

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

- (1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
- (2) an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;

The course also supports coverage of the following curricular areas:

Program Criteria

- d) the application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering;
- i) the performance of standard analysis and design in at least one sub-discipline related to construction engineering;

Discipline Specific Content

- + Industry standards & codes
- + Public safety & health
- + Quality & continuous Improvement

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:

At the end of the course the student should have an understanding of the fundamental principles of structural design in steel and wood using both the working stress and strength design methods. The student will be acquainted with the application of the principles of both ASD and LRFD, (allowable stress design and load resistance factor design), as well as the unified method of design as applicable.

D. Course Outline – Major Component Areas

1. Determination of structural loading using the applicable structural code and method of design
2. Determining and calculating factored design loads
3. Review of analysis of stresses and section mechanics.
4. Design of Steel beams and joists (Flexural, shear and deflection)
5. Design of Steel Columns .
6. Design of bearing and base plates.
7. Design of wood beams.
8. Design of wood columns.

E. Suggested Laboratory Tests

1. None