CE 365K Hydraulic Engineering Design, Spring 2014

Review for First Exam

The material is classified according to ***Bloom's Taxonomy of Educational Objectives***:

Level	Title	Meaning
1	Knowledge	Definitions, facts, formulas
2	Comprehension	Explanation of definitions, formulas, problem solving procedures
3	Application	Know how to use a formula or procedure to solve simple problems
4	Analysis	Break down a complex problem and solve by steps
5	Synthesis	Derivation of basic formulas, design of new systems
6	Evaluation	Advantages and limitations of alternative approaches

Lectures

Lecture	Topic	Level
1	Urban drainage	2
2	Open channel flow	2
3	Hydraulic engineering design and digital campus	3
4	Hydrodesign process	4
5	University closed by weather conditions	
6	Rational method for a single area	5
7	Flooding at the national scale	2
8	Flooding in New York City. Flow in streets	3
9	Flow in gutters and inlets. LIDAR elevation data and TINs	4
10	Flow in a storm sewer	4
11	Consultant overview (Scott Edelman, AECOM)	2
12	Rational method for multiple drainage areas	5
13	Urban water quality and low impact development (Dr Barrett)	2

Readings

Topic	Level
CAEE Strategic plan	2
Low Impact Development Manual Chapters 1 and 4	3
Hydrodesign and digital campus	2
Austin Drainage Criteria Manual, Chapter 2	5
Biggert-Waters 2012 Senate Hearing (Video) (Min 18-45)	3
TR-55 Manual, Chapter 3	4
Applied Hydrology, Chapter 15, Section 1	5

Expected Knowledge

1. What is hydraulic engineering design and how is it similar to or different from other forms of civil engineering design?

2. At what spatial scales does hydraulic engineering design operate, and how do problems differ across those scales?
3. What are the steps in a hydraulic engineering design?
4. What role does GIS play in representation of the physical environment for hydraulic engineering design? What are the different forms in which data can be presented in GIS?
5. What is the time of concentration and how is this determined for flow in a small urban watershed?
6. How is the velocity and discharge of flow determined
    a. For a unit width of flow on a street
    b. For flow in a gutter
    c. For flow in a storm sewer pipe
7. Determine the design discharge by the Rational Method
8. Determine the pipe sizes in a storm sewer network using the Rational Method
9. Calculate the spread of flow on a street and compare to maximum criteria
10. Calculate the flow into a storm sewer inlet and the proportion of flow that bypasses it.

You may bring a review sheet 8/5 x 11 inches with you with anything on it on both sides of the paper that you want.