Civil Drafting Technology – The Theory and Practice of Civil Engineering and Survey Drafting and Mapping

CEST 51, Section 1239 – Fall 2021 Course Syllabus

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Course Goals

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 2022 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 2022.

Topics and Scope

PART 1: Introduction to Basic Manual Drafting (approximately 4 weeks)

- 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 2022 (approximately 5 weeks)

- 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 2022 software
(approximately 7 weeks)

- 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
- 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

- 8/17-12/9: Tuesdays and Thursdays from 6:00PM to 8:30PM, via online "Zoom" invitation.
- Final Exam Date: Tuesday, 12/14. Tentative time of exam: 5:00PM to 7:45PM. The final exam is mandatory.

Required Reading Materials

- Technical Drawing 101 with AutoCAD 2022, by Ashleigh Fuller, Antonio Ramirez, and Douglas Smith
    - (Released 8/9/21 - Please check with the bookstore for availability)
- Beginning AutoCAD 2022 Exercise Workbook, by Cheryl R. Shrock and Steve Heather
- Civil Drafting Technology, 8th Edition, by David P. Madsen, Terence Shumaker, and David A. Madsen
    - (You MUST have this book by no later than 10/1/21)

Other Materials (required by the second day of class - 8/19)

- 12" triangular **Engineer** scale, transparent plastic drafting triangles (30°/60° and 45°), pencil lead compass, semi-circular protractor, and 2H, 4H, & H lead drafting pencils. Note: Loaner drafting kits will be available from the on-campus lab.

Class Preparation and Attendance

- Attendance is required for both lab and lecture hours. **With the exception of online quizzes and exams, having your video turned on is not mandatory, however please turn your video on when asking or answering a question.** Attendance will be taken TWICE during each Zoom session. If your video is turned off and you do not promptly respond after your name is called, you will be "kicked out" of the Zoom session and placed back in the waiting room. 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 late 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. Taking notes is a good practice.
- Students are responsible for correctly obtaining any missed lecture or laboratory course information from their fellow classmates and/or Canvas account. Your class participation can and will affect your final grade, as will your class conduct.
- Make-up exams and/or quizzes will not be granted due to an unexcused absence - no exceptions. Under certain circumstances, 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 (whether "excused" by the instructor or not), the student may be dropped from the course at the instructor's discretion. *10% of total class hours is only 8 hours!*

Assignments and Homework (this is extremely tentative!)

- Weeks 1 thru 4: Read from the Technical Drawing 101 with AutoCAD 2022 textbook, instructor-provided material, and watch instructional videos as assigned. The videos are optional, but extremely helpful.
- Weeks 5 thru 9: Read approx. 5-6 chapters ("Lessons") from the Beginning AutoCAD 2022 Exercise Workbook per week, read from the Technical Drawing 101 with AutoCAD 2022 textbook and watch instructional videos as assigned by the instructor. Again, the videos are optional, but extremely helpful.
- Weeks 9 thru 17: Read approx. 2 chapters from the Civil Drafting Technology, 8th Edition textbook.
- 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.
- 8-10 announced quizzes over the course of the semester.
- "Take-home" Midterm examination on Part 2 of the course.
- One CAD-based Mapping Project (if time allows).
- "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 at instructor's discretion. A penalty of 20% will be deducted from the grade of the late assignment. *Assignments that are more than 2 weeks late will not be accepted, unless due to an excused absence.*
- 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 and/or include the question along with your answer. Failure to follow these instructions may result in no credit.

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 posted here on Canvas 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/SUBJECTIVE GRADING = 5%

Total Accumulated Points

Please note that I DO NOT grade on a curve

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%

Instructor's grading disclaimer: *This is a very full class! Because of this, I will not be grading every assignment. Instead, I will be randomly selecting which assignment(s) to grade each week. Whichever assignment(s) I choose to grade, it will be the same assignment(s) for every student. If you happen to skip a particular written and/or CAD assignment, that skipped assignment may be one of the assignments I have chosen to grade, which will result in zero points. I HIGHLY recommend that you complete ALL assignments, and there will be a lot of them. If you want to become a successful civil or surveying technician, you MUST be proficient at CAD. The only way to become proficient at AutoCAD & Civil 3D is to practice, practice, practice (and take* ***CEST85*** *in the Spring – it is equally important for Surveying students as it is for Civil Engineering students)*

Communications

- If you need to get in touch with me, I can be reached at the email address 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.
- Please note that I have a full-time job as a Land Surveyor, and I work in the field every day without access to a computer or email. I do not have the time to answer questions that may have already been answered either here in the syllabus, OR in the instructions posted on Canvas. *PLEASE THOROUGHLY READ THIS SYLLABUS (INCLUDING ANY LINKS) AND THE INSTRUCTIONS POSTED WITHIN THE CANVAS MODULES PRIOR TO CONTACTING ME.*

Office Hours

- Office hours are conducted online via “Zoom” from 8:30PM to 9:00PM on Tuesdays and Thursdays.

Class Preparation

Students may use their own Windows 10-based PC and/or utilize SRJC's Virtual Lab (recommended) if using a Mac or if the minimum system requirements for running Civil 3D 2022 are not met. 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. Zoom can be accessed from a web browser. 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.

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 2022. The Autodesk 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. As an alternative, students may utilize SRJC's Virtual Lab. Please be advised that we will be using the **2022** 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 2022 version. Please note that it is only necessary to download Civil 3D 2022, as it also includes basic AutoCAD 2022.*** 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. I will NOT be answering any 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

The instructor has zero tolerance for academic dishonesty of any kind. 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. Academic dishonesty on any homework assignment, lab assignment, quiz, or exam will result in ZERO credit for that assignment. ***UNLESS OTHERWISE INSTRUCTED, ALL ASSIGNMENTS ARE TO BE COMPLETED INDEPENDENTLY!***

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.***