Santa Rosa Junior College

SRJC
CATE
COURSE HOMEPAGE

Civil & Surveying Technology, Applied Technology Department

CEST 81: Engineering Construction Design/Drafting

Section 0339, Fall 2004
Class begins: 8/16/2004 Class ends: 12/8/2004 Final: 12/13/2004
1799 Shuhaw, Santa Rosa Campus
Monday & Wednesday 11:00am to 1:30pm

INSTRUCTOR

Jerry Miller, PLS jmiller@santarosa.edu INSTRUCTOR HOMEPAGE

DESCRIPTION

This is a course in public works design. The student will prepare a set of improvement plans for a roadway project using the City of Santa Rosa Design and Construction Standards. The student will learn the proper design and drafting techniques applied to mapping, grading, highways, underground utilities, detailing, structures and estimating. The student will be taught to prepare the necessary drawings using AutoCAD/Land Dev. Desktop and associated computer programs used by local engineering agencies and firms.

The student will:
Identify and list the use, elements, and need for design standards.

Prepare engineering construction drawings in their proper format, content and layout.

Demonstrate an understanding of the use of engineering construction drawings and details.

Demonstrate the proper procedures for interpreting and utilizing surveying data in the design process.

Perform complex computations involving horizontal and vertical roadway alignments.

Construct specific diagrams, plans, views and drawings for earthwork, retaining walls, roadways, utilities and topographic mapping.

Prepare an engineer's cost estimate for their roadway project.

Prepare contract specifications for specific portions of the project.

Official SRJC course outline, description, and catalog information for all sections of this course

CONTENT

The objective of this outline 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 changes to meet the learning objectives for the entire class.

You should be prepared for the project assignment prior to the class lecture. Some students may find it necessary to arrange time outside of the schedule hours to complete the assignments.

TENTATIVE SEMESTER SCHEDULE

Introduction to Land Development Desktop Software

Engineering Design and Construction Standards, Symbols, Scale and Sheet Layout

Topographic Mapping

Plan View – Grading Plan & Horizontal Alignment

Profile View - Underground Utilities Plan & Vertical Alignment

Roadway Structural Section Design & Computations

Cross-section View & Earthwork Computations

The Engineer's Estimate - Writing and Interpreting Contract Specifications

Legend & Cover Sheets

Final submittal of complete set of improvement plans and documents

EXPECTATIONS

I expect you to be on time and prepared for the days lessons. Previous assignments and homework will be due at the beginning of the class. We will spend the first portion of the class answering any questions concerning the reading, homework and assignments from the previous class.
Computer-Aided Drafting:
All assignments will be completed using the CAD system. Upon completion of the lecture portion of the course, you will use these PC's to complete your assignments. Your attendance is mandatory for both portions of the class.

All students will be taught how to use the Autodesk's Land Development Desktop Software. It is assumed that each student has completed Ap Tech 56 (Intro to AutoCAD) and CEST 51 (Civil Drafting Technology) prior to taking this course. We will be using the Windows NT, AutoCAD 2004, LDD3 and Microsoft Office Pro Software packages.

All assignments will be given with a due date. Students may need to arrange for outside time to meet the deadlines set for each assignment. It is important that each student budget their time wisely to meet these deadlines.

This course will be run as if you were working for a local engineering firm or agency. You will be expected to conduct yourself accordingly. Your attendance, participation and ability to meet deadlines will be figured into your grade.

LECTURE NOTES FOR:

Topographic Mapping Assignment No. 2

Background:
Topographic surveys are performed to determine the configuration (relief) of the earth's surface and to locate natural and cultural features on it. Natural features normally shown on topographic maps include relief of the ground, vegetation and water bodies. Cultural features include all features created by people; roads, trails, bridges, buildings, fences and boundary lines. Every civil engineering project must begin with a topographic survey and subsequent map. Civil engineers and planners use these maps to determine the most desirable and economic locations of highways, railroads, canals, pipelines, transmission lines reservoirs, and other facilities.

We will be using this topographic map to design our roadway. We will take surveying data from the surveyors and import it in to our CAD system. By using the civil engineering software, we will create a set of drawings that will be used by the engineering, surveyor, inspector and contractor to layout, check and build our design.

The topographic map will show all features and terrain of our project area. Use your standards and line

types properly show a topographic map of the area as if they are “proposed” features. We will set up a plot style to shade the existing features into the background on subsequent drawings.

ASSIGNMENTS:

Assignment:
Prepare a topographic map from survey data. A file of the “downloaded survey data” may be found on the D:/Civil/CEST81 directory of your computer. The layout of this drawing will have a border and title block inserted into the drawing in paper space. We will print out this drawing and turn it in when complete. Attach this sheet to a plot of your map. This assignment is worth 100 points.

Procedures:
1. Start a new drawing and create a project called ***road. (*** represents your initials) with the following parameters: (pgs. 1-16)
· Units-English
· Scales-1”=30’ horizontal, 1”=3’ vertical
· Sheet size-24”x36”
· No datum
· Default orientation
· Text Style-Leroy, L100
· No Border
· Save Settings as ***-30.set (*** represents your initials)
2. From the Projects pull down menu, Menu Palettes, Load the Land Development Desktop Complete menu.
3. From the Points pull down menu select Point Settings and use the following parameters: (pgs. 33-45)

· Numbering-Insert to drawing as created and Sequential
· Elevations-Manual
· Descriptions-Manual
· Insert-accept defaults
· AutoCAD MOVE Command: Update-Update Point Database After MOVE command
· Point Checking-Accept defaults
· Coords-Northing-Easting
· Desc. Keys-Accept Defaults
· Maker-Use custom marker
· Custom Marker style-Select the “X”
· Custom Marker Size-Size in Absolute units-0.3
· Text-Accept defaults for Color and Visibility
· Style and Size-L80 and accept defaults
· Select Automatic Leaders and Rotate-30d0’0”
· Preferences-Accept defaults
4. From the Points pull down menu – ”Import/Export points”, ”Import” the point file with the following format: (pgs. 55-58)
· Format-PNEZD space delimited
· File: D:/Civil/CEST81/topo_pts.txt
5. Print out a hard copy of the point list using Notepad or Word.
6. AutoCAD Erase all the points in the drawing.
7. Create Layers for CL, FC, SW, SS, SD, W, and EG with the following layering convention:
· C-EX-(layer name)-PTS
· C-EX-(layer name)-LINE
· C-EX-(layer name)-SYMB
· C-EX-(layer name)-TEXT
8. Using the hard copy points list and the Point Group Manager from the Points pull down menu, create specific point groups and add those points to them.
9. From the Points pull down menu, “Insert points to drawing” by point numbers or groups on their appropriate layers. (pgs. 38-39)
10. Draw lines and insert symbols for the topographic features on their appropriate layers. Don’t forget the underground utilities for each street.
11. From the Surface pull down menu create a new surface for the existing ground with a one-foot contour interval. You will be using point data and fault lines to create the surface. We will go over this process together in class when everyone has their points inserted into the drawing and on the appropriate layers. (pgs.173-184,190-203, 255-259)
12. Label all pertinent points and features.
13. Prepare a Layout called TOPO and insert the border and title block from D:/Civil/Misc. Dwgs/SRJCSHT.

14. Add the following topographic notes to the drawing:

NOTES:
· All distances and elevations are shown in feet and decimals thereof.
· Datum for this survey is based off survey point number _____, Elevation = _____' as shown on the drawing.
· Contour Interval = 1 foot.
· No boundary survey as part of this project.
· This map has been prepared at a scale of 1"=30', with field procedures and accuracy's conforming to such scale. Use of this map at any other scale may not meet the requirements of the national mapping standards. This surveyor accepts no liability or responsibility as to the accuracy of this plat should it be enlarged or reduced.
· Although this plat has been formatted using "AutoCAD" (.dwg), it is for the convenience of the design professional. It is not valid without the surveyor's original signature.