

University of Toledo

Construction Engineering Technology

Master Syllabus

Course Title: Engineering Mechanics **Course Code & Number:** CET-1200

Credit Hour Total: 4 **Weekly Contact Hours Lecture:** 4 **Lab Hours:** 0

Prerequisite(s): MATH-1330, PHYS-2010

Text: Statics & Strength of Materials for Architecture & Building Construction, 4th Ed.
Onouye & Kane ISBN: 978-0135079256

Software: None

Course Coordinator: Beall

A. **Course Description** (Approved Catalog Description)

This course covers the basics of statics, load tracing and analysis of determinate structures. Special attention is paid to the application of the laws of statics and strength of materials as they relate to construction materials, techniques and methods. The course covers the analysis of direct and indirect stresses in structural members: stress, strain, bending moment, shear and deflection; and begins the structural design course progression with the design of beams, columns and structural connections.

B. **Related Program Outcomes:**

Upon successful completion of the Construction Engineering Technology program, graduates will have:

ABET/Student Outcomes

- b. an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
- f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;

Program Criteria Outcomes

2. A development of mathematical skills sufficient to solve and analyze technical problems associated with construction projects including building, highway and heavy construction.
3. The ability to demonstrate a thorough knowledge of common construction methods and design procedures associated with building, highway and heavy construction projects.
4. The ability to demonstrate a thorough knowledge of common construction materials- both their proper usage and proper testing procedures.
10. An understanding of the mechanics of structural design.

Evidence of the success of these outcomes is provided by the collection and analysis of:

- Force Vector Mechanics Exam Problem

- Shear & Bending Moment Exam Problem

C. Course Objectives:

Upon the completion of the course the student will be able to:

1. Find resultants of any of two dimensional force system.
2. Determine resultant forces acting upon structural members using force and moment equilibrium.
3. Determine centroids and moments of inertia of composite areas.
4. Determine forces acting upon and within simple structural systems (trusses and frames).
5. Gain the ability to trace loading conditions and convert them to loads on a single component.
6. Develop shear, bending moment diagrams and maximum deflection for beams.
7. Analyze materials in tension, compression, shear, bending, buckling and torsion.

D. Course Outline - Major Content Areas

1. Basic Principles
2. Coplanar Force Systems
3. Trusses & Frames
4. Load Tracing
5. Cross-sectional properties of structural elements
6. Shear and bending stresses in beams
7. Column analysis

E. Suggested Laboratory Tests

1. None