

South Texas College
Math and Science Division
Physical Science, Chemistry & Engineering Department
Master Syllabus
Spring 2009

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Course Name: Statics
Course Number: ENGR – 2301

CRT HRS:03 - LEC HRS:03 - LAB HRS:00

Prerequisite: PHYS 2425 and 2413 with a grade of “C” or better and completion of or concurrent enrollment in MATH 2414, or permission from the instructor.

Catalog Course Description:

This is a calculus-based study of composition and resolution of forces, equilibrium of force system, friction, centroids, and moments of inertia. Other topics include vector algebra, structural analysis (trusses), frames and distributed loads, shear and bending moment diagrams, and virtual work.

Course Description by Instructor:

Statics is the first course in the branch of engineering mechanics. Statics is the foundation for many other engineering courses, including dynamics, vibrations, mechanics of solids and fluid mechanics.

Departmental Course Goals:

- To provide quality academic education
- Develop a prepared workforce
- To firmly establish the ability to draw Free-Body-Diagrams, and to use these diagrams in the solution of the conditions for Static Equilibrium for systems ranging from a single particle in 2-dimensions to systems of rigid-bodies in 3-dimensions.
- To develop problem-solving techniques and expand on the mechanics taught in physics.

Departmental Course Competencies & Learning Objectives: The student will be able to demonstrate the following:

- Introduction to mechanics – general principles
- Vectors – Resolution into components, unit vectors, vector addition, vector products
- Concurrent force systems – 2D and 3D equilibrium
- Statics of particles – analysis and design considerations
- Rigid bodies – force and moment systems
- Distributed forces and body properties – centroids, inertias and center of gravity
- Equilibrium of rigid bodies – two dimensional (2D, 3D) including trusses and frames
- Internal forces in structural members – shear-force and bending moment diagrams
- Friction – Coulomb and dry friction, rolling resistance

Departmental Course Requirements, Evaluation Methods, and Grading Criteria:

Instructor's Choice	A* = \geq 90% B = 80%-89% C = 70%-79% D = 60%-69%
No Make-ups without instructor permission	F = $<$ 60%

Required Text & Resources:

Engineering Mechanics 5th Edition By Bedford
Scientific/graphing calculator
WebCT access

Students work in teams and participate in classroom discussion.

Suggested Activities for Active Learning:

Students are asked to come to the board to present problems, discuss techniques in solving the problems, and answer any questions that the other students may have. Challenging problems of the day will be given where students will be asked to work in pairs to solve the problem. Discussion based on the problem solving process will follow:

ABET category content as estimated by faculty member who prepared this course description

- Engineering science 90%
- Engineering design 10%

FOUNDATION SKILLS

A. Basic Skills:

Reading, Writing, Mathematics, Arithmetic, Speaking and Listening.

Students are required to read the textbook for amplification of lecture. Students work their homework assignments, in a systematic fashion, including every step required to solve the problems. Students ask questions about problems they did not understand and will explain what the problem is asking for and what methods they have already tried. Upon completion of this course the students will:

1. Read the textbook and related materials.
2. Working out problems step by step and explaining the procedures and write a report.
3. Solving problems in mathematics involving the basic operations.
4. Oral Presentation to the class in assigned problems from text.
5. A report will be required on a subject related to mathematics. The report should be typed, double-spaced, with a minimum length of three pages.

B. Thinking Skills:

Creative thinking, Decision making, Problem solving, Visualize (“Seeing Things in the Mind’s Eye”), Knowing How to learn, and Reasoning.

1. Understanding what the problem is asking for; choosing the right method(s) in solving for the unknown(s).
2. Working with applied problems, checking to see if the answers are logical.
3. Recognize problems and devise and implement plan of action.
4. Organize and process symbols, pictures, graphs, objects, and other information.
5. Use efficient learning techniques to acquire and apply new knowledge and skills.

C. Personal Qualities:

Responsibility, Self-esteem, Sociability, Self-management, Integrity, and Honesty

1. Students have to exert a high level of effort and persevere toward goal attainment.
2. Students have to believe in one's own self-worth and maintain a positive view of one-self.
3. Students have to demonstrate understanding, friendliness, adaptability, empathy, and politeness on group settings.
4. Students have to assess one-self accurately, set personal goals, monitor progress, and exhibit self-control.

D. Technology:

Select technology, Apply technology, Maintain and troubleshoot equipment.

1. The student must be able to work with a variety of technologies.
2. The student will understand overall intent and proper procedures for setup and operation of equipment.
3. The student will use word processing and a variety of software including tutorial accompanying the text.
4. The student will have access to the Internet.
5. The student will utilize scientific calculators for solving a variety of problems.

Developmental Studies Policy Statement:

The College's Developmental Education Plan requires students who have not met the college-level placement standard on an approved assessment instrument in reading, writing, and/or mathematics to enroll in Developmental Studies courses including College Success. Failure to attend these required classes may result in the student's withdrawal from ALL college courses.

Statement of Equal Opportunity: *No person shall be excluded from participation in, denied the benefits of, or be subject to discrimination under any program or activity sponsored or conducted by South Texas College on the basis of race, color, national origin, religion, sex, age, veteran status or disability.*

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