**CE/ENVE 4530 Geoenvironmental Engineering**

**Department of Civil and Environmental Engineering**

**School of Engineering**

**University of Connecticut**

**Spring 2021**

**Class Meetings**

 **Lectures:** Tue & Thu: 9.30-10.45 am, Blackboard Collaborate, or PBB 129/WebEx

**Instructor:** Amine Dahmani, Ph.D.

**Contact Information:** amine.dahmani@uconn.edu

**Instructor office Hours:** by Blackboard Collaborate or WebEx appointment

**Course materials**

*Course readings and media are available within HuskyCT, through either an Internet link or Library Resources.*

**Catalog Description**

Principles of solid waste management; design of landfills and waste containment systems; compacted clay liners and slurry walls; overview of soil remediation techniques.

**Prerequisites**

CE3510 (Soil Mechanics) or ENVE 3530 (Engineering and Environmental Geology) or NRE 4135 (Introduction to Ground-Water Hydrology); Open to juniors or higher in the School of Engineering

**Learning Objectives**

At the end of this course, you will be able to:

1. Identify and evaluate the extent and nature of contamination in a site
2. Select the appropriate regulatory framework to meet the state and federal requirements.
3. Conduct a Phase I/II/II Site Investigation
4. Select appropriate sampling and testing methods for soil and groundwater analysis
5. Select appropriate remediation technologies for soil and groundwater remediation.
6. Evaluate alternative remedial action plans and conduct feasibility analysis.

**Course Schedule**

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| --- | --- | --- | --- | --- |
| **Lecture Schedule: Week** | **Date** | **Day** | **Material** | **Evaluation** |
| **1** | 19-Jan | Tue | **Introduction** |   |   |
| 21-Jan | Thu | **Module 1: Subsurface contamination (Geochemical & Hydrogeological background)** | Types and sources of contamination |   |
| **2** | 26-Jan | Tue | Geochemical Background (Dr. Chrysochoou) |   |
| 28-Jan | Thu | Geochemical processes of organic contaminants /Hydrogeological background |   |
| **3** | 2-Feb | Tue |  |  |   |
| 4-Feb | Thu | **Module 1 continued: Subsurface contamination (Geochemical & Hydrogeological background)** | Hydrogeological background /Fate and Transport of contamination |   |
| **4** | 9-Feb (PPB129)\* | Tue | Practice questions & Quiz 1 |
| 11-Feb | Thu | **Module 2: Regulatory Framework** | Federal Environmental Laws (CERCLA, RCRA, Clean Water Act, etc) |   |
| **5** | 16-Feb | Tue | CT regulations  |   |
| 18-Feb (PPB129)\* | Thu | Environmental Land Use restrictions  | Practice questions & Quiz 2 |
| **6** | 23-Feb | Tue | **Module 3: Contaminated Site Characterization and Assessment** | Phase I Site Investigation |   |
| 25-Feb | Thu | Phase II/III Site Investigation |   |
| **7** | 2-Mar (PPB129)\* | Tue | Conceptual Site Model |   |
| 4-Mar | Thu | Data Quality Objectives | Practice questions & Quiz 3 |
| **8** | 9-Mar | Tue | **Interim Project presentations** |   |
| 11-Mar(PPB129)\* | Thu | **Module 4: Sampling and Data Analysis** | Methods for soil sampling  |   |
|  |  |  |
|  |
| **9** | 16-Mar | Tue | **Module 4: Sampling and Data Analysis** | Groundwater sampling |   |
| 18-Mar | Thu | Sampling Plan Development |   |
| **10** | 23-Mar(PPB129)\* | Tue | Data Analysis using ProUCL (Dr. Chrysochoou) |   |
| 25-Mar | Thu | In-class exercise on data analysis | Practice questions & Quiz 4 |
| **11** | 30-Mar | Tue | **Module 5: Remedial Technologies** | In-situ remedial technologies (soil & groundwater) |   |
| 1-Apr (PPB129)\* | Thu |   |
| **12** | 6-Apr | Tue | In-situ remedial technologies (soil & groundwater) |   |
| 8-Apr | Thu | Ex-situ remedial technologies (soil & groundwater) |   |
|  |  |  | Practice questions & Quiz 5 |
| **13** |  |  | **Spring Break** |  |  |
| **14** | 20-Apr (PPB129)\* | Tue | **Module 5: Remedial Technologies** | Ex-situ remedial technologies (soil & groundwater) |  |
| **14** | 22-Apr | Thu | **Module 6: Evaluation and selection of remedial actions** | Analysis of Alternatives; Feasibility Studies |   |
| **15** |  |  |  |   |
| 27-Apr | Tue | **Final Project Presentations** |  |
| **16** | May 6-12 | **Final Exams week** |

\*In-person class at PPB 129

**Course Requirements**

Regular attendance of the lectures is strongly recommended to understand the processes taught. The student is responsible for the material taught in a class not attended. All class presentations are available on HuskyCT.

**Authentication of Remote Students**

Authentication of remote students will be performed through HuskyCT. Students have to log in to class materials (syllabus, links to online discussions, any other materials) through HuskyCT.

**Summary of Course Grading**

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| --- | --- |
| Course Components | Weight |
| Quizzes (5 in total) | 30% |
| Term Project | 30% |
| Final Exam | 30% |
| Participation & Involvement (Practice questions, enthusiasm) | 10% |

**Grading Scale**

|  |  |  |
| --- | --- | --- |
| Grade | Letter Grade | GPA |
| 93-100 | A | 4.0 |
| 90-92 | A- | 3.7 |
| 87-89 | B+ | 3.3 |
| 83-86 | B | 3.0 |
| 80-82 | B- | 2.7 |
| 77-79 | C+ | 2.3 |
| 73-76 | C | 2.0 |
| 70-72 | C- | 1.7 |
| 67-69 | D+ | 1.3 |
| 63-66 | D | 1.0 |
| 60-62 | D- | 0.7 |
| <60 | F | 0.0 |

**Due Dates and Late Policy**

All course due dates are identified based on the syllabus. Submission is through HuskyCT or via email. Deadlines are based on Eastern Time. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

**No late submissions are accepted without proper documentation from a doctor.**

**Final Exam**

Final exam week for Spring 2020 takes place from Monday, May 3, through Saturday, May 8. Students are required to be available for their exam during that time. Students must visit the Dean of Students Office if they cannot make their exam. The DOS will give the student his or her instructions thereafter.

**Feedback and Grades**

I will make every effort to provide feedback and grades within a week. To keep track of your performance in the course, refer to My Grades in HuskyCT.

**Student Responsibilities and Resources**

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important [standards, policies and resources](http://ecampus.uconn.edu/policies.html), which include:

* The Student Code
	+ Academic Integrity
	+ Resources on Avoiding Cheating and Plagiarism
* Copyrighted Materials
* Netiquette and Communication
* Adding or Dropping a Course
* Academic Calendar
* Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
* Sexual Assault Reporting Policy

**Students with Disabilities**

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or<http://csd.uconn.edu/>.
Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.” (Retrieved March 24, 2013 from [Blackboard's website](http://www.blackboard.com/platforms/learn/resources/accessibility.aspx))

**Software/Technical Requirements (with Accessibility and Privacy Information)**

The software/technical requirements for this course include:

* HuskyCT/Blackboard ([HuskyCT/ Blackboard Accessibility Statement](http://www.blackboard.com/Platforms/Learn/Resources/Accessibility.aspx), [HuskyCT/ Blackboard Privacy Policy](http://www.blackboard.com/footer/privacy-policy.aspx))
* [Adobe Acrobat Reader](http://www.adobe.com/products/acrobat/readstep2.html) ([Adobe Reader Accessibility Statement](http://www.adobe.com/accessibility/products/reader.html), [Adobe Reader Privacy Policy](http://www.adobe.com/privacy.html))
* Microsoft Office (free to UConn students through [uconn.onthehub.com](https://uconn.onthehub.com)) ([Microsoft Accessibility Statement](http://www.microsoft.com/enable/microsoft/mission.aspx), [Microsoft Privacy Statement](https://privacy.microsoft.com/en-us/privacystatement/))

**Minimum Technical Skills**

To be successful in this course, you will need the following technical skills:

* Use electronic mail with attachments.
* Save files in commonly used word processing program formats.
* Copy and paste text, graphics or hyperlinks.
* Work within two or more browser windows simultaneously.
* Open and access PDF files.

**Evaluation of the Course**

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the[Office of Institutional Research and Effectiveness](http://www.oire.uconn.edu/) (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.