#### 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		<b>Course Hours per Week</b>		Nbr of Weeks	<b>Course Hours Total</b>	
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)

# **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

AS Degree: CSU GE:	Area Transfer Area			Effective: Effective:	Inactive: 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.

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

Homework problems

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

None

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

PROBLEMS TO SOLVE

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

PROJECT

### **Representative Textbooks and Materials:**

Hibbeler, Engineering Mechanics Statics, 9th Ed., Prentice Hall, 2001 Merriam, Engineering Mechanics, Volume 1, Statics, 5th Ed., Wiley, 2001

nt em se.	Writing 0 - 0%
s, that	
	Problem solving 14 - 20%
g skill	
	Skill Demonstrations 0 - 0%
	Exams 65 - 86%
cally	
	Other Category 0 - 15%