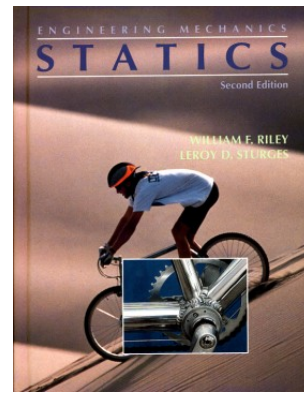**Mechanical Engineering Department**
Iran University of Science and Technology

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Engineering Mechanics - Statics

Instructor: Dr. Mahmood. M. Shokrieh (shokrieh@iust.ac.ir)

Text Book: Engineering Mechanics - Statics, William F. Riley and Leroy D. Sturges, Second edition.

Course Objectives:
This is the first engineering course that teaches students the basic Newtonian mechanics that are used in subsequent analysis and design courses throughout the engineering program and later as practicing engineers. This course teaches students the mechanism of problem solving by identifying the given information, drawing the free body diagrams, formulating the assumptions, choosing the proper equations and performing the solution. This course also utilizes the equations of mechanics to be applied to the general engineering science, including solid, fluid mechanics and materials. You should be able to develop confidence and competence in solving statics problems. You must be able use programs such as EXCEL and engineering programs such as MATLAB.

Topics Covered:

- General Principles
- Concurrent Force System
- Statics of particles
- Equivalent Force/Moment Systems
- Distributed Forces: Centroids and Center of Gravity
- Equilibrium of Rigid Bodies
- Truss, Frames, and Machines
- Internal Forces in Structural Members
- Second Moments of Area and Moments of Inertia

Learning Outcomes

- Students gain knowledge of Vector Mechanics, representation of physical quantities by a vector notation. Grasp the meaning of magnitude and direction of a vector.
- Students are able to understand the physical meaning of force and moment equilibrium. Master the balance of forces and moments to ensure equilibrium for 2D and 3D structures.
- Students acquire the skill to draw a correct and complete Free Body Diagram of forces and moments for a structure.
- Students learn the method of joints and the method of sections for the analysis of the trusses. They also should be able to identify the zero-force members of a truss by inspection.
- Students understand the internal forces in structures, and learn how to draw shear and bending-moment diagrams for beams.
- Students learn how to calculate the Centroid and Moment of Inertia of lines, areas, and composite objects.

Course Management:

- Home Work
- Project
- Quizzes
- Mid-term Exam
- Final Exam