

University of Toledo

Construction Engineering Technology

Master Syllabus

Course Title: Structural Design **Course Code & Number:** CET-2250

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

Prerequisite(s): CET-1200

Text: Principles of Structural Design: Wood, Steel, and Concrete, 2nd Ed.
Gupta, ISBN: 978-1466552319

Software: None

Course Coordinator: Beall

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

This course covers the principles of statics and strength of materials as applied to structural design of steel and timber products, using applicable codes. Applications of both allowable stress, load factored design and unified design methods will be covered for both spanning and axial elements.

B. **Related Program Outcomes:**

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

ABET/Student Outcomes

- a. an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;
- 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.
8. An understanding of codes and specifications in the implementation of building and highway projects.
10. An understanding the mechanics of structural design.

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

- Wood Column, Beam & Truss Exam Problems

- Steel Beam, Bearing Plate and Column Exam Problems

C. Course Objectives:

Upon the completion of the course the student will obtain the ability to:

1. Apply the engineering formulae used in the design of steel beams, columns, bearing plates and base plates.
2. Apply the engineering formulae used in the design of wood framed structures.
3. Determine loading characteristics utilizing proper structural codes (ASD & LRFD)

D. Course Outline – Major Component Areas

1. Determination of structural loading.
2. Review of analysis of stresses and section mechanics.
3. Design of Steel beams and joists (Flexural, shear and deflection)
4. Design of Steel Columns .
5. Design of bearing and base plates.
6. Design of wood beams.
7. Design of wood columns.

E. Suggested Laboratory Tests

1. None