**UNIVERSITY OF WISCONSIN
INDEPENDENT LEARNING**

U901213: Statics

Course Format: Online

Course Author/s: Md Rasedul Islam, PhD

Course credits: 3

Prerequisites: Calculus, Coordinate Geometry, Basic Physics

Course Description: This course will introduce students to the fundamental concepts and skills that form the foundation for structural and mechanical design. Topics covered in this course include elementary vector operations, resultant of two and three-dimensional force systems, centroid, equilibrium of trusses and frames, friction, internal forces, and moments of inertia. The problem-solving-oriented lectures help students develop the ability to understand and analyze static forces in a variety of engineering and structure applications.

Required Course Materials
Textbook: *Engineering Mechanics: Statics*. 15th edition. Russel C. Hibbeler. Pearson Publishing.
    ISBN: 9780137514663

Optional/Recommended Course Materials
- Vector Mechanics for Engineers: Statics. 12th edition. Ferdinand Beer and E. Johnston and David Mazurek.
  Publisher: McGraw Hill
  ISBN: 9781259977268

- Engineering Mechanics: Statics. 3rd edition. Michael Plesha and Gary Gray and Francesco Costanzo.
  Publisher: McGraw Hill
  ISBN: 9781264975532

Course Learning Objectives
- Know fundamental concepts of statics and general procedure for analysis of statics problem
- Mathematically manipulate scalars and vectors in the analysis of static forces
- Draw free-body diagrams for a particle subject to any system of forces and write corresponding equilibrium equations
- Calculate the moment of force for a system and apply it to the static equilibrium condition.
- Draw free-body diagrams for a rigid body subject to any system of forces and write corresponding equilibrium equations.
- Apply the conditions of equilibrium to the analysis of trusses, frames, and machines
- Use the general ideas of internal forces and draw shear and moment diagrams of a beam
- Analyze problems involving frictional forces
- Determine the centers of gravity and mass and centroids of a simple and composite body
- Compute the moment of inertia for an area

Course Overview

MODULE/ UNIT	MODULE/UNIT TOPIC	EVALUATED ACTIVITIES
1	General Principles	• Quiz • Homework (Math Problems)
2	Force vectors	• Quiz • Homework (Math Problems)
3	Equilibrium of a Particle	• Quiz • Homework (Math Problems)
4	Force system Resultants	• Quiz • Homework (Math Problems)
5	Equilibrium of a Rigid Body	• Quiz • Homework (Math Problems)
6	Structural Analysis	• Quiz • Homework (Math Problems)
7	Internal Forces	• Quiz • Homework (Math Problems)
8	Friction	• Quiz • Homework (Math Problems)
9	Center of Gravity and Centroid	• Quiz • Homework (Math Problems)
10	Moments of Inertia	• Quiz • Homework (Math Problems)

Evaluation Methods

Your final grade will be based on your performance on the following:
1) Quizzes (10%).
2) Assignments (20%).
3) Exam-1 (30%)
4) Exam-2 (20%)
5) Exam-3 (20%)

Quizzes (10%)

Quizzes are assigned in each module of this course and will cumulatively account for 10% of your final course grade.

Homework (20%)
Homework is assigned in each module of this course and will cumulatively account for 20% of your final course grade.

Exam-1 (30%)
Exam-1 will be based on Modules 1, 2, 3, and 4 of this course and will cumulatively account for 30% of your final course grade.

Exam-2 (20%)
Exam-2 will be based on Modules 5, 6, and 7 of this course and will cumulatively account for 20% of your final course grade.

Exam-3 (20%)
Exam-3 will be based on Modules 8, 9, and 10 of this course and will cumulatively account for 20% of your final course grade.

Exam Method: Online Without Proctoring
This course requires all students to complete exams online. Students will submit a file containing the answers to the exam questions.

Grading Scale
The following grading scale is used to evaluate all course requirements and determine your final grade:

A = 93–100	B = 83–87.9	C = 70–77.9	D = 60–69.9
AB = 88–92.9	BC = 78–82.9		F = Below 60

Pass/Fail Option
Students who enroll in an Independent Learning (IL) course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C and a final grade of U in place of a final grade equivalent to a D or F.