

University of Toledo

Construction Engineering Technology

Master Syllabus

Course Title: Construction Graphics **Course Code & Number:** CET-2030

Credit Hour Total: 3 **Weekly Contact Hours Lecture:** 2 **Lab Hours:** 2

Prerequisite(s): CET-1100, CET-1210

Text: Ohio Department of Transportation, Location & Design Manual Volume 1
(Selected Chapters)
Ohio Department of Transportation, Roadway Plan Reading Manual

Software: CADD: Microstation (Latest available version)
Design: Bentley Inroads

Course Coordinator: Kissoff

A. Course Description (Approved catalog description.)

Computer drafting as related to construction engineering projects such as highways, streets, sanitary and storm sewers, and building sites. The computer drafting portion will use Microstation and associated third party support (eg. Inroads).

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;
- d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
- f an ability to identify, analyze, and solve broadly-defined engineering technology problems;
- g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- k. a commitment to quality, timeliness and continuous improvement.

Program Criteria Outcomes

1. Effective communication skills related to the construction environment through the proper usage of oral, written and graphic techniques.
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.

5. The ability to demonstrate the capability to develop architectural and engineering drawings for construction projects, including working, presentation and shop drawings.
6. Proficiency in the use of computer graphics associated with civil and construction projects.
7. An understanding of working drawings for residential, commercial, highway and heavy construction projects.
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:

- Final Site Plan Drafting Project Submittal
- Horizontal & Vertical Curve Quiz and Exam Problems
- Site Layout Assignment
- Site Layout Checking Quiz
- Drafting Qualifiers (Plan Set-up, Digital Terrain Models, 3D Highway Design)
- Final Exam Site Dimensioning Problem
- Final Exam Highway Standards Questions
- Final Exam Site Plans Components Questions
- Final Exam Highway Plan Reading Problem
- Final Exam Site Plan Reading Qualifying Exam

C. Course Objectives:

Upon completion of this course the student will:

1. Obtain the ability to read, understand and produce a neat, legible and coherent set of site and roadway plans.
2. Obtain the ability to express site and roadway design information in a legible and coherent manner on a set of plans.
3. Gain an understanding of basic roadway design elements.
4. Gain the understanding site layout and grading design.
5. Obtain the ability to produce roadway and site drawings on the computer-aided drafting software format including: plan & profile sheets, typical sections and cross sections
6. Obtain the ability to design and produce roadways and sites using Inroads third party three dimensional design software.
7. Obtain the ability to produce cut and fill quantities using third party three-dimensional software.

D. Course Outline – Major Content Areas

1. Site Development Plan Elements
2. Site Selection, Geometric Design and Drafting Techniques
3. Site Grading Design and Drafting Techniques
4. CADD 3D Surface Modeling
5. Gravity Utility Location Design and Drafting Techniques
6. Pressure Utility Location Design and Drafting Techniques

7. Site Details
8. Roadway Horizontal Alignment Design
9. Roadway Vertical Alignment Design
10. CADD Roadway Modeling
11. Roadway Plan and Profile Drafting
12. Roadway Typical Section Design and Drafting
13. Roadway Cross-section Design

E. Suggested Laboratory Drafting Assignments

1. Overall Site Plan
2. Site Geometrics Plan
3. Site Grading Plan
4. Site Utilities Plan
5. Site Details with Utility Profile
6. Roadway Plan & Profile
7. Roadway Typical Section
8. Roadway Cross-sections