

ITT Technical Institute

CD310

Civil Drafting and Introduction to GIS

Onsite and Online Course

SYLLABUS

Credit hours: 4


Contact/Instructional hours: 50 (30 Theory Hours, 20 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisite: CD230 Architectural Drafting II

Course Description:

An introduction to site planning, civil engineering, plot plans, contour maps, map profile, highway layout and basic Geographic Information Systems (GIS).



COURSE SUMMARY

COURSE DESCRIPTION

An introduction to site planning, civil engineering, plot plans, contour maps, map profile, highway layout and basic Geographic Information Systems (GIS).

MAJOR INSTRUCTIONAL AREAS

1. Introduction to AutoCAD Civil 3D
2. Working with points and surfaces
3. Surface volumes and analysis
4. Alignment properties and alignment styles
5. Working with profiles and profile views
6. Working with assemblies
7. Working with corridors
8. Sample lines, section view, material takeoff, and volume reports
9. Feature lines and grading

COURSE LEARNING OBJECTIVES

By the end of this course, you should be able to:

1. Describe the basic features of AutoCAD Civil 3D and its screen components.
2. Create and edit points and point groups.
3. Create and edit various types of surfaces.
4. Compute surface volumes and generate surface analysis.
5. Create and edit alignments and their components.
6. Create and edit different types of profiles and profile views.
7. Create assemblies and subassemblies in a project.
8. Create and edit corridors in a project using different methods.
9. Create and edit sample lines and section views.
10. Use various methods to compute quantity takeoff and generate reports.
11. Create and edit feature lines, set properties of feature lines, and add labels to feature lines.

COURSE OUTLINE

MODULE 1: INTRODUCTION TO CIVIL DRAFTING TECHNOLOGY

COURSE LEARNING OBJECTIVES COVERED

- Describe the basic features of AutoCAD Civil 3D and its screen components.

TOPICS COVERED

- Introduction to Civil Drafting
- AutoCAD Civil 3D: Application and Features
- Layers and Layer Standards
- Template Drawings
- Symbols and Symbol Libraries

| MODULE LEARNING ACTIVITIES | GRADED | OUT-OF-CLASS TIME |
|--|--------|-------------------|
| Reading: <i>Civil Drafting Technology, Chapter 1 and Chapter 2</i> (pp. 37-66) | No | 5 hrs |
| Reading: <i>Exploring AutoCAD Civil 3D 2015, Chapter 1 (pp. 1-2 to 1-21)</i> | No | 2 hrs |
| Lesson: Study the lesson for this module. | No | 1 hr |
| Discussion: Participate in the discussion titled “The Power of AutoCAD Civil 3D.” | Yes | N/A |
| Lab: Complete the lab titled “Components and Interface of AutoCAD Civil 3D.” | Yes | N/A |
| Project: Read and begin the project. | No | 1 hr |

Total Out-Of-Class Activities: 9 Hours

MODULE 2: MAPPING AND SURVEYING FUNDAMENTALS

COURSE LEARNING OBJECTIVES COVERED

- Create and edit points and point groups.
- Create and edit various types of surfaces.
- Compute surface volumes and generate surface analysis.

TOPICS COVERED

- Map Scales and Surveying
- Surveying Instruments and Techniques
- Points and Point Groups
- Surfaces and Surface Styles
- Surface Volumes and Analysis

| MODULE LEARNING ACTIVITIES | GRADED | OUT-OF-CLASS TIME |
|---|--------|-------------------|
| Reading: <i>Civil Drafting Technology, Chapters 3 and 5</i> | No | 2 hrs |
| Reading: <i>Exploring AutoCAD Civil 3D 2015, Chapter 3 (pp. 3-2 to 3-45) and Chapter 4 (pp. 4-2 to 4-24)</i> | No | 10 hrs |
| Lesson: Study the lesson for this module. | No | 2 hrs |
| Exercise 1: Submit the exercise titled “Basic Mapping and Surveying.” | Yes | 1 hr |
| Exercise 2: Submit the exercise titled “Measuring Elevations.” | Yes | 1 hr |
| Lab 1: Complete the lab titled “Creating Points and Surfaces (from GIS Data).” | Yes | N/A |
| Lab 2: Complete the lab titled “Elevation Analysis.” | Yes | N/A |
| Project: Continue work on Project Part 1. | No | 2 hrs |

Total Out-Of-Class Activities: 18 Hours

MODULE 3: ALIGNMENTS AND PROFILES

COURSE LEARNING OBJECTIVES COVERED

- Describe the basic features of AutoCAD Civil 3D and its screen components.
- Create and edit points and point groups.
- Create and edit various types of surfaces.
- Compute surface volumes and generate surface analysis.
- Create and edit alignments and their components.
- Create and edit different types of profiles and profile views.

TOPICS COVERED

- Contour Lines and Maps
- Alignments and Their Types
- Creating and Editing Alignments in AutoCAD Civil 3D
- Profiles and Their Types
- Creating and Editing Profiles in AutoCAD Civil 3D
- Bearing and Legal Description

| MODULE LEARNING ACTIVITIES | GRADED | OUT-OF-CLASS TIME |
|---|--------|-------------------|
| Reading: <i>Civil Drafting Technology, Chapters 7, 8, and 11</i> | No | 5.5 hrs |
| Reading: <i>Exploring AutoCAD Civil 3D 2015, Chapter 5 (pp. 5-2 to 5-54) and Chapter 6 (pp. 6-2 to 6-46)</i> | No | 8.5 hrs |
| Lesson: Study the lesson for this module. | No | 2 hrs |
| Exercise: Submit the exercise titled “Calculating Azimuths and Bearings.” | Yes | 1 hr |
| Lab 1: Complete the lab titled “Criteria-Based Alignment Layout.” | Yes | N/A |
| Lab 2: Complete the lab titled “Creating and Editing Profiles.” | Yes | N/A |
| Project: Submit Project Part 1. | Yes | 2 hrs |

Total Out-Of-Class Activities: 19 Hours

MODULE 4: ESSENTIAL COMPONENTS FOR CORRIDOR MODELING

COURSE LEARNING OBJECTIVES COVERED

- Create assemblies and subassemblies in a project.
- Create and edit corridors in a project using different methods.

TOPICS COVERED

- Assemblies and Their Properties
- Subassemblies and Their Properties
- Creating Customized Assemblies
- Creating Simple Corridors
- Creating Corridor Surface
- Computing Earthwork Volume

| MODULE LEARNING ACTIVITIES | GRADED | OUT-OF-CLASS TIME |
|---|--------|-------------------|
| Reading: <i>Civil Drafting Technology, Chapter 12</i> | No | 1.5 hrs |
| Reading: <i>Exploring AutoCAD Civil 3D 2015, Chapter 7 (pp. 7-2 to 7-9 and pp. 7-16 to 7-25) and Chapter 8 (pp. 8-1 to 8-28)</i> | No | 4 hrs |
| Lesson: Study the lesson for this module. | No | 2 hrs |
| Discussion: Participate in the discussion titled “Civil 3D Corridors.” | Yes | 1 hr |
| Exercise: Submit the exercise titled “Assemblies and Corridors.” | Yes | 2 hrs |
| Lab 1: Complete the lab titled “Creating Assemblies.” | Yes | 1.5 hrs |
| Lab 2: Complete the lab titled “Creating Corridors.” | Yes | 1.5 hrs |
| Project: Continue work on Project Part 2. | No | 3 hrs |

Total Out-Of-Class Activities: 16.5 Hours

MODULE 5: SAMPLE LINES, SECTIONS, AND VOLUMES

COURSE LEARNING OBJECTIVES COVERED

- Create and edit alignments and their components.
- Create and edit different types of profiles and profile views.
- Create assemblies and subassemblies in a project.
- Create and edit sample lines and section views.
- Use various methods to compute quantity takeoff and generate reports.

TOPICS COVERED

- Sample Lines and Properties
- Creating Sample Lines
- Section Views and Properties
- Creating Section Views
- Quantity Takeoff Criteria
- Computing Materials
- Generating Volume Reports

| MODULE LEARNING ACTIVITIES | GRADED | OUT-OF-CLASS TIME |
|---|--------|-------------------|
| Reading: <i>Civil Drafting Technology, Chapter 13</i> | No | 4 hrs |
| Reading: <i>Exploring AutoCAD Civil 3D 2015, Chapter 9 (pp. 9-2 to 9-35)</i> | No | 3 hrs |
| Lesson: Study the lesson for this module. | No | 2 hrs |
| Exercise: Submit the exercise titled "Sample Lines, Sections, and Volumes." | Yes | 1.5 hrs |
| Lab 1: Complete the lab titled "Section View." | Yes | 1.5 hrs |
| Lab 2: Complete the lab titled "Quantity Takeoffs." | Yes | 1.5 hrs |
| Project: Submit Project Part 2. | Yes | 3 hrs |
| Project: Continue work on Project Part 3. | No | 1 hr |

Total Out-Of-Class Activities: 17.5 Hours

MODULE 6: FEATURE LINES AND GRADING

COURSE LEARNING OBJECTIVES COVERED

- Describe the basic features of AutoCAD Civil 3D and its screen components.
- Create and edit points and point groups.
- Create and edit various types of surfaces.
- Compute surface volumes and generate surface analysis.
- Create and edit alignments and their components.
- Create and edit different types of profiles and profile views.
- Create assemblies and subassemblies in a project.
- Create and edit corridors in a project using different methods.
- Create and edit sample lines and section views.
- Use various methods to compute quantity takeoff and generate reports.
- Create and edit feature lines, set properties of feature lines, and add labels to feature lines.

TOPICS COVERED

- Creating Feature Lines
- Editing Feature Lines
- Adding Labels to Feature Lines
- Grading Creation and Editing
- Grading Transition and Style
- Creating a Grading Group

| MODULE LEARNING ACTIVITIES | GRADED | OUT-OF-CLASS TIME |
|--|--------|-------------------|
| Reading: <i>Exploring AutoCAD Civil 3D 2015, Chapter 10 (pp. 10-2 to 10-30)</i> | No | 2.5 hrs |
| Lesson: Study the lesson for this module. | No | 2 hrs |
| Exercise: Submit the exercise titled "Feature Lines and Grading." | Yes | 1 hr |
| Lab: Complete the lab titled "Creating Feature Lines and Pond Grading." | Yes | N/A |
| Project: Submit Project Part 3. | Yes | 5 hrs |

Total Out-Of-Class Activities: 10.5 Hours

EVALUATION AND GRADING

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

| CATEGORY | WEIGHT |
|------------|--------|
| Lab | 45% |
| Project | 25% |
| Discussion | 10% |
| Exercise | 20% |
| TOTAL | 100% |

GRADE CONVERSION

The final grades will be calculated from the percentages earned in the course, as follows:

| GRADE | PERCENTAGE |
|----------|------------|
| A (4.0) | 90–100% |
| B+ (3.5) | 85–89% |
| B (3.0) | 80–84% |
| C+ (2.5) | 75–79% |
| C (2.0) | 70–74% |
| D+ (1.5) | 65–69% |
| D (1.0) | 60–64% |
| F (0.0) | <60% |

LEARNING MATERIALS AND REFERENCES

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Tickoo, S., Purdue University and CAD/CIM Technologies (2014). *Exploring AutoCAD Civil 3D 2015*. Boston, MA: Pearson Custom.
- Madsen, D. A., Shumaker, T. M., Madsen, D. P., & Ward, H. O. (2010). *Civil Drafting Technology (7th ed.)*. Upper Saddle River, NJ: Prentice Hall.
- <http://cadcim.com/itt/ittCourses.aspx>
- Student companion Website:
http://wps.prenhall.com/chet_madsen_civildrafting_7/105/26908/6888647.cw/-/t/index.htm

OTHER ITEMS

- AutoCAD Civil 3D

RECOMMENDED RESOURCES

- Books and Professional Journals
 - Chappell, E. (2012). *AutoCAD Civil 3D 2015 Essentials (1st ed.)*. Indianapolis, IN: Wiley.
 - Davenport, C., & Voiculescu, L. (2014). *Mastering AutoCAD Civil 3D 2015 (1st ed.)*. Indianapolis, IN: Wiley.
- Professional Associations
 - American Design Drafting Association: <http://www.adda.org/>
 - American Society of Civil Engineers: <http://www.asce.org/>
 - Autodesk User Group International: <http://www.augi.com/>
 - American Institute of Architects: <http://www.augi.com/>
- ITT Tech Virtual Library (accessed via Student Portal | <https://studentportal.itt-tech.edu>)
 - Basic Search>
 - Hicks, T.G. (2009). *Civil Engineering Formulas (2nd ed.)*. New York, NY: McGraw-Hill.
 - Narayanan, R.S., & Beeby, A.W. (2000). *Introduction to Design for Civil Engineers*. London: GBR.

- Basic Search> Browse> Browse by Format> Magazines and journals> EbscoHost Academic Search Elite> Publications
 - Journal of Construction Engineering and Management
 - Journal of the American Planning Association
 - Journal of Urban Planning & Development

- Additional Reading from ITT Tech Virtual Library
 - School of Study> School of Drafting and Design> Recommended Links> Software> Autodesk Education Community> Search: BIM For Infrastructure And Civil Projects> Related resources>
 - Build tomorrow's infrastructure
 - Creating smart and sustainable cities
 - Video: Use BIM to create efficient transportation systems
 - Certified BIM specialist: Road and Highway Solution

INSTRUCTIONAL METHODS AND TEACHING STRATEGIES

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course uses several teaching strategies, such as multiple lab assignments based on that module's learning as a teaching strategy, that will help you discover Civil 3D by practice. Your progress will be regularly assessed through a variety of assessment tools including labs, discussions, exercises, and a project. These assignments revolve around the project and the instructor's feedback on these assignments will help you complete your course project. In addition, the course employs a draft, revise, and finalize theme, which will ensure that you have the opportunity to first create the draft version and then submit the finalized version after incorporating the instructor's feedback. Due to this method, you will get two attempts to submit work for all assignments. The instructor will provide an interim grade on the first draft submission. After incorporating the instructor's feedback, the final submission will carry 100% weightage.

OUT-OF-CLASS WORK

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a "time-based option" for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education,

ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

ACADEMIC INTEGRITY

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

INSTRUCTOR DETAILS

| | |
|-----------------|--|
| Instructor Name | |
| Office Hours | |
| Contact Details | |

(End of Syllabus)