



蘇州大學
Soochow University

CEN 417 Hydraulic Design

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course immerses students in the difficulties of designing network distribution systems that meet precise flow and pressure specifications. The curriculum covers a thorough examination of sewer junction hydraulics, the practical use of measuring equipment in urban water and sewage networks, an understanding of pump principles, and the operation of pumping stations. Students also learn how to undertake a thorough assessment of environmental conditions. The seamless inclusion of actual fieldwork enhances the overall learning experience by providing students with hands-on understanding of the complexities of water supply and wastewater systems.

Upon Completion of this Course, students will be able to:

1. Develop a thorough grasp of fluid dynamics in complicated water systems, allowing you to evaluate and optimize flow.
2. Apply fundamental flow concepts to real-world circumstances, notably in water distribution systems.
3. Develop abilities in understanding and evaluating the dynamics of series and parallel pipes, as well as complicated pipe networks with many loops.
4. Familiarize oneself with water-quality modeling, which will help them increase their knowledge of water properties in distribution systems.
5. Conduct comprehensive assessments of environmental conditions affecting water supply and wastewater systems.



PREREQUISITES

CEN 215 Fluid Mechanics, CEN 316 Principles of Hydraulics.

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Midterm	20 Points
Assignments	20 Points
Project	20 Points
Final Exam	20 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Larry W. Mays, *Hydraulic Design Handbook*, McGraw-Hill Professional, 1999.

Recommended (Optional) Texts or Other Materials:

Larry Mays, *Water Distribution System Handbook*, McGraw-Hill, 1999.

COURSE TOPICS

MODULE	TASKS
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Module 1	<p>Topics: Topic 1: Hydraulics of Pressurized Flow Topic 2: Hydraulics of Open Channel Flow Topic 3: Subsurface Flow and Transport Topic 4: Environmental Hydraulics</p> <p>Assessments: Quiz#1 Assignment#1</p>
Module 2	<p>Topics: Topic 5: Sedimentation and Erosion Hydraulics Topic 6: Risk and Reliability-Based Hydraulic Engineering Design Topic 7: Hydraulics of Water Distribution Systems Topic 8: Pump System Hydraulic Design</p> <p>Assessments: Quiz#2 Assignment#2</p>
Module 3	<p>Topics: Topic 9: Water Distribution System Design Topic 10: Hydraulic Transient Design for Pipeline Systems Topic 11: Hydraulic Design of Drainage for Highways Topic 12: Hydraulic Design of Urban Drainage Systems</p> <p>Assessments: Midterm Project</p>
Module 4	<p>Topics: Topic 13: Hydraulic Design of Culverts and Highway Structures Topic 14: Hydraulic Design of Flood Control Channels and Spillways Topic 15: Hydraulic Design of Stilling Basins and Energy Dissipators Topic 16: Flow Transitions and Energy Dissipators for Culverts and Channels</p> <p>Assessments: Quiz#3 Project due</p>
Module 5	<p>Topics: Topic 17: Hydraulic Design of Flow Measuring Structures Topic 18: Water and Wastewater Treatment Plant Hydraulics Topic 19: Hydraulic Design for Groundwater Contamination Topic 20: Artificial Recharge of Groundwater: Systems, Design, and Management</p> <p>Assessments: Final Exam</p>



ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).



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ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.