

# **Civil Drafting Technology – The Theory and Practice of Civil Engineering and Surveying Drafting and Mapping**

## **CEST 51, Section 1239 – Fall 2020 Course Syllabus (Rev 1, 8/18/20)**

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### **Course Goal**

The primary goal of this class is to introduce students to basic manual drafting and sketching, 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.

As a class, students will be exposed to the concepts identified in the "Topics and Scope" area below. Upon completion of the course, students are not expected to be civil drafting experts, but they will have acquired a basic understanding of manual (hand) drafting, 2D AutoCAD, and the theory of Civil Drafting. This course is intended to establish a foundation which students can use to broaden their knowledge and better prepare themselves for CEST85 – Computer-Aided Drafting for Civil, Surveying, and Land Development using AutoCAD Civil 3D 2021.

### **Topics and Scope**

#### **PART 1: Introduction to Basic Manual Drafting**

- Multiview drawing
- Isometric drawing
- Projection planes
- Linetypes and lineweights
- Hidden features and centerlines
- Geometric shapes
- Technical hand lettering
- Traditional drafting tools and techniques
- Dimensioning conventions

#### **PART 2: Introduction to AutoCAD 2021**

- CAD drawing environment and drawing tools
- Geometric construction and positioning tools
- Geometric constructions
- Multi-view drawings
- Blocks
- Plotting

#### **PART 3: Introduction to Civil Drafting Theory and the Civil 3D 2021 software**

- Graphical representation in civil engineering, surveying, and land development projects
- Types of maps and drawings
- Surveying measurements in civil drafting
- Contour lines
- Profiles and cross sections
- Roadway layout
  - ✓ tangent curve geometry
  - ✓ horizontal curve types - simple, compound, and reverse
  - ✓ vertical curve types - sag and crest
  - ✓ layout and stationing
- Earthwork
  - ✓ cross sections
  - ✓ volume calculations
- Legal descriptions and plats
  - ✓ types of legal descriptions
  - ✓ plotting legal descriptions and plats

## Student Learning Outcomes

Upon completion of this course, students will be able to:

- Properly select and utilize drafting equipment in the production of manual drafting projects
- Produce consistent linework, legible lettering, and graphically execute geometric constructions in assigned manual drafting projects
- Develop orthographic and isometric drawings and utilize appropriate dimensioning conventions in completing a manual drafting project
- Demonstrate knowledge of AutoCAD file management, commands and drawing environments
- Generate and edit geometric constructions, projections, dimensioning, and text annotations
- Demonstrate proficiency using AutoCAD blocks, creating/managing layers and line types, and effectively control printing/plotting of AutoCAD drawing files
- Identify proper scale, orientation, symbols, and conventions used in civil engineering and land surveying
- Prepare civil engineering plans, drawings, and maps using computer-aided drafting software
- Prepare and interpret plats, maps and legal descriptions of properties

## Recommended Course Prerequisite

- Completion or concurrent enrollment in SURV 60 (Introduction to Plane Surveying)
- High school geometry

## Course Expectations

CEST 51 is the first of two Civil Drafting/CADD-based courses. This course will be relatively fast-paced due to the number of topics that will be covered. CEST 51 is designed to provide the fundamentals of manual drafting, 2D AutoCAD, Civil and Survey data management, basic project development, and basic map production skills. In CEST 51, students will develop the most basic civil drafting skills in order to prepare students for CEST 85 and to become entry-level Civil and Survey Technicians upon completion of the certificate requirements. A serious student attitude is strongly encouraged, and a team learning approach underpins the course culture. A team learning approach is one where a student takes an equal (or better) measure of responsibility for their learning experience through their participation, performance, and professional attitude.

## Course Schedule

- 8/21-12/11: Fridays from 5:00PM to 10:00PM, via online “Zoom” invitation. You will be given the link.
- Final Exam Date: Friday, 12/18. Tentative time of exam: 5:00PM to 7:45PM. The final exam is mandatory.

## Required Reading Materials

- Beginning AutoCAD 2021 Exercise Workbook, by Cheryl R. Shrock and Steve Heather
- Civil Drafting Technology, 8<sup>th</sup> Edition, by David P. Madsen, Terence Shumaker, and David A. Madsen
- Autodesk Civil 3D 2021 Fundamentals, SDC Publications, by Ascent

## Other Materials

- Engineers scale, drafting triangles (30°/60° and 45°), pencil lead compass, protractor **OR an Engineers Drafting Kit (Alvin item # BDK-1E) which contains all the tools necessary for PART 1 of this course**
- **Refer to “Class Preparation” on page 4 for specific computer hardware and software requirements**

## Class Preparation and Attendance

- Attendance is required for both lab and lecture hours. Your lack of attendance can and will affect your grade for this course. Attendance is considered a part of the “class participation” portion of your grade (5%). Class generally begins on the hour and ends at ten (10) minutes before the scheduled end of class.
- It is good practice to notify your instructor **by email** if you are going to be tardy or absent. An excused absence may be granted by contacting instructor **sufficiently prior** to the start of class.
- Students are responsible for all material discussed in lecture and lab as well as the readings and assignments.
- Students are responsible for correctly obtaining any missed lecture or laboratory course information from their fellow classmates. Your class participation can and will affect your final grade, as will your class conduct.
- There will be no make-ups for missed class activities (quizzes, exams, in-class demonstrations, etc). Rarely, certain late assignments may be accepted but will be discounted starting at 20% off the total point value, depending on how many classes have passed since the due date. Such instances will be solely at the instructor’s discretion.
- Excessive unexcused absences will not be tolerated. Per SRJC’s policy, if a student misses over 10% of total class hours, they can be dropped from the course.

## Assignments

- Weeks 1 thru 4: Readings will be provided by the instructor.
- Weeks 5 thru 9: Read approx. 5-6 chapters ("Lessons") from the Beginning AutoCAD 2021 Exercise Workbook per week (I really meant 5-6 chapters...it is NOT a typo).
- Weeks 9 thru 17: Read approx. 2 chapters from the Civil Drafting Technology, 8<sup>th</sup> Edition textbook and 1-2 chapters from the Autodesk Civil 3D 2021 Fundamentals textbook per week.
- Homework/chapter review problems assigned from textbook or instructor handouts. The number of assigned problems will vary, depending on the topic.
- Weekly lab assignments using manual drafting, sketching, and/or CAD.
- 6-8 announced quizzes over the course of the semester.
- Midterm examination on Part 2 of the course.
- One CAD-based Mapping Project (if time permits).
- "Written" and CAD-based final exam on Part 3 of the course.
- All assignments are to be completed as instructed and are to be submitted via Canvas at the beginning of class on the assigned due date, unless otherwise instructed. Late assignments will only be accepted with instructor's **prior** approval. A penalty will be deducted from the grade of the late assignment.
- All assignments are to include your name, assignment number or title, and due date unless otherwise instructed.
- With the exception of manual drafting/sketching assignments, ALL written assignments are to be typed and double-spaced. Please answer questions using complete sentences.

## Quizzes and Exams

- Quizzes and exams will be given on specific areas covered throughout the semester. Sufficient notice will be given prior to the scheduled exam. Brief reviews will be conducted during the previous class lecture.
- **Except when due to extenuating circumstances, NO MAKE-UP QUIZZES OR EXAMS WILL BE GIVEN.**

## Tentative Course Schedule

- A tentative course schedule will be distributed prior to the first day of class. The objective of the schedule is to assist you in planning your schedule. Every effort will be made to stay on schedule. However, the instructor may find it necessary to make appropriate adjustments to meet the learning objectives for the entire class. If/when the schedule requires changes, you will receive a revised schedule with the changes noted in **red**.

## Grading

- Your grade will be based on the total number of points you accumulate with respect to the "top score" total number of points. The sum of the points in each category are multiplied by the following percentages and then added together to determine total points accumulated:

HOMEWORK = 15%
LAB ASSIGNMENTS = 35%
QUIZZES = 20%
MIDTERM & FINAL EXAM = 25%
+ CLASS PARTICIPATION = 5%
<b>Total Accumulated Points</b>

- Lab assignments are typically worth 25 points each but can also vary. Homework points will also vary. Exams and class project are worth 100-150 points, and quiz points will vary. The final exam is worth 250 points (150 points for the written portion and 100 points for the CAD portion). Final grades are calculated as noted above and are based on the following percentages of the total points accumulated by the top score in each category.

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = Below 60%

## Communications

- If you need to get in touch with me, I can be reached at the email address [jlooper@santarosa.edu](mailto:jlooper@santarosa.edu). Please include "CEST 51" in the subject line of the email. You may also reach me on my cell phone 707-509-9292. Leave a voicemail message and I will return your call. Please do not text me – I will not respond.

## Office Hours

- Office hours are conducted online via "Zoom" from 4:30PM to 4:50PM on Fridays. Please visit my [website](#) for more information.

### **Class Preparation**

Students must have a Windows 10-based desktop or laptop computer in order to successfully complete this course (see below for the minimum system requirements). Students must also have a webcam and a reliable internet connection capable of streaming “real-time” audio and video via Zoom Online Conferencing. Cell phones and/or tablets will not be sufficient, except for viewing PDF files or other NON-CAD files. Please note that you do NOT need to sign up for or download Zoom in order to join the online class. You will be emailed an invitation containing a link to join via a compatible web browser such as [Mozilla Firefox](#) or [Google Chrome](#). Both are free to download.

**IMPORTANT! Webcams are currently in VERY HIGH DEMAND due to COVID-19 and are often back-ordered for several weeks, so please do not wait until the last minute to acquire one. A decent and relatively inexpensive webcam is the [Logitech C270](#). A microphone is also required for this course. I recommend headphones or earbuds with a built-in microphone for audio input and output. Please do not rely on your computer speaker(s) because everyone else will hear it and the sound is extremely disruptive to the rest of the class.**

Students must also have the ability to print 8-1/2” x 11” sheets of paper (B&W is fine) and scan completed assignments to a PDF document for submitting via Canvas (unless otherwise instructed). Clear and legible digital images may be considered acceptable in lieu of scanning.

**Please test your equipment and ensure that everything is working properly PRIOR to the first day of class.**

Autodesk provides a free student download of the Educational version of Civil 3D 2021. The software is available here: <http://www.autodesk.com/education/free-software/autocad-civil-3d>. The Civil 3D software is very hardware-intensive, so be certain that your computer meets the [minimum system requirements](#) prior to installing. Please be advised that we will be using the **2021** version of AutoCAD Civil 3D and it is not backwards compatible with earlier versions. When you download the software, be certain to select only the 2021 version. Please note that it is only necessary to download Civil 3D 2021, as it also includes basic AutoCAD 2021. Before attempting to download and install the software, students should be proficient at software installation, file management, and correctly transferring class data to and from their own computer to Canvas. Unfortunately, I will be unable to answer software installation-related questions because every computer is different.

It is the student's responsibility to consult the SRJC web-based information listed below -- please do so as it is considered a part of this syllabus:

- SRJC Schedule of classes: <https://classes.santarosa.edu/>
- SRJC Academic Calendar: <http://admissions.santarosa.edu/academic-calendar/>
- SRJC Rights & Responsibilities: <https://studentlife.santarosa.edu/rights-and-responsibilities>
- SRJC Disability Resources: <http://drd.santarosa.edu/>
- SRJC Student Services: <https://student-services.santarosa.edu/>

### **Academic Integrity**

Per [SRJC Policy 3.11](#): Academic dishonesty is regarded as any act of deception, benign or malicious in nature, in the completion of any academic exercise. Examples of academic dishonesty include cheating, plagiarism, impersonation, misrepresentation of idea or fact for the purpose of defrauding, use of unauthorized aids or devices, falsifying attendance records, violation of testing protocol, or inappropriate course assignment collaboration.

### **Class Conduct & Courtesy**

During the Zoom lectures, students should be listening to the presentation. Unless instructed to do so, students shall refrain from working on assignments during the lecture or presentation. Disruptive behavior may result in the student being removed from the Zoom session and the loss of points for that day.

### **Syllabus Purpose and Disclaimers**

This syllabus is an agreement. Continued registration in CEST 51 means that you, the student, agree to the policies and procedures outlined in this document. If some aspect or aspects of the syllabus are unclear to a student, it is their responsibility to inquire regarding that matter at the beginning of the course.

This syllabus is intended to provide the student with guidance in what will be covered during the semester and will be followed as closely as possible. **However, the instructor reserves the right to modify, supplement or make changes as necessary for general course needs as the semester progresses. Changes shall be noted in red.**