CE 322: Hydrotechnical Engineering

Credit hours: 3
Contact Hours: 43
Instructor: Antar Jutla, ESB 627
Office hours: Thursday 4:00-5:00pm or by appointment
Location of Class: ESB E-G-84
Email: asjutla@mail.wvu.edu
Required Text: David Chin, Water Resources Engineering, Third Edition, Pearson Inc .
Recommended Text: Larry Mays, Water Resources Engineering, Wiley International.

Objective: This course extends the student's understanding of elementary fluid mechanics and brings it to bear on three of the most common and important areas of hydrotechnical engineering practice: water distribution systems, sanitary sewer systems, and storm water collection systems

Prerequisite: CEE 321

Expected Learning Outcomes - Upon successful completion of this course students will:

Goals by topic	*Student Outcome*
Learn concepts of flow in a single pipe covered in CE 321 to the analysis of complex pipe networks using computer programs. The hydraulics of pumps is studied. The elements of municipal water distribution system design such as regulations; appurtenances, demand forecasting, and fire flow estimation are covered.	A,C,E
The theory of uniform and gradually varied flow in prismatic channels is developed and applied to the design of gravity flow sanitary and storm sewers. Regulations and design practices for sanitary sewer systems are described. Alternatives to traditional gravity flow collection systems are covered.	A,C,E
Learn elements of urban drainage systems including storm sewers and detention basins	A,C,E
Learn use of computer programs (spreadsheets, Fortran programs, and commercial software) in engineering design.	K

Assignments: Homework assignments will be given approximately every other week. Each assignment will have 50 points. If you do not submit assignments by the due date, 10% of the marks will be deducted. Late assignments after ONE day will **NOT** be accepted, unless you have obtained necessary permission. Instructor reserves right not to grade any late assignments and cannot be challenged. Sometimes your assignments will be returned with comments, though graded; you must rework any incorrect material and resubmit the assignment. Grades *will not be recorded* until each answer is correct and upto expectations. Your graded assignments will be returned within one week of the date of submission.

Attendance: You are expected to attend all classes. You are expected to come to class on time. If you have specific problems with attendance notify me prior to class, unless the emergency is such that this is not possible. In the event of an emergency, notify me as soon as possible. Your class participation (5% of your total grade) will be reflective of your attitude during the class and remain discretionary.

Grading: Final grades will be based on 90%, 80%, 70%... corresponding to A, B, C,... The instructor reserves the right to curve up. **To pass this class, you must earn a 70% in the final exam.** Mid-Term and Final Exam are mandatory. There is no substitution to both of these exams.

Chapter	Topic	Number of Lectures
1	**Introduction**	1
2	**Fundamentals of Flow in Closed Conduits**	
	2.1- 2.2	3
	2.3	1
	2.4	2
	Assignment 1	
3	**Design of Water Distribution System**	
	3.1-3.2	2
	3.3	2
	3.4-3.5	2
	Assignment 2	
	WaterGEMS-Introduction	1
	Setting up WaterGEMS	2
	Running and execution of WaterGEMS: Project	2
	Assignment 3	
6	**Design of Sanitary Sewers**	
	6.1-6.2	2
	Exam 1	1
	6.3	2
	6.4-6.5	2
	Exam 2	1
	Assignment 4	
11	**Design of Stormwater Collection System**	
	11.1-11.2	2
	11.3	2
	11.4-11.5	2
	Assignment 5	
4	***Fundamentals of Flow in Open Channels***	
	4.1-4.2	1
	4.3	1
	Assignment 6	
	FINAL EXAM Presentation	**1**
	Total Lectures	**34**
		~43 contact hours

Course Logistics and Syllabus

Semester:	Spring 2014
Course Format :	2 class periods, 75 minutes each
Credit Hours:	3
Prerequisite:	CE 321
Instructor:	Dr. Antar Jutla, 627 Engineering Sciences Building asjutla@mail.wvu.edu
Schedule:	Lecture. TR: 1230 – 1345
Location:	ESB-G-84
Office Hours:	By Appointment only Location: ESB 627

Course Objectives and Expected Learning Outcomes:

CE 322 extends the student's understanding of elementary fluid mechanics and brings it to bear on three of the most common and important areas of hydrotechnical engineering practice: water distribution systems, sanitary sewer systems, and storm water collection systems.

The course extends the concepts of flow in a single pipe covered in CE 321 to the analysis of complex pipe networks using computer programs. The hydraulics of pumps is studied. The elements of municipal water distribution system design such as regulations, appurtenances, demand forecasting, and fire flow estimation are covered.

The theory of uniform and gradually varied flow in prismatic channels is developed and applied to the design of gravity flow sanitary and storm sewers. Regulations and design practices for sanitary sewer systems are described. Alternatives to traditional gravity flow collection systems are covered.

Elements of urban drainage systems including storm sewers and detention basins are studied.

CE 322 emphasizes the use of computer programs (spreadsheets, Fortran programs, and commercial software) in engineering design.

Text:

(1) ***David Chin, Water Resources Engineering, Third Edition, Pearson Inc (required)***

(2) Larry Mays, Water Resources Engineering, Wiley International, (Recommended)

Grading		
	Exam 1	15%
	Exam 2	25 %
	Peer Feedback	5 %
	Assignments (~6)	25 %
	Final Exam	30 %
		100 %

Grade	100 – 90 A
Assignment:	89.999 – 80 B

79.999 – 70 C
69.999 – 60 D
59 – 0 F

Grading Policy:

- All exams are mandatory. There is no substitution to exams.
- You may use calculators, but use of cell phones, computers and any other equipment with wireless connection is prohibited. The format of exams will be posted online atleast two weeks in advance.
- There is NO replacement rule for anything. If you have had any emergency, please contact me immediately.
- Assignments are due by the end of the due date, generally in my mailbox (located in 651 ESB) unless instructed otherwise. If the assignment is multiple choice, you are will be given instruction to how to solve it. It is your responsibility to make sure you have collected the graded assignments
- Some projects are to be conducted in a group. It is your responsibility to choose groups or to do work independently. If you chose a group route, you will be responsible for all the grades etc, whether or not your group member provided any insights or help.
- Your grades will be posted outside my office door (ESB627) regularly but not at fixed intervals. It is your responsibility to make sure that grades are entered correctly. I will NOT revise, edit or modify TWO weeks prior to final submission of grades.
- Grades will not be revised for loss of potential scholarships, fellowships and other financial aid. No exception will be made.
- It is better to discuss early than later if you have any problems with your grades or your understanding of course material.

Assignments: Homework assignments will be given approximately every other week. Each HW will be equally weighted, irrespective to points in the homework. Since this is the design course, the final answer **MATTERS**, although points will be awarded for methodology as well. If you do not submit assignments by the due date, 10% of the marks will be deducted. I will not accept any late assignment after ONE day, unless you have obtained necessary permission to do so. Instructor reserves right **NOT** to grade any late assignments and cannot be challenged. *Your graded assignments will be returned within one week of the date of submission. THIS IS AN IMPORTANT COURSE POLICY.*

IMPORTANT NOTES:

- A successful completion of this class requires self-reading from the textbook. Most of the material will be covered in the class. However, you are REQUIRED to read relevant chapters from the book since exam, assignments and mid-term problems will be from those chapters.
- If you think you have trouble in understanding any aspect of class, please see me in by my office or send me email elaborating such issues. If you decide to drop this course, please do so during first one to two weeks of the semester.
- I have an open door policy for meetings; however, I also encourage sending email and making prior appointments. No appointments will be entertained two hours before class lecture.
- You may eat, but please turn off your cell phones and **do not sleep in the class**. Your class participation (5% of your total grade) will be reflective of your attitude during the class and remain discretionary. Do not disturb fellow

students.

- During the class, please feel free to ask any relevant question pertaining to this course.
- I will provide limited lecture notes and when available, will be posted on eCampus. It is your responsibility to download and print it and bring it to class. If for any reason, lecture notes are not posted 24 hours prior to the class, I will print it and bring it with me. There will be email communication for this as well. You are also required to bring textbooks in class since not everything will be covered from the notes.
- Since this class is mathematical in nature, blackboard learning will be encouraged, implying that you are expected to write down your own notes.
- It is your responsibility to track grades. If you are unsure, please send email to me and expect a reply within reasonable time. If I do not reply, please see me in my office after two working days. A word of mouth is NOT acceptable communication mode for this class.
- **STRICTLY ENFORCED:** Every issue has to be communicated through email. Your email subject line should start like this: "CE322: issue". For example if you have questions regarding assignment your email subject line should be: "CE322: problem with assignment". You should expect a definitive response if you follow these instructions. Failure to do so will result in delayed communication and possibly other consequences.
- Your submitted work should have cover pages, unless otherwise mentioned. If you DO NOT attach cover pages, 5% of your grade will be deducted.
- Some of the assignment questions are design questions. I expect you to be creative and innovative and think in all dimensions. If your design questions involve sketches, it should be drawn neatly, with pencil and appropriate drawing tools.

Attendance Policy: Attendance is not counted in the grading system. However, attendance is recommended and encouraged.
"WVU recognizes the diversity of students, many of whom must be absent from class to participate in religious observances. Students must notify their instructors by the end of the third class meeting regarding religious observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of a religious observance." See missed exam policy under Grading Policy.

Social Justice Statement: "West Virginia is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. 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 arrangement with Disability Services (293-6700)."

Academic/ West Virginia University expects that every member of its academic community shares

Honesty Policy: the historic and traditional commitment to honesty, integrity, and the search for truth. Students and faculty should act to prevent opportunities for academic dishonesty to occur, and act in such a manner to discourage any type of academic dishonesty. Academic dishonesty includes plagiarism; cheating and dishonest practices in connection with examinations, papers, and projects; and forgery, misrepresentation, and fraud. Complete policy statements and definitions on academic integrity/dishonesty can be accessed at:
http://www.arc.wvu.edu/admissions/integrity.html

Supplies: You are encouraged to purchase a file storage device (upto 5GB) to hold files for your computer related projects.

A note on Final exam (30% of Final grade):
Final Exam will be a design project and will consist of two parts: presentation (25%), design (50%) and written report (25%). You are required to design a water system for a city (it can be hypothetical but those who will use a real data will get added bonus). You are encouraged to use design softwares such as AutoCAD from your previous classes. Details on projects will be discussed in the month of March.