

West Virginia University
Department of Civil & Environmental Engineering

CE 493 C

Water System Design

Spring 2018

Instructor: Seung Ho Hong, 531 ESB, email:sehong@mail.wvu.edu, 304-293-9926

Credit Hours: 3

Office Hours: TR 2-3pm

Prerequisite: CE 321 Fluid Mechanics.

Required Text: David Chin, Water Resources Engineering 3rd edition, Pearson Inc.

Objective: This course extends the student's understanding of fluid mechanics and brings it to bear on common and important areas of water system design: water distribution systems, sanitary sewer systems, and storm water collection systems.

Expected learning outcomes:

After taking this course, students will be able to design water distribution systems, sanitary sewer systems, and storm water collection systems. - Students can apply concepts of flow in a single pipe flow (pressurized flow) covered in CE 321 to the analysis and design of complex pipe networks using computer programs. The elements of municipal water distribution system design (regulations, appurtenances, demand forecasting, and fire flow estimation) will be covered. Also, for the theory of uniform and gradually varied flow in non-pressurized flow will be developed by using computer program and applied to the design of sanitary and storm water sewers. Regulations and design practices for sanitary sewer and storm water systems will be described during the class.

ABET Program outcomes:

	ABET Outcome
Describe basic fluid properties and understand how these influence fluid movement (e.g. density, specific weight, specific gravity, and viscosity);	a
Learn basic concepts of pipe flow and their application to complex pipe networks in engineering design including pumps and pipe distribution systems. Learn basic concept of uniform and gradually varied flow in open channel and their application to engineering design of sanitary sewer and storm water collection system;	c, e
Use computer programs (e.g. Excel, Commercial program- WaterGEMS) to solve the contemporary water system issues (e.g. collection of sanitary sewer and storm water during extreme hydrologic events) and their applications in engineering design.	j, k

a Apply knowledge of math, science, and engineering

c Design civil engineering projects and components of projects

e Identify, formulate, and solve Civil Engineering problems

j Knowledge of contemporary issues

k Use techniques, skills, and modern engineering tools

Homework: Homework is due at the start of the lecture on the assignment due date. Late Homework (up to the next day at 5 pm) will receive 50% credit. You may work in groups, but independent homework solutions must be turned in.

Exams: There will be two exams and a final. All exams are closed book and mandatory. There is no substitution to exams without prior approval. If you have any emergency, contact me immediately. The final exam will be given according to the University Final Examination Schedule. You can use calculators, but use of cell phones, computers, and any other equipment with wireless connection is prohibited.

Grade: Your final grade will be based on graded homework problems (20%), two exams (25% each), and final exam (30%). The range of grade will be based on 90%, 80%, 70%, 60%, and less than 60% corresponding to A, B, C, D, and F. The instructor reserves the right to lower the grade ranges.

COURSE TOPICS:

<u>Chapter Sections</u>	<u>Topics</u>	<u>Week</u>	<u>Date</u>	
-	Introduction	1	Jan.	9
-	Review of Fluid Mechanics	1		11
2	Fundamentals of Flow in Closed Conduits	2, 3		16,18,23,25
	Pumps	4		30
	Exam 1 (Chapter 2)	5	Feb.	1
				6
3	Design of Water-Distribution System	5, 6		8, 13, 15
	WaterGEMS for design of Water-Distribution System	7, 8		20, 22, 27
4	Fundamentals of Flow in Open Channels	8, 9	March	1, 6, 8
Spring Recess				
4	Design of water surface profiles	10, 11	March	20, 22, 27
	Exam 2 (Chapter 3 &4)	11		29
6	Design of Sanitary Sewers	12, 13	April	3, 5, 10, 12
11	Design of Storm-Collection Systems	14, 15		17, 19, 24
Review		15		27

Honor code:

1. Plagiarism by WVU catalog means the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgement including, but not limited to, the unacknowledged use of materials prepared by another individual. If caught plagiarizing, you will be dealt with according to the WVU Academic Honor Code.

2. When working on homework, you may work with other students in the class. However, you must turn in separate versions of the homework with the following written on it: your name and the names of everyone you collaborated with.

3. Cheating off of another person's test is unethical and unacceptable. Cheating off of anyone else's work is a direct violation of the WVU Academic Honor Code, and will be dealt with accordingly.

4. Unauthorized use of any previous semester course materials, such as tests, homework, and any other coursework, other than that provided by the instructor, is prohibited in this course. Using these materials will be considered a direct violation of academic policy and will be dealt with according to the WVU Academic Honor Code.

Inclusivity Statement:

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700).