

**PALOMAR COLLEGE**  
**COURSE OUTLINE OF RECORD FOR**  
**DEGREE CREDIT COURSE**

  X   Transfer Course     X   A.A. Degree applicable course  
(check all that apply)

**COURSE NUMBER AND TITLE:** ENGR 235 - Engineering Mechanics-Statics

**UNIT VALUE:** 3

**MINIMUM NUMBER OF SEMESTER HOURS:** 48

**BASIC SKILLS REQUIREMENTS:** Appropriate language and computational skills.

**ENTRANCE REQUIREMENTS**

**PREREQUISITE:** PHYS 230 and MATH 140

**COREQUISITE:** None

**RECOMMENDED PREPARATION:** None

**SCOPE OF COURSE:**

Force systems and equilibrium conditions. Engineering problems covering structures, machines, distributed forces, and friction. Graphical and algebraic solutions, and vectorial analysis.

**SPECIFIC COURSE OBJECTIVES:**

The successful student will be able to:

1. Apply principles and theory of statics to problems and situations that will be encountered in advanced engineering courses as well as in a work place.
2. Apply deductive reasoning based upon fundamental principles of mechanics.
3. Apply inductive reasoning through the analysis of simple problems, followed by analysis of harder problems, to prepare for advanced applications.
4. Correctly analyze a statics problem.
5. Correctly solve a problem and present the solution in a concise, precise, and understandable form.
6. Analyze written and oral problems related to the fundamental principles of statics.
7. Fabricate simple mechanical models to demonstrate the theoretical concepts of statics.

**CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:**

1. Vector Algebra
  - A. Vectors in cartesian and polar coordinate systems
  - B. Dot Products
  - C. Cross Products
  - D. Triple vector products
  - E. Forces as a vector
  - F. Resultant of forces

2. Equilibrium of a Particle
  - A. Equilibrium of a particle in 3-D space
3. Equilibrium of a rigid body
  - A. Internal and External forces
  - B. Moment of a force
  - C. Couples
  - D. Equivalent system of forces
  - E. Equilibrium in 2-D
  - F. Equilibrium in 3-D
4. Centroids and Centers of Gravity
  - A. Centroids
  - B. First moments of areas and lines
  - C. Centroids of solid bodies
  - D. Distributed loads on beams
5. Structures
  - A. Analysis of trusses by the method of joints
  - B. Analysis of trusses by the method of sections
  - C. Analysis of machines
6. Forces in Beams and Cables
  - A. Various types of loading and support
  - B. Shear and bending moment in a beam
  - C. Shear and bending moment diagrams
  - D. Cables
7. Friction
  - A. Analysis of friction
  - B. Wedges and screws
  - C. Belt Friction
8. Moment of inertia
  - A. Moment of inertia of areas
  - B. Moment of inertia of volumes
  - C. Moment of inertia of masses
  - D. Product of inertia
  - E. Mohr's circle for moment and product of inertia

**REQUIRED READING:**

Beer, Ferdinand P. and Russell E. Johnston, Jr. Vector Mechanics for Engineers. 6<sup>th</sup> Ed. New York:

McGraw-Hill, 1996.

**SUGGESTED READING:** None

**REQUIRED WRITING:**

On all written assignments, including tests, quizzes, homework, and class projects, the student is required to submit work that provides the basis for reporting of engineering work and results in the work place. This requirement includes identification of the problem, listing of relevant data and factors, description of solution selected, computations and solution of problem, and results and conclusions.

**OUTSIDE ASSIGNMENTS:**

**Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.**

The student will solve assigned problems and hand in for grading. The student will be assigned a class project wherein he/she will demonstrate a proficiency and in-depth understanding of a specific, key, theoretical concept presented in the lectures.

**INSTRUCTIONAL METHODOLOGY:**

**Check all that apply:**

- lecture
- laboratory
- lecture-laboratory combination
- directed study

**DISTANCE LEARNING:**

**This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.**

Yes  No

**If yes, check all that apply:**

- Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- Two-Way Video Conferencing (Two-way interactive video and audio)
- One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

**GRADING POLICY AND STANDARDS** (include methods of determining whether the stated objectives have been met by students):

Grades are determined by scores received on exams and other projects according to the following plan:

Homework	0 - 10%
Class projects	10 - 20%
Quizzes	0 - 20%
Exams	30 - 50%
Final	30 - 50%

**IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?**

Yes  No  Number of times course may be taken for credit: 1

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable:

**CONTACT PERSON:** Martin Mason

SIGNATURES ON FILE