NJIT New Jersey's Science & Technology University

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CE 322-002 Hydraulic Engineering Spring 2024

Course Description (from the course catalog):

The objective is to provide the tools required to design water distribution systems, storm drains, sanitary sewers, and controls. Examines related hydrologic and hydraulic techniques. Includes preliminary coverage of coastal engineering.

Co-requisite or Pre-requisite:

Prerequisite: CE 320 and CE 321 with a grade of C or better

Course Section: 102

Canvas: CE 322002-Hydraulic Engineering

Lectures: Mondays and Fridays, 10:00 AM – 11:20 AM EST/EDT

Instructor: Dr. William Pennock

Office: Colton 268

Office Hours: Mondays and Fridays 11:30 AM – 1:00 PM, or by appointment (Colton 268 or https://njit.webex.com/meet/whp3)

Email: whp3@njit.edu

Communication:

Communication by the Instructor will primarily be done through Canvas. It is your responsibility to check e-mail, and the course page on Canvas regularly.

Text: R. J. Houghtalen, A. O. Akan, N. H. C. Hwang, *Fundamentals of Hydraulic Engineering Systems*, 5th Edition, Pearson, ISBN: 9780134292380.
Since the hard copy is priced the same as a normal textbook, it may be advantageous to use the Pearson+ subscription system, which charges a monthly fee for use of the textbook. The ISBN for this resource is 9780137525768.

For best results, please read the assigned reading (including example problems) before it is covered in class.

References:

1. **R. G. Dean & R. A. Dalrymple, *Coastal Processes with Engineering Applications*, Cambridge University Press, ISBN: 9780511754500**
   This is the essential textbook on coastal engineering. The lessons in this course on coastal engineering will be based on this textbook. It is available online through the NJIT library.
2. **J.A. Roberson, J. J. Cassidy, and M. H. Chaudhry, *Hydraulic Engineering Applications*, 2nd ed., ISBN: 978-0-471-12466-5**
   This is another hydraulic engineering textbook, but it has not been updated as recently and is a bit longer, with more emphasis on hydrology.
3. **J. E. Gribbin, Introduction to Hydraulics and Hydrology with Applications for Stormwater Management, Delmar Thomson Learning, ISBN: 9780766827943**
   This is a textbook with more practical details on stormwater management.

Items Required for this Course:

1. **Computer to access course resources**
2. **DeepNote or Google Colab account (or another way to create Jupyter notebooks with Python such as installing Anaconda)**
3. **Calculator capable of solving cubic functions**
4. **HEC-RAS, EPANET, HEC-HMS, and EPA-SWMM software (free to download, available on lab computers)**

Grading Policy:

- **Homework:** 15%
  - To be submitted to Gradescope as Jupyter notebooks (.ipynb files), unless otherwise specified
- **Quizzes:** 25%
  - The lowest quiz grade will be dropped.
- **Midterm Exam:** 30%
- **Final Exam:** 30%
- **Attendance/Participation:** Students within 2% of a letter grade can be promoted up to the next highest grade level or demoted to the next lowest grade level based on their attendance and participation in class (both during lectures and in online discussions).

Grading Scale:

A:	**100-90**
B+:	**89-85**
B:	**84-80**
C+:	**79-70**
C:	**69-60**
D:	**59-50**
F:	**Below 50**

Assignment Policy:

All assignments are due by 11:59:59 PM on Saturdays, unless otherwise specified. Late assignments will automatically be deducted 10% per day they are late and will not be accepted after 72 hours.

Week	Topic	Reading
1	Introduction **End of Add-Drop**	1.1–1.7, 8.1
2	Dams	2.5–2.6, 8.2–8.4
3	Open Channel Flow	6.1–6.5, 8.5, 8.6, 8.8, 8.10
4	Open Channel Computation & Applications	6.6–6.10
5	Groundwater	7.1–7.9
6	Storage & Pipe Networks	4.1–4.4, 4.7
7	Pumps & Water Hammer	4.5–4.6, 5.1–5.11
8	**Spring Break**	
9	**Midterm**	
10	Hydraulic Measurements	9.1–9.4
11	Hydrology Basics **Last Day to Withdraw**	11.1–11.4
12	Drainage Design	8.9, 11.5–11.7
13	Drainage Networks	Notes from Gribbin
14	Coastal Processes	Notes from Dean & Dalrymple
15	Coastal Engineering	
Final	**Cumulative**	

Attendance and Participation:

Please do your best to be fully present during lectures and avoid distractions for yourself and for your fellow students. As noted above, attendance and participation is a non-negligible component of your grade. If a student must miss a class or an exam, please contact the professor to discuss the issue at least **24 hours prior to** the class or exam. Students will not be allowed to make up exams or quizzes if the professor is not contacted prior to the class, and quizzes will only be made up after the dropped quiz has been used. If a student had a serious medical issue, death in the family, or other excusable emergency absence, the student is required to obtain an excused absence from the Dean of Students prior to asking for a make-up.

Students with Disabilities:

NJIT is committed to providing students with documented disabilities equal access to programs and activities. If you have, or believe that you may have, a physical, medical, psychological, or learning disability that may require accommodations, please contact the Office of Accessibility Resources and Services.

Additional Support:

College studies provide many new challenges and opportunities, and many students experience some form of distress as a result. If you feel overwhelmed or would like to talk with someone about your mental or emotional state, please reach out to C-CAPS or the Dean of Students.

Withdrawals:

In order to insure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

Exam Policy:

Exams will be given in person during class time. Both the midterm and the final exam are cumulative. Quizzes will be given on a weekly basis at the end of class.

Academic Integrity:

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.*** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"*

Syllabus Information:

The dates and topics of the syllabus are subject to change with consultation with the students.

Copyright:

All course content (including this syllabus, lecture materials, homework assignments, and exams) is protected content. Students should not make copies of any course materials or distribute these materials in the public domain, including sites such as Chegg, CourseHero, etc.

Transition to Remote Instruction

Prior to the start of this semester, please read through the NJIT Guidance for Transitioning to Remote Instruction page and register for the Campus Wide Notification System. In the event that NJIT transitions to remote instruction, I will share course-specific delivery information with students via email and through the Canvas Announcement tool. It is recommended that students have their

notifications turned ON for Canvas Announcements. If you do not have adequate computing equipment for remote instruction, please contact the Dean of Students (dos@njit.edu).

Class Recordings:

Class sessions may be recorded by the instructor. These recordings shall only be used as an educational resource and are not to be distributed or used outside of this class. Information on how to access recorded lectures will be made available by your instructor. Any recordings that contain identifiable information about students will not be used beyond this semester.

CEE Mission, Program Educational Objectives and Student Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students
- to promote service to the engineering profession and society

Our program educational objectives are reflected in the achievements of our recent alumni:

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward safe, practical, resilient, sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Alumni will advance their skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of

engineering, science and mathematics

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies