FA24-ENE662851: Brownfield Assessment, Investigation, and Remediation: The Foundational Building Blocks of a Sustainable Future

(3 credits)

Lectures Asynchronous Online Course

Instructor Maria Coler
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Virtual
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Prerequisite Undergraduate Civil or Environmental Engineering degree

Required Textbook

Reading materials provided on Canvas.

Other Recommended Texts & Reading

"Exposure," by Robert Bilott; Dramatized in the Movie, Dark Waters.
"A Civil Action," by Jonathan Harr; Dramatized in the movie, A Civil Action.

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 CSMs defines the source, nature, extent, fate and transport of contaminants in the environment. 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.

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: N/A

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 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.

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)](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

Week of:	Date	Quiz/Exam	Assignment/Discussion	Description of Session	Lecturer	Reading Materials
	3-Sep	Class 1	Discussion #1	Brownfields and Climate Change--A Timeline of Two Crises	MC	PPT Provided
	9-Sep	Class 2	**Written Assignment #1 (2**	Lessons from the Environmental Canon: "Silent Spring" and "Love Canal"	MC	Excerpts from: "Silent Spring," "Love Canal," Waterfront Alliance article
	16-Sep	Class 3		Brownfield Regulatory Framework (Part I)	MC	Environmental Regulatory Framework in NJ
	23-Sep	Class 4		Brownfield Regulatory Framework (Part II) and Applicable Rules	MC	NJ LSRP Program - SRRA, LSRP Code of Conduct
		Quiz (2.5%)	Disucssion #2			
	30-Sep	Class 5		Brownfield Regulatory Framework (Part II) and Applicable Rules (cont'd)		
		Quiz (2.5%)				
	7-Oct	Class 6		Building a CSM: Starting with Due Diligence--NJ Preliminary Assessment v. Phase I ESA	MC	Preliminary Assessment Guidance + ASTM Standard Practice for Phase I ESAs
	14-Oct	Class 7		Building a CSM: SWRI- Soil	MC	PPT, Soil Guidance Documents, CSM Guidance Document
		Quiz (5.0%)	Discussion #3			
	21-Oct	Class 8		Building a CSM: SWRI - Groundwater (Part I)	MC + Gue	PPT and Groundwater Guidance Document
	28-Oct	Class 9		Building a CSM: SWRI - Groundwater (Part II)	**MC**	PPT and Groundwater Guidance Document
		Midterm (30%)	**Written Assignment #2 (5%)**			
	4-Nov	Class 10		Feasibility Studies + Ex-situ Remediation	MC	PPT + Other Documents
			Discussion #4			
	11-Nov	Class 11		Insitu Remediation Technologies: Part I	MC + Gue	PPT + Other Documents
		Quiz (2.5%)				
	18-Nov	Class 12		Insitu Remediation Technologies: Part II	MC + Gue	PPT + Other Documents
	25-Nov	Class 13	**Quiz (2.5%)**	Introduction to Emerging Contaminants	MC	PPT + ITRC Documents
			Disucssion #5			
	2-Dec	Class 14		Emerging Contaminants	MC + Gue	PPT + ITRC Documents
		Quiz (2.5%)				
	9-Dec	Class 15		Sustainable and Resilient Remediation	MC + Gue	PPT
		Final (35%)				

Quizzes + Assiggments (30%)
Participation in Virtual Discussions (10%)
Extra Credit - TBA (max 5 points added to GPA)

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, 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 technical and interpersonal skills through professional growth and development activities such a 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