriate:

1. Find the resultant of any number of concurrent forces in space.
2. Resolve a force into orthogonal components.
3. Draw a free-body diagram of a particle (or object) which is in static equilibrium.
4. Determine and use three-dimensional unit direction vectors to solve problems involving the equilibrium of particles in space.
5. Use of the principle of transmissibility.
6. Use the vector product to determine the moment of a force about an axis.
7. Determine the components of a moment vector about three mutually perpendicular axes.
8. Determine the angle formed by two vectors by use of the scalar product of the two vectors.
9. Determine the projection of a vector on a given axis by use of the scalar product of two vectors.
10. Determine the component of the moment vector about an arbitrary axis by use of the mixed triple product of three vectors.
11. Determine the moment of a force about an arbitrary axis by use of the mixed triple product of three vectors.
12. Determine the moment of a couple.
13. Add couples vectorially, and replace a given couple with an equivalent couple.
14. Replace a given force with a couple and a parallel force at a different location.
15. Reduce a system of forces to one force and one couple.
16. Determine reactions at supports, and the various types of connections for both two- and three-dimensional structures.

17. Recognize and understand how to analyze a two-force body.
18. Recognize and understand the various methods of analysis of a three-force body.
19. Solve three-dimensional equilibrium problems.
20. Determine the centroids of areas, lines, volumes, and composite bodies.
21. Use of the two theorems of Pappus-Guldinus.
22. Deal with distributed loads on beams, and with distributed forces on submerged surfaces.
23. Use the method of joints to analyze the forces in members of simple trusses, frames, and machines.
24. Use the method of sections to determine the forces in certain members of trusses, frames, and machines.
25. Determine the internal forces and bending moments within structural members.
26. Determine the relations among load, shear, and bending moment in a beam.
27. Draw the shear and bending-moment diagrams for variously loaded beams, and be able to locate the position of the maximum bending moment.
28. Explain the laws of dry friction and belt friction, and the concept of angle of friction.
29. Solve various practical dry-friction problems relating to simple machines, wedges, square-threaded screws, and belts.
30. Determine the moment of inertia, for various simple and composite areas.
31. Use the parallel-axis theorem for both areas and masses.
32. Determine the moment of inertia of a three-dimensional mass, a thin plate, and a composite body.
33. Effectively interact with fellow students to solve engineering problems.

Topics and Scope:

1. Statics of particles in both two and three dimensions.
2. Equivalent systems of forces on rigid bodies.
3. Equilibrium of rigid bodies in both two and three dimensions.
4. Centroids, centers of gravity, and distributed forces.
5. Analysis of trusses, frames, and machines.
6. Forces in beams.
7. Friction.
8. Moments of inertia.

Assignment:

1. Homework: Approximately 100 problems.
2. Group Assignments: 0-2 (depends on instructor).
3. Quizzes, 0-10 (depends on instructor).
4. Midterm exams: no less than three.
5. Project: 0-1 (depends on instructor).
6. Final exam.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems	Problem solving 14 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

PROBLEMS TO SOLVE	Exams 65 - 86%

Other: Includes any assessment tools that do not logically fit into the above categories.

PROJECT	Other Category 0 - 15%

Representative Textbooks and Materials:

Hibbeler, Engineering Mechanics Statics, 9th Ed., Prentice Hall, 2001

Merriam, Engineering Mechanics, Volume 1, Statics, 5th Ed., Wiley, 2001