

# 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

- 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;
- 5) an ability to function effectively as a member as well as a leader on technical teams.

The course also supports coverage of the following curricular areas:

##### Program Criteria

- b) the estimation of costs, estimation of quantities, and evaluation of materials for construction projects;
- f) the performance of economic analyses and cost estimates related to design, construction, and maintenance of systems associated with construction engineering;
- g) the selection of appropriate construction materials and practices;
- i) the performance of standard analysis and design in at least one sub-discipline related to construction engineering.

##### Discipline Specific Content

+ Industry standards & codes

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