AA 210 COURSE DETAILS

TITLE:	Engineering Statics
CREDITS:	4
FORMAT & SCHEDULE:	Lecture, 3 hours / week; Quiz, 2 hours / week
FACULTY CONTACT:	James Hermanson

COURSE DESCRIPTION (Catalog Short Form, 50 words Max):

Applies vector analysis to equilibrium of rigid body systems and subsystems. Includes force and moment resultants, free body diagrams, internal forces, and friction. Analyzes basic structural and machine systems and components.

COURSE OVERVIEW & LEARNING OBJECTIVES:

This course is an introduction to the concepts of force systems, static equilibrium, friction, centroids, centers of gravity, shear and moment diagrams, and moments of inertia. It provides the basic tools necessary for the analysis of any engineering system in which materials transmit forces. Course Objectives:

1. Work comfortably with basis engineering mechanics concepts required for statics problems.
2. Identify an appropriate structural system and isolate it from its environment.
3. Model the problem using good free-body diagrams and accurate equilibrium equations
4. Identify and model various types of loading and support conditions that act on structural systems.
5. Apply relevant mathematical, physical and engineering principles to analyze and solve problems.
6. Understand the meaning of centers of gravity, centroids, and moments of inertia using integration and composite body methods.
7. Communicate the solution to all problems in an organized and coherent manner and elucidate the meaning of the solution in the context of the problem.

COURSE REQUIREMENTS

PREREQUISITES: 1) minimum grade of 2.0 in either MATH 126 or MATH 136
2) Minimum grade of 2.0 in PHYS 121

REQUIRED TEXTBOOK: *Engineering Mechanics: Statics*, 5th Ed by Bedford & Fowler

COURSE TOPICS

1. Vector in 2D and 3D; vector products, projection of vectors parallel and perpendicular to a line
2. Introduction to forces; free body diagram; pulleys and springs
3. Introduction to moment, moment vector; moment about a line; couple
4. Equivalent systems; wrench
5. Objects in equilibrium; static determinacy and indeterminacy
6. Types of supports in 2D and 3D; proper and improper support
7. Two-force and three-force members
8. Truss analysis; method of sections; method of joints; space trusses
9. Frames and simple machines
10. Centroids; distributed loads; Pappus-Guldinus theorems; center of mass
11. Moment of inertia, mass moment of inertia; parallel axis theorem, perpendicular axis theorem
12. Transformations of moment of inertia; Mohr circle
13. Friction; friction in wedges
14. Beams; internal forces and moments; axial force, shear force and bending moment diagrams
15. Equilibrium via minimization of total potential energy; stability of equilibrium configuration