

Fall 2023

## **CE 321-003:Water Resources Engineering**

Thomas Olenik

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Text	<p>Water Resources Engineering by David Chin, 4<sup>th</sup> edition, Pearson Publishing. Access Card, 4/e 9780135357705; available from NJIT bookstore or online at the MyPearsonStore. Recommended not required</p> <p>Additional class resources(Required): NJDEP Stormwater regulations and Best Management Practices(BMP) manual; HEC-RAS programs; Hydraflow Hydrographs and Storm sewer design software imbedded in Civil 3D 2021(educational version that is available to all students at no charge) (Required for each student)</p>
Instructor	<p>Professor Thomas Olenik P.E. <a href="mailto:Olenik@njit.edu">Olenik@njit.edu</a> Office hours: any day from 9am to 9 pm using Webex (Personal room # 927 738 446) in person also on class days</p>

Course objectives: Engineering analysis of: 1. Development of surface water supplies. 2. Drought prevention. 3. Flood protection according to Army Corps of Engineers (ACOE) and New Jersey Department of Environmental Protection (NJDEP) standards. 4. Storm water Management (flowrate, volume, groundwater recharge, water quality enhancement and storm sewer design) according to current NJDEP standards. 5. Groundwater supplies. The techniques utilized in the course will include statistical analysis, hydrograph development and the use of available design software that is common in the consulting engineering field. Students are required to have Civil 3D downloads to access design software in order to do the class project

COURSE ASSIGNMENTS	
Reading Assignments	Textbook Assignments
Chapter 1(all)	1.1
Chapter 8- pages 496-510	8.1, 8.7
Chapter 9-pages 566-576, 591-599, 606-614, 629-636	9.3
Chapter 10- pages 669-681, 688-715	10.5, 10.9, 10.48
Chapter 11- pages 764-815	11.1, 11.25, 11.27
Chapter 12- pages 824-903	12.5
Chapter 14-pages 959-971	
Chapter 16- pages 1082-1102	
<p>Other individual assignments(design project) will be presented in class that will require the use of the additional resources listed above</p>	

GRADING: Project 100 points; Midterm 100 points; Final Exam 100 points

**Final Grades: A= 90 to 100 per cent; B+= 85 to 89; B= 80 to 84; C+= 70 to 79; C= 60 to 69; D= 50 to 59; F= below 50%**

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](mailto:dos@njit.edu).

The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.

**Outcomes Course Matrix – 321 Water Resources Engineering**

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
<b>Student Learning Outcome 1: Identify how water supply needs are quantified and how water resources are developed.</b>			
Discuss source of information and time horizons utilized for water resource planning.	1, 2, 7	1,2	Discussions, homework, and quizzes. NJDEP website
Discuss various options associated with developing water resources.	1, 2, 7	1, 2, 3	Discussions, homework, and quizzes. Software analysis
<b>Student Learning Outcome 2: Demonstrate how the potential for extreme hydrologic events (e.g. floods and droughts) are analyzed and quantified.</b>			
Discuss floods and droughts as well as data sources.	1, 2, 4	1, 2, 3	Discussions and quizzes. NJDEP website; Army Corps of Engineers flood control projects
Discuss methodologies for assessing return periods associated with droughts and floods of interests	1, 2	1	Homework and quizzes; project
<b>Student Learning Outcome 3: Demonstrate the importance of insuring water resources that are adequate from both a quantitative and qualitative standpoint.</b>			
Discuss the importance of water quality from a safety and aesthetic standpoint.	2, 4	1, 2, 3	Discussions and quizzes.
Provide examples of water quality standards and their rationale	4, 7	1, 2, 3	Discussions and quizzes.

<b>Student Learning Outcome 4: Utilize state of the art techniques employed in the discipline.</b>			
Present techniques utilized to assess safe yield of surface water supply sources, and potential draw down effects for groundwater supplies.	1, 2, 7	1, 2	Discussions, homework, and quizzes.
Discuss reservoir design. Reservoir and detention basin routing and hydrograph analysis.	1, 2, 7	1, 2	Discussions, homework and project;. Design Software, NJDEP website

Stormwater Management

### **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 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

REVISED: July 17, 2023