

ITT Technical Institute

CD310T

Civil Drafting and Introduction to GIS

Onsite Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 60 (36 Theory Hours, 24 Lab Hours)

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

Prerequisites: CD230T 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).

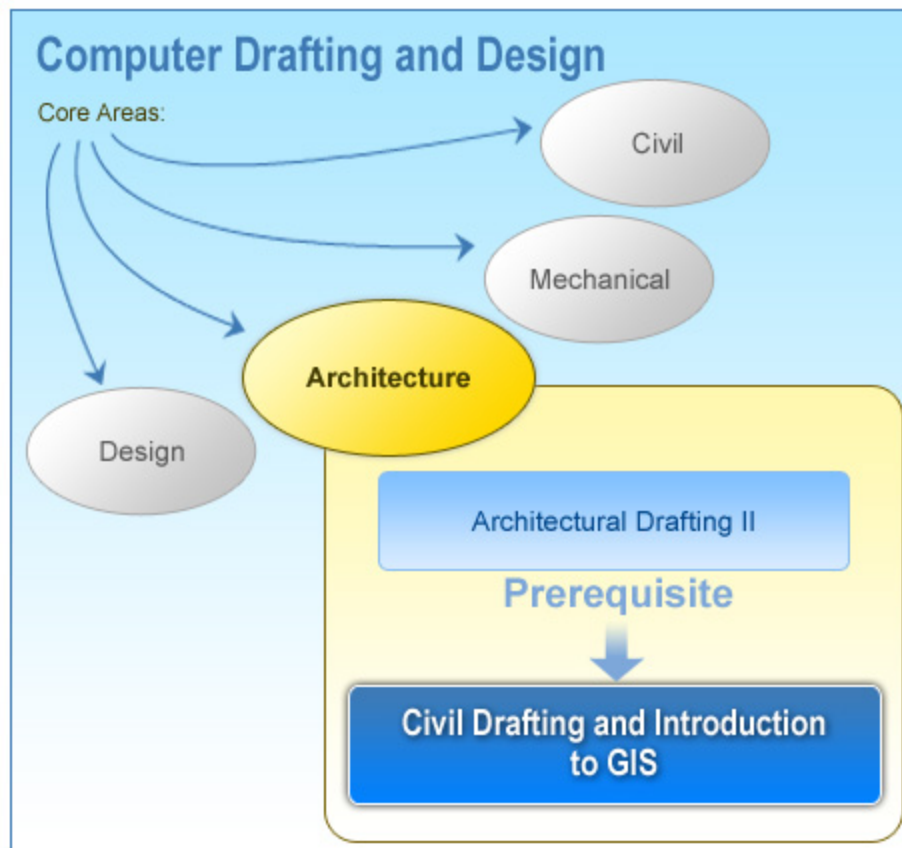
Where Does This Course Belong?

How does this course relate to the program? Take a look!

Civil Drafting and Introduction to GIS course is required to obtain an Associate of Applied Science degree in the Computer Drafting and Design program.

The course is designed to expand students' knowledge of civil drafting or design and geographic information system (GIS). The course will guide students on how to use software programs related to civil drafting and GIS and become proficient with the skills and technology related to this field. The course will add weight to students' project portfolios as the students become familiar with real world civil and GIS projects.

The following course sequence provides an overview of how the Civil Drafting and Introduction to GIS course fits in the program.



Note: Refer to the catalog for the state-specific course information.

Syllabus: Civil Drafting and Introduction to GIS

Instructor:	_____
Office hours:	_____
Class hours:	_____

Major Instructional Areas

1. Role of civil drafting technology
2. AutoCAD Civil 3D 2012 interface
3. Mapping and points
4. Surfaces and surface volumes
5. Surface analyses
6. Alignments
7. Profiles
8. Assemblies and subassemblies
9. Corridors
10. Fundamentals of GIS

Course Objectives

1. Examine the relevance of civil drafting technology.
2. Analyze the AutoCAD Civil 3D 2012 interface.
3. Analyze mapping scales, symbols, and AutoCAD Civil 3D points.
4. Discuss surveying fundamentals and the procedure to create surfaces.
5. Generate surface volumes and perform surface analyses.
6. Create contour lines and alignments.
7. Demonstrate the procedure to create profiles.
8. Demonstrate the procedure to create assemblies.
9. Demonstrate the procedure to create corridors.
10. Analyze civil engineering drawings.
11. Discuss the role of GIS.

SCANS Objectives

SCANS is an acronym for Secretary's Commission on Achieving Necessary Skills. The committee, created by the National Secretary of Labor in the early 1990s, created a list of skills and competencies that the committee feels are necessary for employees to function in a high-tech job market.

1. Apply new knowledge and skills in both familiar and changing situations.
2. Demonstrate competence in applying technology to task.
3. Employ computers to acquire, organize, analyze, and communicate information.
4. Select and analyze information and communicate the results using oral, written, pictorial, or multimedia methods.
5. Comprehend and use effective learning techniques to acquire and apply new knowledge and skills.
6. Develop an effective, workable schedule based on accurate estimates.
7. Prepare budgets, including cost forecasts.
8. Organize information from computer, visual, oral, and physical sources in readily accessible formats.
9. Identify the best methods of presenting information.

Course Outline

Note: All graded activities, except the Projects and Final Exam, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Labs: 2.1 refers to the first lab activity in Unit 2.

Unit	Activities
1—Introduction to AutoCAD Civil 3D 2012 and Civil Drafting	<ul style="list-style-type: none"> • Content Covered: <ul style="list-style-type: none"> <i>Civil Drafting Technology:</i> <ul style="list-style-type: none"> ○ Chapter 2, "Computer-Aided Design and Drafting (CADD)" <i>Exploring AutoCAD Civil 3D:</i> <ul style="list-style-type: none"> ○ Chapter 1, "Introduction to AutoCAD Civil 3D 2012" • Labs: 1.1 • Assignments: 1.1
2—Mapping Scales/Symbols and Points	<ul style="list-style-type: none"> • Read from: <ul style="list-style-type: none"> <i>Civil Drafting Technology:</i> <ul style="list-style-type: none"> ○ Chapter 3, "Map Scales," pp. 75-82 ○ Chapter 4, "Map Symbols," pp. 91-99 <i>Exploring AutoCAD Civil 3D:</i> <ul style="list-style-type: none"> ○ Chapter 2, "Working with Points," pp. 2-2 to 2-34 and pp. 2-45 to 2-48 • Labs: 2.1-2.2 • Assignments: 2.1 • Project 1 (Start)
3—Surveying Fundamentals and Surfaces	<ul style="list-style-type: none"> • Read from: <ul style="list-style-type: none"> <i>Civil Drafting Technology:</i> <ul style="list-style-type: none"> ○ Chapter 6, "Surveying Fundamentals," pp. 125-140 <i>Exploring AutoCAD Civil 3D 2012:</i> <ul style="list-style-type: none"> ○ Chapter 3, "Working with Surfaces," pp. 3-2 to 3-10, pp. 3-18 to 3-25, and pp. 3-28 to 3-42 • Labs: 3.1-3.2 • Quizzes: 3.1 • Assignments: 3.1
4—Surface Volumes and Analysis	<ul style="list-style-type: none"> • Read from <i>Exploring AutoCAD Civil 3D 2012:</i> <ul style="list-style-type: none"> ○ Chapter 4, "Surface Volumes and Analysis" • Labs: 4.1 (PORTFOLIO)

Unit	Activities
	<ul style="list-style-type: none"> • Assignments: 4.1 • Project 1 (Submit) • Project 2 (Start)
5—Contour Lines and Alignments	<ul style="list-style-type: none"> • Read from: <ul style="list-style-type: none"> ◦ <i>Civil Drafting Technology</i>: <ul style="list-style-type: none"> ◦ Chapter 9, “Contour Lines,” pp. 229-236 ◦ <i>Exploring AutoCAD Civil 3D 2012</i>: <ul style="list-style-type: none"> ◦ Chapter 5, “Alignments,” pp. 5-2 to 5-17, pp. 5-26 to 5-34, pp. 5-42 to 5-47, and pp. 5-49 to 5-54 • Labs: 5.1-5.2 (PORTFOLIO) • Quizzes: 5.1 • Assignments: 5.1
6—Profiles-I	<ul style="list-style-type: none"> • Read from: <ul style="list-style-type: none"> ◦ <i>Civil Drafting Technology</i> : <ul style="list-style-type: none"> ◦ Chapter 11, “Profiles” ◦ <i>Exploring AutoCAD Civil 3D 2012</i>: <ul style="list-style-type: none"> ◦ Chapter 6, “Working with Profiles” pp. 6-2 to 6-21 • Labs: 6.1 (PORTFOLIO) • Assignments: 6.1 • Project 2 (Submit) • Project 3 (Start)
7—Profiles-II	<ul style="list-style-type: none"> • Read from <i>Exploring AutoCAD Civil 3D 2012</i>: <ul style="list-style-type: none"> ◦ Chapter 6, “Working with Profiles” pp. 6-22 to 6-42 • Labs: 7.1 • Quizzes: 7.1 • Assignments: 7.1
8—Assemblies and Subassemblies	<ul style="list-style-type: none"> • Read from <i>Exploring AutoCAD Civil 3D 2012</i>: <ul style="list-style-type: none"> ◦ Chapter 7, “Working with Assemblies and Subassemblies,” pp. 7-2 to 7-9 and pp. 7-16 to 7-25 • Labs: 8.1(PORTFOLIO) • Assignments: 8.1 • Project 3 (Submit) • Project 4 (Start)
9—Corridors	<ul style="list-style-type: none"> • Read from <i>Exploring AutoCAD Civil 3D 2012</i>: <ul style="list-style-type: none"> ◦ Chapter 8, “Working with Corridors” • Labs: 9.1 (PORTFOLIO) • Quizzes: 9.1 • Assignments: 9.1
10—Civil Engineering Drawings and GIS	<ul style="list-style-type: none"> • Read from <i>Civil Drafting and Technology</i>: <ul style="list-style-type: none"> ◦ Chapter 13, “Civil Engineering Detail Drawings,” pp. 331-356 ◦ Chapter 14, “Introduction to Geographic Information Systems (GIS),” pp. 377-398 • Labs: 10.1 • Assignments: 10.1 • Project 4 (Submit)
11—Course Review and Final Exam	<ul style="list-style-type: none"> • Course Review • Final Exam

Instructional Methods

The Civil Drafting and Introduction to GIS course is composed of both theory and laboratory components. The course will cover civil drafting, computer-aided design and drafting (CADD) methods, and AutoCAD Civil 3D fundamentals.

Read the assigned chapters before coming to each class. All weekly assignments must be completed to ensure that you fully understand the subject matter. You will also complete four projects. These activities provide sufficient time for you to examine and apply civil drafting and AutoCAD Civil 3D concepts.

Each software-based assignment has been structured to allow you to use the school's laboratory computers to complete the tasks.

In addition, you will take bi-weekly quizzes and a final exam to assess your understanding of the material.

Instructional Materials and References

Student Textbook Package

- Madsen, David A., Terence M. Shumaker, David P. Madsen, and Harry O. Ward. *Civil Drafting Technology*. 7th ed. Upper Saddle River, NJ, 2010.
- Tickoo, Sham. (2012). *Exploring Autocad Civil 3D 2012* (Custom 1st ed.). Boston, MA: Pearson Custom.

References

ITT Tech Virtual Library

Log on to the ITT Tech Virtual Library at <http://library.itt-tech.edu/> to access online books, journals, and other reference resources selected to support ITT Tech curricula.

Books

You may click "Books" or use the "Search" function on the home page to find the following books.

Ebrary>

- Hicks, T. G. *Civil Engineering Formulas*. 2nd ed. New York, NY: McGraw-Hill, 2010.
- Narayanan, R. S., and A. W. Beeby. *Introduction to Design for Civil Engineers*. London: Routledge, 2000.
- Sullivan, R., and H. Wynham. *Effective Environmental Management: Principles and Case Studies*. Australia: Allen and Unwin, 2000.

Periodicals

You may click "Periodicals" or use the E-Journal Lookup on the home page to find the following periodicals.

EbscoHost>

- Construction Specifier
- Journal of Construction Engineering and Management
- Journal of the American Planning Association
- Journal of Urban Planning and Development

School of Study

You may click on School of Study> School of Drafting and Design> Professional Organizations links to find the following Web resources.

- American Design Drafting Association
- American Institute of Architects
- American Society of Civil Engineers
- Autodesk User Group International (AUGI)

Other References

The following resources may be found **outside** of the ITT Tech Virtual Library, whether online or in hard copy.

Books

- Chappell, E. *AutoCAD Civil 3D 2012 Essentials*. Sybex, 2011.
- Devereux, A. *Basic Survey and Engineering Math*. Boston, MA: Pearson Custom Publishing, 2001.
- Eastman, C., P. Teicholz, R. Sacks, K. Liston, et al. *BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors*. Hoboken, NJ: John Wiley and Sons, 2008.
- Field, H. *Landscape Surveying*. Florence, KY: Thomson Delmar Learning, 2003.
- Graham, R. *Mastering AutoCAD Civil 3D 2012*. 1st ed. Sybex, 2011.
- Krygiel, E., B. Nies, and S. McDowell. *Green BIM: Successful Sustainable Design with Building Information Modeling*. Indianapolis: Wiley Publishing, Inc., 2008.
- Leffers, R. *Sustainable Construction and Design*. Upper Saddle River, NJ: Prentice Hall, 2010.
- Vallero, D. A., and C. Brasier. *Sustainable Design: The Science of Sustainability and Green Engineering*. Indianapolis: Wiley Publishing, Inc., 2008.

Websites

- AECbytes
<http://www.aecbytes.com/> (accessed Nov. 14, 2011)
This site is the home page for a monthly newsletter containing BIM information, software reviews, and tips and tricks for the AEC (architecture/engineering/construction) industry.
- American Planning Association
<http://www.planning.org/> (accessed Nov. 14, 2011)

This is the home page of the American Planning Association, an independent, not-for-profit educational organization that works for the development of vital communities by advocating excellence in community planning, promoting education and citizen empowerment, and providing the tools and support to members.

- Autodesk—AutoCAD Civil 3D
<http://usa.autodesk.com/civil-3d/> (accessed Nov. 14, 2011)
This is the home page for the AutoCAD Civil 3D software package from Autodesk with training, support, and information for users.
- Autodesk—Guide to Sustainable Design for Architects, Engineers, and Construction
<http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=12638619> (accessed Nov. 14, 2011)

This site offers resources for the design, drafting, and management of civil engineering project types focused on sustainable design.

- CADCIM
<http://www.cadcim.com> (accessed Nov. 14, 2011)

The path for the resource folder is as follows: Textbooks> Civil/GIS> AutoCAD Civil 3D> Exploring AutoCAD Civil 3D 2012. Tutorial files, part files, and exercise files are available in this folder.

- Construction Specifications Institute
<http://www.csinet.org> (accessed Nov. 14, 2011)

The Construction Specifications Institute, a national association of commercial-level construction professionals, develops industry standards and formats, certifies professionals who work with construction documentation, and offers continuing education.

- National BIM Standard
<http://www.buildingsmartalliance.org/index.php/nbims/> (accessed Nov. 14, 2011)

This is the home page of the NBIMS (National Building Information Model Standard Project) Committee, a project of the National Institute for Building Sciences (NIBS) BuildingSMART Alliance.

- U.S. Green Building Council
<http://www.usgbc.org/> (accessed Nov. 14, 2011)

This site provides both print and electronic resources to help design and build construction projects from a whole-systems perspective with an integrated design approach to minimize ecological impact and maximize economic performance. LEED information is also available here.

All links to Web references are always subject to change without prior notice.

Course Evaluation and Grading

Evaluation Criteria Table

The final grades will be based on the following categories:

CATEGORY	WEIGHT
Assignments	10%
Projects	20%
Labs	30%
Quizzes	10%
Final Exam	30%
Total	100%

Grade Conversion Table

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

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

(End of Syllabus)