

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: Bentley 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

- 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;
- 3) an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.

The course also supports coverage of the following curricular areas:

Program Criteria

- c) the utilization of measuring methods, hardware, and software that are appropriate for field, laboratory, and office processes related to construction;
- d) the application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering;
- e) the production and utilization of documents related to design, construction, and operations;

Discipline Specific Content

- + Industry standards & codes
- + Respect for diversity
- + Quality & continuous Improvement

Evidence of the success of the student outcomes and coverage of the curricular areas 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 (Digital Terrain Models, 3D Highway Design)
- Final Exam Site Dimensioning Problem
- Final Exam Site Plans Components Questions
- Final Exam Highway Plan Reading Problem
- Final Exam Site Plan Reading Qualifying Exam
- ADA Accessibility Field Assignment

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