JOHN A. REIF, JR. DEPARTMENT OF
CIVIL AND ENVIRONMENTAL ENGINEERING
NJIT New Jersey Institute of Technology

ENE-662-851: Brownfield Assessment, Investigation, and Remediation: The Foundational Building Blocks of a Sustainable Future

(3 credits)

Lectures Asynchronous Online Course

Instructor **Maria Coler**
Office Hours: By Appointment
Virtual
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Prerequisite Undergraduate Civil or Environmental Engineering degree

Required Textbook

Reading materials provided on Canvas.

Other Recommended Texts & Reading

Love Canal: A Toxic History from Colonial Times to the Present, Richard S. Newman

Silent Spring, by Rachel Carson

Course Description *(from NJIT's course catalog)*

This course will provide students with an understanding of how to assess and remediate a brownfield site in the State of New Jersey: from conducting a preliminary assessment to constructing a conceptual site model, to choosing a remediation strategy. Emerging contaminants and the concepts of resilient and sustainable remediation are explored. In addition, the course contextualizes brownfields in the sustainability movement by providing a broad legislative overview and an exploration of the evolution of public awareness regarding brownfield sties.

http://catalog.njit.edu/undergraduate/newark-college-engineering/civil-environmental/civil-engineering-bs/

Course Objectives (General)

By the end of this course, the student will be able to:

Course Topic 1: Understand the historical context in the United States from which brownfield initiatives and legislation emerged. Learn why brownfields are the building blocks of a sustainable future.

Course Topic 2: Learn the fundamentals of constructing a conceptual site model (CSM) in the State of New Jersey: from the preliminary assessment, to the site investigation, to the remedial investigation. A CSM defines the source, nature, extent, fate and transport of contaminants in the environment. At a high level, you will learn the iterative approach to constructing an effective CSM.

Course Topic 3: Understand the role of the CSM in conducting a feasibility study and selecting the appropriate remediation strategy.

Course Topic 4: Become familiar with ex-situ and in-situ remediation technologies often employed at contaminated sites.

Course Topic 5: Become familiar with the emerging contaminants affecting the brownfield industry and the various federal and state regulations.

Course Topic 6: Learn about sustainable and resilient remediation and the concept of ecological uplift-- and how brownfields are serving as the sites of clean energy redevelopment projects.

Course Topic 7: Learn how the lessons of the iconic environmental sagas continue to be relevant today.

POLICIES & PROCEDURES

Academic Integrity: It is expected that NJIT's University Code on Academic Integrity will be followed in all matters related to this course. Refer to NJIT's Dean of Students website to become familiar with the Code on Academic Integrity and how to avoid Code violations.

https://www.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Communication: All communications should be via email, unless otherwise specified.

Lectures/Class: Students must be present for the first lecture. Participation is requested and recommended for additional live, on-line classes.

Handouts: Handouts will be made available online.

Homework: Students are expected to read all course materials and comprehensively respond to written assignment questions.

Homework Format: Written responses to assignment questions and discussions.

Late Homework: Credit for late homework submissions will be decided on a case-by-case basis.

Homework Solutions: Feedback will be provided as either a solution handout or comments on each student's work.

Exams: All materials provided during the class will be allowed during quizzes and exams.

Calculation of Course Grade: A weighted average grade will be calculated as follows:

Describe how your assignments, exams, quizzes, projects, etc. are weighted.

Assignments	7.5%
Quizzes	17.5%
Virtual Discussion Participation	10.0%
Mid-Term	30.0%
Final	35.0%
Extra Credit	Max 2.5 points added to final GPA

The minimum requirements for final letter grades are as follows:

A = 90%, B+ = 85%, B = 80%, C+ = 75%, C = 70%, D = 65%, F < 65.0%

Grades will not be curved.

Instructor Commitment: You can expect the Instructor to be courteous, punctual, organized, and prepared for lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if office hours are moved; to provide a suitable guest lecturer or pre-recorded lecture when they are traveling or unavailable; and to grade uniformly and consistently.

AI statement: The use of artificial intelligence (AI) is permitted in this course only when explicitly stated in assignments. If students use AI for any course-related work, they must cite it according to the guidelines provided on the **NJIT Library AI Citation page**. If you have any questions about AI use in this course, please contact the course instructor before submitting any assignments. In cases where AI use is not allowed, students are expected to complete work without AI assistance to develop their skills in this subject area.

Students with Documented 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 Coordinator of Student Disability Services located in the Center for Counseling and Psychological Services, in Campbell Hall, Room 205, (973) 596-3414. Further information on disability services related to the self-identification, documentation and accommodation processes can be found on the webpage at: (http://www.njit.edu/counseling/services/disabilities.php)

Course Schedule: Include a table with a preliminary schedule including estimated exam dates, course topics, project dates, etc.

ENE 662-852 Brownfield Remediation: Course Syllabus
Spring 2025

Week	Date	Percent	Quiz/Exam	Assignments	Discussions	Description of Session	Lecturer	Reading Materials
21-Jan	Class 1					Brownfields and Climate Change--A Timeline of Two Crises Lessons from the Environmental Canon: "Silent Spring" and "Love Canal"	MC	PPT Provided Excerpts from: "Silent Spring," "Love Canal," Waterfront Alliance article
		2.5		**Assignment #1**				
28-Jan	Class 2					Brownfield Regulatory Framework and Applicable Rules	MC	PPT
					Discussion #1			
4-Feb	Class 3					Brownfield Regulatory Framework an Applicable Rules (cont.)	MC	PPT and LSRP Code of Conduct
					Discussion #2			
11-Feb	Class 4	2.5	**Quiz**			Building a CSM: Starting with Due Diligence--NJ Preliminary Assessment v. Phase I ESA	MC	PPT, Preliminary Assessment Guidance + CSM Guidance
					Discussion #3			
18-Feb	Class 5					Building a CSM: SI/RI- Soil		PPT and Soil Technical Guidance
		4		**Assignment #2**	**Discussion #4**			
25-Feb	Class 6	2.5	**Quiz**			Building a CSM: SI/RI - Groundwater (Part I)	MC	PPT and Groundwater Technical Guidance
					Discussion #5			
4-Mar	Class 7					Building a CSM: SI/RI - Groundwater (Part II)	MC	PPT and Groundwater Technical Guidance
		7.5	**Quiz**		**Discussion #6**			
11-Mar	Class 8					Investigative Technologies	MC	PPT and other documents
		3.5		**Assignment #3**	**Discussion #7**			
SPRING RECESS								
25-Mar	Class 9					Feasibility Studies + Ex-situ Remediation	**MC**	PPT and other documents
		25	**Midterm (30%)**					
1-Apr	Class 10					Insitu Remediation Technologies: Part I	MC	PPT + Other Documents
					Discussion #8			
8-Apr	Class 11					Insitu Remediation Technologies: Part II		PPT + Other Documents
					Discussion #9			
22-Apr	Class 12					Introduction to Emerging Contaminants		PPT + Other Documents
					Discussion #10			
29-Apr	Class 13	5	**Quiz**			Emerging Contaminants Continued	MC + Guest	PPT + Guest Lecturer
6-May	Class 14					Sustainable and Resilient Remediation	MC + Guest	PPT + Other Documents
		2.5	**Quiz**					
TBA	Class 15	35	**Final**			FINAL EXAM	MC + Guest	PPT
TBA		2.5		**Extra Credit**				

	Activity	**Percent**	
	Quizzes	20	
	Assignments	10	
	Discussions	10	(0 or 10)--must participate in all
	Midterm	25	
	Final	35	
	TOTAL:	100	
	Extra Credit	2.5	

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

Program Educational Objectives

Our **Program Educational Objectives** are reflected in the achievements of our recent alumni:

- **Engineering Practice:** Alumni will successfully engage in the ethical practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
- **Professional Growth:** Alumni will advance their technical and interpersonal 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 academia, business, and law through further education.
- **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.

Student Outcomes

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

- an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
- 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
- an ability to communicate effectively with a range of audiences
- 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
- 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
- an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusion
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 1/6/2025