South Central College

CTLS 2825 Civil Design

Course Outcome Summary

Course Information

Description This course covers the general techniques and procedures used in the design of necessary infrastructure associated with highway design. Bentley's Microstation software is utilized throughout the course. (Prerequisites: CTLS 1110 and CTLS 1815)

Total Credits 4

Total Hours 96

Types of Instruction

Instruction Type	Credits/Hours
Lecture	2/32
Lab	2/64

Pre/Corequisites

CTLS 1110 and CTLS 1815

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Develop horizontal alignments for roadways

Learning Objectives
Analyze alignment considerations
Perform manual curve calculations
Perform automated curve calculations
Perform design speed determination

2. Develop vertical alignments for roadways

Learning Objectives

Calculate vertical alignments
Perform manual grade and vertical curve calculations
Perform automated grade and curve calculations
Perform sight distance calculations

3. Develop existing cross sections for roadways

Learning Objectives

Develop existing cross sections
Process survey data
Use automated cross section development with templates

4. Develop construction limits

Learning Objectives

Prepare horizontal alignment design during construction limit development
Prepare vertical alignment design during construction limit development
Examine hydrological impacts

5. Describe safety and minimizing impacts in a rural design

Learning Objectives

Examine intersection design
Examine interchange safety design
Examine design speed considerations

6. Describe safety and minimizing impacts in an urban design

Learning Objectives

Examine intersection safety design
Examine entrance safety design
Examine channelization safety design

7. Perform roadway capacity calculations for rural roadways

Learning Objectives

Examine rural ADT design standards
Examine urban ADT design standards
Perform lane capacity calculations

8. Summarize the Bentley Microstation working environment

Learning Objectives

Create a new Microstation design file using a seed file
Navigate within the Microstation interface environment
Identify mouse settings and mouse mechanics

9. Modify drawing settings

Learning Objectives

Customize the level display to manage levels
Use level filters to manage levels and turn groups of levels on and off
Use design file settings to set preferences in the design file

10. Utilize software elements

Learning Objectives

Use linear elements to draw alignments
Create alignment chains
Change line type and style
Operate fence and selection tools

11. Create design graphics using positioning tools

Learning Objectives

Perform delete, undo, and redo commands
Use Accudraw to establish drawing element positions

Set snap, grid, and axis locks

12. Manipulate and modify design graphics

Learning Objectives

Change the level on which an element was placed
Control nested references
Perform the copy attachment option
Modify elements using the trim and extend tools
Manipulate elements using the parallel copy tool

13. Utilize cells and patterns

Learning Objectives

Load cell libraries
Import cells using the cell selector
Manipulate cells using scale and angle commands
Utilize various hatch patterns

14. Layout alignments using Geopak

Learning Objectives

Utilize the design computation manager
Create road centerline alignments
Develop road profiles and cross sections
Store alignment pi's, curves, and chains

15. Produce and plot drawing sheets

Learning Objectives

Assign scale and border to drawing sheets
Create pdf drawing plots
Place text on drawing plots

SCC Accessibility Statement

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