CE 322
Hydraulic Engineering

Course Description
Quantifying water flow in waterways is a crucial step in the design of environmental facilities, such as drinking water treatment plants and in delineating floodplains. This course focuses on developing engineering approaches for design and modeling of water flow in water distribution systems, rivers, and groundwater. Various public software will be presented and provided to the students.

Required courses: Calc II and fluid mechanics.

Text
Textbook is: "Fundamentals of Hydraulic Engineering Systems, 5th Edition" by Houghtalen, Akan, and Hwang, by Pearson's press. ISBN-13: 978-0134292380/ISBN-10: 0134292383

Additional textbooks
"Hydrologic Analysis and Design", Third Edition, by Richard McCuen.

Classes
Held weekly in Room 315 Central King Building (CKB) on Monday 02:30 PM-05:25 PM. Attendance is expected. Students may leave after 15 minutes if the instructor or a substitute has not arrived by that time.

Instructor
Dr. Xiaolong (Leo) Geng, Room 430 Colton Hall.
xg56@njit.edu; gengxiaolong@gmail.com
Office hours for the course: Tuesday 1:00-5:00 PM or by appointment.

Grading
Weekly quizzes	20%
Mid term exam	25%
Final exam	35%
Homework	10%
Class Participation	10%

90-100=A
80-90=B+
75-80=B
70-75=B-
65-70=C+

Homework Instructions
! Homework should be turned in at the beginning of the class on the due date. Late homework will receive a zero grade.

! The questions sheets should be provided in the beginning of the homework solution.
! Only one side of a 8.5×11 sheet must be used.
! Include the information that is given and clearly state any assumption. To receive credit for a problem, you must show your work.
! No credit will be given if you only write the answer.
! If you think that your answer is not correct (i.e., it does not make sense to you) but you don't know what else to do, say so.
! Homework should be written as technical reports. The text should be reported first followed by tables and then figures. The text should present the question and the solution, and point to the figures and tables. All tables should be numbered, and all figures should be numbered. Tables should have titles but no captions. Figures should have captions but no titles.
! All axes in graphs should have titles displaying the name of the variable and the units that are being used in the graph.
! Straight lines should be used to connect between data points in graphs. Use of smooth lines from a spreadsheet software, such as Excel, will be penalized.
! Printout of columns of numbers from a spreadsheet will be penalized.
! Discussing the problems with your colleagues is permitted but copying is not.
! Documents should be stapled only on the top left.

Exams Instructions

- Quizzes might be given at the beginning of any lecture.
- Bring a **non-programmable calculator** with you to the class, you might need it for a pop quiz.
- Make-up examinations will only be offered with advance permission from the instructor and only under the most extreme circumstances. A typed request and explanation must be provided. But regardless, expect make-up exams to be more difficult.
- To receive credit for a problem, you must show your work. No credit will be given if you only write the answer. If you think that your answer is not correct (i.e., it does not make sense to you) but you don't know what else to do, say so.

PROPOSED TOPICS in chronological order

Topic 1	Review of Fluid Mechanics
	Energy
Topic 2	Water flow in pipes
	The Darcy-Weisbach Equation and Hazen-Williams equation
Topic 3	Minor losses, pumps, and water hammer
Topic 4	WaterCad software and networks (branched and looped)
Topic 5	Networks, looped
Midterm Exam	
Topic 6	Open channel flow: The Manning's equation
Topic 7	Energy considerations, gradually varied flow, and backwater curves
Topic 8	Backwater and hydraulic jump
Topic 9	HECRAS to model river flow
Topic 10	Groundwater flow, Darcy's experiments and equation
Topic 11	Groundwater flow, the hydraulic gradient in aquifers
Topic 12	Well hydraulics
Final Exam	

Accessibility
Any student who has a need for accommodation based on the impact of a disability should contact the Instructor privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services to coordinate reasonable accommodations for students with documented disabilities. The NJIT web site below provides additional information: http://www.njit.edu/counseling/services/disabilities.php

Academic Honesty
Student's expected to abide by the NJIT's Academic Honesty Policy. Any work submitted by a student for academic credit will be the student's own work. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.