

**CEST 51 Course Outline as of Fall 2021****CATALOG INFORMATION**

Dept and Nbr: CEST 51 Title: CIVIL DRAFTING TECH

Full Title: Civil Drafting Technology

Last Reviewed: 10/24/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: CET 51

**Catalog Description:**

Theory and practice of civil engineering drafting and mapping: An introduction to basic manual drafting skills, computer-aided drafting and design (CADD), and the production of civil engineering, surveying and land development plans, plats, maps and drawings utilizing AutoCAD Civil 3D software. Topics include linework, lettering skills, geometric constructions, drawing perspectives and types, software organization, commands and tools, symbols, dimensioning, annotation, mapping scales and output types all in the context of civil engineering and surveying project deliverables.

**Prerequisites/Corequisites:****Recommended Preparation:**

Course Completion or Concurrent Enrollment in SURV 60

**Limits on Enrollment:****Schedule of Classes Information:**

Description: Theory and practice of civil engineering drafting and mapping: An introduction to basic manual drafting skills, computer-aided drafting and design (CADD), and the production of

civil engineering, surveying and land development plans, plats, maps and drawings utilizing AutoCAD Civil 3D software. Topics include linework, lettering skills, geometric constructions, drawing perspectives and types, software organization, commands and tools, symbols, dimensioning, annotation, mapping scales and output types all in the context of civil engineering and surveying project deliverables. (Grade Only)

Prerequisites/Corequisites:

Recommended: Course Completion or Concurrent Enrollment in SURV 60

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective: Fall 1981	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Apply manual drafting concepts and skills to conceptualize 2D construction from the 3D environment.
2. Produce CAD projects that employ geometric construction/editing, orthographic projection, layering, dimensioning, and text annotation utilizing the AutoCAD software.
3. Prepare basic civil engineering drawings and maps utilizing the AutoCAD Civil 3D software.
4. Prepare and interpret basic plats, maps and legal descriptions of properties.

### **Objectives:**

Upon successful completion of this course, the student will be able to:

1. Properly select and utilize drafting equipment in the production of manual drafting projects
2. Produce consistent linework and legible lettering in manual drafting projects
3. Graphically execute geometric constructions in assigned manual drafting projects
4. Develop orthographic and isometric drawings in completing manual drafting projects
5. Utilize dimensioning conventions appropriately in a manual drafting project
6. Demonstrate knowledge of AutoCAD file management, commands and drawing environments
7. Generate and edit geometric constructions, projections, dimensioning, and text annotations
8. Demonstrate proficiency using AutoCAD blocks
9. Demonstrate proficiency creating/managing layers and line types
10. Effectively control printing/plotting of AutoCAD drawing files
11. Implement theory of graphical representation in the production of drawings, maps, and plats

- used in civil, surveying and land development
12. Identify the types of drawings, maps and plats used in civil, surveying and land development
13. Summarize and identify the proper scales, symbols and conventions for the types of drawings, maps and plats used in civil, surveying and land development.

### **Topics and Scope:**

- I. Introduction to Basic Manual Drafting
  - A. Introduction to contemporary drafting
  - B. Drafting equipment and supplies
  - C. Drafting conventions and formats
  - D. Geometric construction
  - E. Views and perspectives
  - F. Dimensioning conventions
- II. Introduction to Computer-Aided Drafting (CAD)
  - A. CAD drawing environment and drawing tools
  - B. Geometric construction and positioning tools
  - C. Geometric constructions
  - D. Multi-view drawings
  - E. Plotting
- III. Introduction to Civil Drafting Theory
  - A. Graphical representation in civil engineering, surveying, and land development projects
  - B. Types of maps and drawings
  - C. Surveying measurements in civil drafting
  - D. Contour lines
    - 1. data sources
    - 2. construction methods
  - E. Profiles and cross sections
    - 1. data sources
    - 2. construction methods
  - F. Roadway layout
    - 1. tangent curve geometry
    - 2. horizontal curve types - simple, compound, and reverse
    - 3. vertical curve types - sag and crest
    - 4. layout and stationing
  - G. Earthwork
    - 1. cross sections
    - 2. volume calculations
  - H. Legal descriptions and plats
    - 1. types of legal descriptions
    - 2. plotting legal descriptions and plats

### **LABORATORY TOPICS & SCOPE:**

- I. Introduction to Basic Manual Drafting
  - A. Introduction to contemporary drafting
  - B. Use of drafting equipment and supplies
  - C. Drafting conventions and formats
    - 1. linework
    - 2. lettering
    - 3. drawing formats
  - D. Geometric construction

- E. Multi-view orthographic projection
- F. Isometric drawing
- G. Dimensioning conventions
- II. Introduction to Computer-Aided Drafting
  - A. Introduction to the computer as a drafting/design tool with emphasis on hardware and software
  - B. Accessing AutoCAD commands via ribbons, pull-down menus, toolbars, and keyboard
  - C. Setting up the drawing environment
  - D. Geometric construction and positioning tools
  - E. Geometric constructions
  - F. Multi-view drawings
  - G. Plotting
- III. Introduction to Civil Drafting Technology
  - A. Theory of graphical representation in civil engineering, surveying, and development projects
    - 1. scale
    - 2. symbols
    - 3. convention
    - 4. orientation
  - B. Types of maps and drawings used in civil engineering
    - 1. mapping requirements
    - 2. civil drafting techniques
    - 3. mapping scales and symbols
    - 4. graphic scales
    - 5. written scales
    - 6. civil engineering symbols
    - 7. civil engineering line types
    - 8. civil engineering text types
  - C. Surveying Fundamentals in Civil Drafting
    - 1. earth's geometry
    - 2. elevation measurements
    - 3. distance measurements
    - 4. angular measurements
  - D. Location and direction of lines
    - 1. by local (assumed) coordinates
    - 2. by state plane coordinates
  - E. Contour lines
    - 1. from field data
    - 2. from polylines
    - 3. building a surface
  - F. Profiles and cross sections
    - 1. from a surface
    - 2. from a file
    - 3. from field notes
  - G. Roadway layout
    - 1. tangent curve geometry
    - 2. horizontal curves - simple, compound, and reverse
    - 3. vertical curves - sag and crest
    - 4. layout
    - 5. stationing
  - H. Earthwork
    - 1. cross sections

2. volume calculations by average end method
- I. Legal descriptions and plats
  1. types of legal descriptions
  2. plotting legal descriptions and plats

### Assignment:

#### Lecture Related Assignments:

1. Read approximately 1-2 chapters of the textbook and/or 2-10 pages of a lab handout per week
2. Civil & surveying homework problem sets (2-6)
3. Quizzes (2-4)
4. Midterms (2)
5. Final exam

#### Lab Related Assignments:

1. Manual drafting and CAD drawing assignments (8-12)
2. Civil 3D mapping projects (2-5)
3. Quizzes (2-5)

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Civil & surveying homework problem sets

Problem solving  
15 - 25%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Manual drafting and CAD drawing assignments; Civil 3D mapping projects

Skill Demonstrations  
40 - 55%

**Exams:** All forms of formal testing, other than skill performance exams.

Examinations and quizzes

Exams  
25 - 35%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Class Participation
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Other Category 5 - 10%
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**Representative Textbooks and Materials:**

Exploring Drafting. 12th ed. Walker, John and Mathis, Bernard and Scribner, Shauna. Goodhart-Wilcox. 2018

Civil Drafting Technology. 8th ed, Madsen, David P. and Madsen, David A. and Shumaker, Terence. Pearson. 2017

AutoCAD Civil 3D 2016 Essentials. Chappell, Eric. Wiley. 2015