



North South University
Department of Civil and Environmental Engineering
CEE 470: Solid and Hazardous Waste Management Engineering
SUMMER 2019

Course Outline

1. BASIC INFORMATION

1.1 COURSE DESCRIPTION

Solid Waste Management: Sources and Types of Solid Wastes; Physical and Chemical Properties of Solid Wastes; Solid Wastes Generation; On-Site Handling. Storage and Processing; Collection of Solid Wastes, Transfer Stations and Transport; Ultimate Disposal Methods; Resources and Energy Recovery, Soil Pollution. Industrial Soils Waste Collection and Disposal; Hazardous Waste Management.

1.2 COURSE CONTENTS

- Perspectives: Evolution of solid and hazardous waste management; Legislative trends and impacts
- Sources, types and composition of municipal solid waste
- Engineering principles
- Separation, transformation and recycling of waste materials
- Closure, restoration and rehabilitation of landfills
- Solid waste management and planning issues

1.3 COURSE INFORMATION

1. Senior year undergraduate course
2. Credit hours: 3 hours of classroom contact and 6 hours of self-study per week.
3. Two classes per week having 1.5 hours of duration
4. Tutorials moderated by teaching assistants
5. The course requires background knowledge of Sanitation and Wastewater Engineering, Environmental Chemistry and Fluid Mechanics

1.4 PREREQUISITE COURSES:

1. CEE 373 (Sanitation and Wastewater Engineering)
2. CEE or ENV 209 (Environmental Chemistry)
3. CEE 211 (Fluid Mechanics)

1.5 FACULTY

1. Dr. Shama E. Haque; Ph.D., Associate Professor, DCEE; Initial: SEQ
2. Room: SAC 730
3. Office Phone: 02-55668200 ext. 6232



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4. Email: shama.haque@northsouth.edu (“CEE 470” in the subject line); Email sent to my personal account and phone calls on my personal cell phone will NOT be replied to.
5. Office Hours: SMTW 8:45 am - 9:30 am; MW 11:20 am - 12:50 pm; or by email appointment

1.6 CLASS HOURS:

Section 1. MW 09:40 AM - 11:10 AM (Room# NAC 604)

1.7 TEXT BOOK:

1. “Integrated Solid Waste Management. Engineering Principles and Management Issues” by George Tchobanoglous et al. Available at NSU Book Store

2. COURSE OBJECTIVES AND OUTCOMES

2.1 COURSE OBJECTIVE:

1. To elucidate solid and hazardous waste management engineering issues
2. To train the students to communicate effectively through a group project focusing on solid and hazardous waste management issues/practices
3. To evaluate local and global solid and hazardous waste management issues that are stemming from abandoned waste sites and waste disposal operations.

2.2 COURSE OUTCOMES (COs):

- 2.2.1 CO1: Analyze and solve solid and hazardous waste management engineering problems
- 2.2.2 CO2: Communicate effectively through oral presentation on solid and hazardous waste management issues.
- 2.2.3 CO3: Identify and evaluate global and local contemporary solid and hazardous waste management issues applying the knowledge gained throughout.

2.3 MAPPING OF COURSE OUTCOMES TO BSCEE PROGRAM OUTCOMES

L: Slightly maps (low); M: Moderately maps (medium); H: Substantially maps (high)

	PO - 1	PO - 2	PO - 3	PO - 4	PO - 5	PO - 6	PO - 7	PO - 8	PO - 9	PO - 10	PO - 11	PO - 12	PO - 13
CO1		H											
CO2										H			
CO3													M



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2.4 CO DELIVERY AND ASSESSMENT

SI.	CO Description	Bloom's Taxonomy Domain / Level (C: Cognitive; P: Psychomotor; A: Affective)	Delivery Methods and Activities	Assessment Tools
CO 1	Analyze and solve solid and hazardous waste management engineering problems	C-4	Lecture, Group Discussions, Practice Problems, Videos	Quiz/Exam
CO 2	Communicate effectively through oral presentation on solid and hazardous waste management issues	C-4, A-3	Oral Presentation	Oral Presentation
CO 3	Identify global and local contemporary solid and hazardous waste management issues applying the knowledge gained throughout the course	C-3	Lecture, Group Discussions, Practice Problems, Videos	Quiz/Exam

2.4.1 Cognitive domain (knowledge-based): C

1: Knowledge, 2: Comprehension, 3 Application, 4 Analysis, 5: Synthesis, 6: Evaluation

2.4.2 The affective domain (emotion-based): A

1: Receiving, .2: Responding, 3: Valuing, 4: Organizing, 5: Characterizing

2.4.3 The psychomotor domain (action-based): P

1: Perception, 2: Set, 3: Guided response, 4: Mechanism, 5: Complex overt response, 6: Adaptation, 7: Origination

3. BSCEE PROGRAM OUTCOMES (PO)

3.1.1 PO – 1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex civil engineering problems.



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3.1.2 PO – 2: Problem analysis

Identify, formulate, research the literature and analyze complex civil engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.

3.1.3. PO – 3: Design/development of solutions

Design solutions for complex civil engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.

3.1.4 PO – 4: Investigation

Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

3.1.5 PO – 5: Modern tool usage

Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex civil engineering activities with an understanding of the limitations.

3.1.6 PO – 6: The engineer and society

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional civil engineering practice.

3.1.7 PO – 7: Environment and sustainability

Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

3.1.8 PO – 8: Ethics

Apply ethical principles and commit to professional ethics, responsibilities and the norms of the civil engineering practice.

3.1.9 PO – 9: Individual work and teamwork

Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.

3.1.10 PO – 10: Communication

Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.

3.1.11 PO – 11: Project management and finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.

3.1.12 PO – 12: Life-long learning

Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.



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3.1.13 PO – 13: Contemporary Issues

Demonstrate sound knowledge on global and local contemporary civil engineering issues.

4.0 COURSE ASSESSMENT

4.1 TEACHING/LEARNING STRATEGIES

4.1.1 Lectures

- Attend lectures regularly and punctually
- Pay attention and learn concepts
- Understand concepts that are not precise in the textbook

4.1.2 Tutorials and Group work

- Contact teaching assistant when required
- Come to the tutorial sessions
- Work with peers to solve problems, discuss with friends

4.1.3 Private study

- Review lecture material and textbook

4.2 ASSESSMENT

All exams are written focusing on impartiality of evaluation and fairness. The Exams are objective, which require students to select the correct response from several alternatives or to supply a word or short phrase to answer a question or complete a statement. Most of your grade is derived directly from the lectures. Some concepts covered in the lecture are not in the text. The instructor will inform the students of the exam syllabus well ahead of time. In order to prepare for the exams, the lecture notes should be thoroughly reviewed. Hardcopy of presentation reports must be submitted at the beginning of class on time on the prescribed date; electronic versions will NOT be accepted. NO LATE SUBMISSION WILL BE ACCTEPED.

4.3 EVALUATION (TENTATIVE):

Lecture	
Attendance	5%
Oral Presentation	10%
2 Midterm Exams (1 hour each)	50%
Final Exam (1 hour 15 minutes)	35%

4.4 GRADING POLICY:



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Generally, NSU grading policy will be followed. However, minor deviation is still possible depending on the situation.

4.5 EXAM POLICY:

A missed exam and presentation will not be rescheduled for any reasons. If due to unavoidable circumstances, an assignment, presentation, midterm or final exam needs to be rescheduled, prior notice will be given. It is the students responsibility to regularly check their email/SMS, notice boards (outside the DCEE Office for any changes or announcements.

5. TENTATIVE LECTURE SCHEDULE:

* One Day = 1.5 lecture hours, Total 24 days lecture = 36 lecture hours

Day*	Outcome/ Material Covered	Reference Reading
Day-1	Course overview and Introduction	-
Day-2	Evolution of Solid Waste Management and Relevant Engineering Principles	Chap-1
Day-3	Legislative Trends and Impacts	Chap-1, 2
Day-4	Sources, Composition, and Properties of Solid Waste	Chap-3
Day-5	Sources, Types, and Composition of Municipal Solid Waste	Chap-3
Day-6	Physical and Chemical Properties of MSW; Midterm Exam 1 Review	Chap-4
Day-7	Midterm Exam 1	
Day-8	Biological Properties of MSW; Physical, Chemical and Biological Transformations of Solid Waste	Chap-4
Day-9	Sources and Types of Hazardous Waste found in MSW	Chap-5
Day-10	Properties of Hazardous Waste found in MSW	Chap-5
Day-11	Engineering Principles of Solid Waste Management, Solid Waste Generation and Collection Rates	Chap-6
Day-12	Industrial Solid Waste Collection; Waste Handling, Storage and Processing;	Chap-6, 7
Day-13	Waste Handling, Storage and Processing;	Chap-7, 8



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	Collection of Solid Wastes	
Day-14	Separation and Processing and Transformation of Solid Waste	Chap-9
Day-15	Transfer and Transport of Waste; Midterm Exam 2 Review	Chap-10
Day-16	Midterm Exam 2	
Day-17	Solid Waste Management	Chapt-11, 15
Day-18	Ultimate Disposal Methods; Resources and Energy Recovery	Chapter 11, 14
Day-19	Oral Presentations and ALL Reports Due	
Day-20	Oral Presentations	
Day-21	Landfill Method of Solid Waste Disposal	Chap-11, 19
Day-22	Landfill Design	Chap-11
Day-23	Landfill Closure and Post-closure Care; Soil Pollution	Chap-16, 17, 19
Day-24	Final Exam Review	
Day-25	Final Exam (As per schedule declared by NSU)	

6. CODE OF CONDUCT:

It is highly requested that you maintain discipline in the class and not be late, refrain from making noise during lecture, and not leave class early. To get attendance grade you **MUST** attend the section you are officially registered in. Turn off cell phone before coming to a class or exams. There are two types of behaviour that are considered academically dishonest. Plagiarism is the deliberate formal presentation or submission of the research, words, ideas, illustrations or diagrams of others as one's own without citation or credit. Cheating is the use of unauthorized aids (including electronic devices), assistance or materials in the preparation of assignments or in examinations. Copying or showing your work to others, or asking for answers is also considered cheating. Penalties for cheating or plagiarism include one or more of the following: a zero grade on an assignment or exam, a failing grade in the course, suspension from the college, and expulsion from the college. On the premises of the University or at a University-sponsored program, students must abide by the Student Code of Conduct: <http://www.northsouth.edu/student-code-of-conduct.html>