## **CIVL 200: Engineering Mechanics - Statics (3 credits)**

A vector treatment of the concepts and characteristics of forces and couples. Distributed forces. Center of mass; centroid of area. Equilibrium of particles and rigid bodies. Trusses and frames. Internal forces. Shear and moment distribution in beams. Area moment of inertia. The main purpose of this course is to develop the engineering student’s ability to analyze static equilibrium problems in a logical manner. Emphasis is placed on an understanding of principles employed in the solution of problems rather than reliance on a rote process of substitution in numerous formulas. *(Prerequisite: PHYS 101)*

**Course Learning Outcomes:**

By the end of the course, students will be able to:

A1. Demonstrate detailed knowledge and understanding of forces and moment on and between components of a structure.

A2. Identify the appropriate tools and analytical methods in solving engineering mechanics problems.

B1. Solve problems related to Statics by applying the right procedure.

B2. Analyze real life problems for different scenarios in Statics.

**Course Learning Materials:**

* Hibbeler, R.C., "Statics ",  Pearson Prentice Hall
* Bedford. “Engineering Mechanics: Statics”
* Meriam. “Engineering Mechanics: Statics”

**Course Content:**

1. Scalars and Vectors, Vector Operations and Vector addition pf Forces
2. Position Vectors, Force Vector Directed Along a Line and Dot Product
3. Condition for the Equilibrium of Particles. The Free Body Diagram
4. Three-dimensional Force Systems
5. Moment of a Force- Scalar Formulation.
6. Cross Product and Moment of a Force-Vector Formulation
7. Moment of a Force about a specified Axis and Moment of a Couple
8. Simplification of a Force and Couple System and Further simplification of a Force and a Couple System.
9. Condition for Rigid -Body Equilibrium and Equations of Equilibrium
10. Equilibrium in Three Dimensions
11. Structural Analysis, Internal Forces
12. Centre of Gravity and Centroid
13. Moment of Inertia and Friction