CCE 201, Summer 2017

Lab 6, Civil 3D: Alignments and Cross Sections (AutoCAD Civil 3D Essentials, by E. Chappell) – **50 points**

Submit to TEACH, Thursday, 20 before noon.

**Part I, Chapter 5, Designing in 2-D Using Alignments (18 points)**

Read and work through pages 91 – 98

Complete exercise: 5.1, 5.2, 5.7, 5.8, and 6.8

1. **(2 pts)** What is an alignment? Describe unique features of an alignment.
2. **(2 pts)** What does it mean to create an alignment by object? What does it mean to create an alignment with temporary geometry?
3. **(2 pts)** Take a snippet of newly created alignment create step 7, page 93.
4. **(2 pts)** In alignment terminology describe the meaning of:
   a. Tangency:
   b. PI:
   c. PC:
   d. PT:
5. **(2 pts)** According to the “Using Temporary Geometry,” on page 98, the perpendicular intersection was designed for what two things?
6. **(2 pts)** What types of design checks are conducted with alignments?
7. **(2 pts)** What is the difference between an alignment design check set and design criteria?
   a. Use the internet to understand roadway design standards. Download the Table of contents. List 4 design considerations for local urban streets.
   b. Open the file: Autodesk Civil 3D Imperial (2011) Roadway Design Standards.xml with Excel review and provide a brief summary of table. This file in on class:

   ![Autodesk Civil 3D Imperial (2011) Roadway Design Standards.xml](Autodesk Civil 3D Imperial (2011) Roadway Design Standards.xml)

**Part II, Chapter 10: Creating Cross Sections of the Design (22 points)**

Read and work through Pages 192 – 204

1. **(2 pts)** At the end of step 15 on page 195 – What did these steps accomplish? Discuss and include a before and after snippet of the results. Refer to figure 10.4, page 194 as an after example.
2. **(2 pts)** From Step 5, page 198, what are other methods used to create sample lines?
3. **(2 pts)** How is a sample line used?
4. (2 pts) What is a section view? What is linked to the section view?
5. (2 pts) After step 8, page 200, take a snippet of the results on our class ANSI B layout.
6. (2 pts) After completing step 10 review the results of the section views.
   a. Why are the multiple section views arranged like they are shown? Hint: top of page 201.
   b. How did the section views get set to his arrangement? Hint: read steps on page 201.
7. (2 pts) After step 10 on page 202 – go to a layout (ANSI D), delete the viewport and then re-add a single viewport. Set plot scale 1” = 20’, adjust so a single sheet of section views are visible and take snippet.
8. (2 pts) After step 18, page 204, on a layout zoom into cross section STA 4+50 and take a snippet. Label the existing ground surface, rock surface and road surface.
9. (6 pts) After completing steps 19, page 20 – what do you see? Pan from section view to section view. What story about the construction of the road are you being told?
   a. Which section views do you feel represent areas that require more time, effort, and money to build as opposed to others?
   b. In the first section views, you can see the road cross section is much wider on the left side. Why?
   c. Review cross sections: STA 1+50, ST 4+50, STA 13+50, and STA 19+50.
      i. For each STA indicate whether the existing ground surface is close to the designed road or whether the road is in an area that is cut (earth needs to be removed) or in an area that is in fill.
      ii. Comment of the road side ditches for each STA and why they are possibly designed like this.

Part III, Chapter 14: Designing Gravity Pipe Networks (10 points)

Read pages 217-284

Complete exercises 14.1, 14.2 and 14.3

1. (2 pts) What is runoff? What causes runoff? In what ways does runoff negatively affect our cities?
2. (2 pts) What is the purpose of a catch basin?
3. (2 pts) What is the purpose a storm water system?
4. (2 pts) Take a snippet of Ex. 14.1, step 13
5. (2 pts) Take snippet of Ex. 14.3, step 8