

University of Toledo

Construction Engineering Technology

Master Syllabus

Course Title: Advanced Structural Design

Course Code & Number: CET-4250

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

Prerequisite(s): CET-2250

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

and

National Concrete Masonry Association, TEKS (From web)

and

Dayton Superior Corp., Formwork Tables (From web)

Software: None

Course Coordinator: Loy

A. Course Description:

This course deals with the design of reinforced concrete structural elements as well the principles of masonry design in accordance with applicable standards and codes. The design of temporary structures for use during construction will also be introduced.

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;
- e. an ability to function effectively as part of a team;
- 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:

- Masonry Wall Design Project
- Reinforced Concrete Slab, Column & Beam Design Projects
- Concrete Formwork Design Projects

C. Course Objectives:

Upon completion of the course the student will:

1. Gain an understanding of the applicable codes and regulations regarding masonry construction.
2. Obtain the ability to apply the engineering formulae used in the design of masonry walls.
3. Gain an understanding of the applicable codes and regulations regarding reinforced concrete construction.
4. Obtain the ability to apply the engineering formulae used in the design of reinforced concrete structural elements.
5. Obtain the ability to design structural connections for concrete and masonry components.
6. Obtain the ability to design temporary structures for construction of permanent structural systems.
7. Gain an understanding of the mechanics of structure demolition.

D. Course Outline

1. Reinforced Concrete Codes
2. Reinforced Concrete
 - i) Slabs
 - ii) Beams
 - iii) Columns
 - iv) Shallow Foundations
3. Masonry Codes
4. Masonry Walls
 - i) Load Bearing
 - ii) Shear Walls
5. Temporary Structures
 - i) Concrete Formwork
 - ii) Floor Slab Erection
6. Demolition

E. Suggested Laboratory Tests

1. None