

Spring 2019

# ENE 262-006: Introduction to Environmental Engineering

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**ENE 262- 002TBV – INTRODUCTION TO ENVIRONMENTAL ENGINEERING**  
**Department of Civil & Environmental Engineering**  
**New Jersey Institute of Technology**  
**Spring 2019**

Instructor (s) : **Paul Schorr, PE, PP, Section 002**

Office Hours: **9:30 – 10 am Tuesday**

**Room 261 Colton Hall**

**609- 933-3900**

**[schorr@njit.edu](mailto:schorr@njit.edu); CLASS ROOM 416 Colton Hall 11:30 TO 4:30**

**Prerequisites:** CHEM 126, MATH 112, and PHYS 121.

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Comments</b>
1	1/22	-Introduction; Definitions, Regulations/Standards, Environmental Ethics, Environmental Justice, Global Warming	Ch. 1 Ch. 9 part	Tie the ASCE Code of Ethics, into environmental ethics, environmental justice, sustainability, & global warming.
2	1/29	Global Warming Sustainability and Green Engineering	Ch. 9 part Ch. 13	Civil Engineers and the infrastructure they design are on the front lines of response to global warming and sustainability.
3	2/5	-Mass Balance -Risk Assessments	Ch. 2 Ch. 3	Homework #1 Assigned
4	2/12	-Water Resources Engineering - - - Pick Groups and Topics for the Papers	Ch.4	Homework #2 Assigned
5	2/19	- Water Pollution	Ch.7	Homework #3 Assigned
6	2/26	-Water Chemistry <i>10/3 TBV Lab on Alkalinity meets in Colton 414</i>	Ch.5	Approximately 1.25 hr of lecture prior to lab
7	3/5	- Water Chemistry - Water Treatment <i>10/10 TBV Lab on Hardness meets in Colton 414</i>	Ch. 5 Ch. 6	Approximately 1.25 hr of lecture prior to lab
8	3/12	Midterm		
	3/19	Spring Break		
9	3/26	-Water Treatment Submit Outline of Paper <i>10/17 TBV Lab on Jar Testing meets in Colton 414</i>	Ch.6	Approximately 1.25 hr of lecture prior to lab
10	4/2	Noise	Ch. 10	Homework #4 Assigned
11	4/9	-Wastewater Treatment - Air Quality	Ch. 8 Ch. 9	
12	4/16	- Air Quality	Ch. 9	Homework #5 Assigned
13	4/23	-Solid Waste -Hazardous Waste	Ch. 11 Ch.12	
14	4/30	<i>Paper Presentations</i>		
		Final Exam		8:30am to 11am

Note: There will generally be papers (on topic, but relatively short) assigned to be read prior to class so that they can be discussed in class. Those discussions will be part of the class participation grade.

General Notes: A field trip to an environmental facility may be scheduled during the semester.

Lecture slides and assigned papers will be placed on Moodle.  
No late assignments accepted without pre-approval.

Texts: 1) Davis, M.L. and Cornwell, D.A., Introduction to Environmental Engineering, 5<sup>th</sup> Edition, McGraw Hill Companies, New York, NY, 2013, ISBN 978-0-07-340114-0  
2) Handouts and class presentations

Grading:	Midterm	25%
	Final Exam	25%
	Laboratories	25%
	Paper & Presentation	10 %
	Homework	10%
	Class Participation	5%

***Subject to consolidation PS***

*“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)”***

**Department of Civil and Environmental Engineering**  
**ENE 262 – Introduction to Environmental Engineering**

**Description:**

To introduce students to the integrated science, engineering, design and management concepts of engineered environmental systems. The course will cover environmental regulations and standards, environmental parameters, mass balance and natural systems, water quality management, water and wastewater treatment, air pollution control, noise pollution, and solid and hazardous waste management. Background material and laboratories in the environmental sciences and management areas will be covered. Group term papers and presentations will be required.

**Prerequisites:** CHEM 126, MATH 112, and PHYS 121.

**Textbook(s)/Materials Required:**

- 1) Davis, M.L. and Cornwell, D.A., Introduction to Environmental Engineering, 5<sup>th</sup> Edition, McGraw Hill Companies, New York, NY, 2013, ISBN 978-0-07-340114-0
- 2) Handouts and class presentations

**Course Objectives:**

1. Provide students with the most relevant environmental regulations and standards; the driving forces behind environmental science and engineering projects.
2. Provide students with the ASCE Code of Ethics and an environmental code of ethics and how that relates to environmental justice, sustainability and the response to global warming
3. Provide students with the scientific background needed to assess environmental quality in terms, of the physical, chemical and biological aspects.
4. Provide students with the basic scientific and engineering principles of sustainability and green engineering, water and wastewater treatment, air pollution control, noise pollution, and solid and hazardous waste management.
5. Introduce students to environmental report writing.

**Topics:**

Definition of Environmental Engineering  
Impact of engineering projects on the environment.  
Environmental legislation. Regulations and standards (current and proposed).  
Environmental ethics. Environmental justice.  
Health effects. Risk assessment and management.  
Physical, chemical and biological sciences and parameters.  
Mass balance and natural systems in the environment.  
Water quality management.  
Water & wastewater treatment.  
Air pollution (including greenhouse gases) and control.  
Noise pollution and control.  
Solid and hazardous waste management.  
Sustainability and green engineering  
Environmental report writing – case study.  
Laboratory Experiments in the environmental sciences.

**Schedule:** Lecture/Recitation- 3 hours per week  
Laboratory- 1 hour per week

**Professional Component:** Engineering Topics

**Program Objectives Addressed:** 1 to 5

**Prepared By:** Prof. Crossan

**Date:** 08/14/18

**Course Objectives Matrix – ENE 262 Introduction to Environmental Engineering**

<b>Strategies, Actions and Assignments</b>	<b>ABET Student Outcomes (1-7)</b>	<b>Program Educational Objectives</b>	<b>Assessment Measures</b>
<b>Student Learning Outcome 1: Describe and discuss relevant environmental regulations ethics and standards; the driving forces behind environmental science and engineering projects.</b>			
Define environmental science and engineering	4, 7	1	Homework, class, discussions and examinations.
Explain and discuss current and proposed relevant regulations, standards and ethical rules.	4	1	Homework and examinations.
<b>Student Learning Outcome 2: Assess environmental quality in terms of the physical, chemical and biological aspects.</b>			
Provide an overview of environmental sciences and parameters.	1, 2	1, 2	Homework, class discussions, and examinations.
Conduct experiments in the environmental sciences.	6, 5	1, 2	Laboratory group discussions and laboratory reports.
<b>Student Learning Outcome 3: Illustrate mass balance in environmental systems.</b>			
Illustrate the mass balance approach.	1, 2	1, 2	Homework, class examples and examinations.
<b>Student Learning Outcome 4: Recognize the basic scientific and engineering principles of water and wastewater treatment, air pollution control, noise pollution, and solid and hazardous waste management.</b>			
Introduce the scientific and engineering principles of water treatment.	2	1, 2	Homework, class discussions and examinations.
Introduce the scientific and engineering principles of wastewater treatment.	2	1	Homework, class discussions, and examinations.
Introduce the scientific and engineering principles of air pollution and control	2	1	Homework, class discussions and examinations.
Introduce the scientific and engineering principles of noise pollution and control.	2	1	Class examples, and examinations.
Introduce the scientific and engineering principles of solid and hazardous waste management.	2	1	Homework, class discussions, and examinations.
<b>Course Objective 5: Practice environmental report writing.</b>			

Provide the mechanisms of environmental report writing.	3	1, 2	Class discussions and case study paper.
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### 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: 2/13/18

