

# University of Toledo

## Construction Engineering Technology

### Master Syllabus

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**Course Title:** Advanced Construction Materials      **Course Code & Number:** CET-3120

**Credit Hour Total:** 3   **Weekly Contact Hours Lecture:** 3   **Lab Hours:** 0

**Prerequisite(s):** CET-2110, CET-2220

**Text**                      Ohio Department of Transportation - Pavement Design & Rehabilitation Manual  
And  
Concrete Pipe Association Pipe Design Manual

**Software:** None

**Course Coordinator:** Kissoff

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**A. Course Description** (Approved catalog description.)

This course focuses on the design and construction of ground based structures such as flexible and rigid pavements, floor slabs and buried pipe loading. Coverage of the construction and preparation of soil is also covered in order to provide a quality subgrade upon which to construct the items. Standard industry manuals and procedures are used to complete design problems.

**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;
- d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
- 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

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.
8. An understanding of codes and specifications in the implementation of building and highway projects.

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

- Pavement Design Project

### **C. Course Objectives:**

Upon completion of the course the student will have:

1. An understanding of subgrade soils materials, how they are classified for pavement support and how they can be modified to provide additional support.
2. The ability to design flexible pavement sections dependent upon traffic and local environmental conditions.
3. An understanding of FHWA Superpave specifications for HMA materials.
4. The ability to design rigid pavement sections dependent upon traffic and local environmental conditions.
5. An understanding of the design process of joint placement and reinforcement design in rigid pavements.
6. The ability to design floor slabs for use in industrial and commercial environments dependent upon loading and traffic conditions.
7. The ability to determine pipe material specifications based upon live and dead load (depth of cover) for concrete and flexible conduits.

### **D. Course Outline – Major Component Areas**

1. Subgrade Soils, Construction and Improvements (Classifications, Additives and Modifications, Subsurface Drainage, Compaction Methods)
2. Flexible Pavements (Thickness Design, Superpave Specifications)
3. Rigid Pavements (Thickness Design, Reinforcement Design, Joint Design, Construction Methods)
4. Industrial Floor Slab Design ( Thickness Design for various loading conditions, Jointing, Construction Methods)
5. Loads on Buried Pipes ( Concrete & Flexible Conduits, Construction Methods)

### **E. Suggested Laboratory Tests**

None