



EES1125H Contaminated Sites Remediation
Tuesdays, 6:00 pm to 9:00pm
Albert Ho
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Office Hours: By appointment at 5:30 to 6:00 pm Tuesdays outside HW308

COURSE DESCRIPTION

The course presents the basis for and practical application of environmental management strategies and remedial technologies in a professional setting and seeks to develop an understanding of the multi-faceted nature of environmental management, including practical design and application aspects. The contaminated site remediation process is considered in the context of the relative roles and importance of art, science, judgment, business issues and stakeholder influences. There isn't one remedial approach or technology that can be applied to every property or site. Typically a combination of management approaches and/ or remedial technologies are used to satisfy the objective of a client and other stakeholders. Class discussions will include the applicability, challenges, advantages and limitations of each technology.

COURSE OBJECTIVES

Students will be introduced to the contaminated site remediation processes, objectives and stakeholders and to the most commonly applied remedial technologies, along with the rationale for their application, the basic information requirements and fundamentals of remedial process design. By the completion of the course, students will have been provided the information to allow them to complete a rationale evaluation of the applicable remedial options in a given set of circumstances and to assess the technical, economic and regulatory feasibility of the applicable options. Students will be provided with information allowing them to identify the stakeholders with an interest in the outcome of the remedial process and to evaluate their needs and expectations.

SCHEDULE

Lecture No.	Topics
1	Course Outline, Remediation Context and Conceptual Site Models
2	Approaches and Technologies for Environmental Management (Integrating Science and Stakeholder Objectives)
3	Contamination & Monitored Natural Attenuation
4	Evaluating Risk and Site-specific Risk Assessment
5	Bioremediation: Applications and Design Considerations
6	In-situ Chemical Oxidation/ Reduction: Applications and Design Considerations
7	Soil Vapour Extraction and Related Technologies: Applications and Design Considerations
8	Removal, Treatment and Passive Containment: Applications and Design Considerations

9	Ex-situ Management Options: Applications and Design Considerations
10	Emerging Technologies and enhancements for Soil and Groundwater Remediation and Investigation
11	The Necessity and Value of Environmental Management/ Term Paper Presentations
12	Course Review and The "Business" of Environmental Management

EVALUATION

Mid-Term Examination (Take home)	30%
Final Examination (Take home)	35%
Term Assignment (Groups of 5 or less)	30%
Participation in Discussions	5%

The evaluation will be carried out in accordance with the Graduate Grading and Evaluation Practices Policy (and how that policy is interpreted and applied in this Dept.)

<http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/grading.pdf>

EMERGENCY PLANNING

Students are advised to consult the university's preparedness site (<http://www.preparedness.utoronto.ca>) for information and regular updates regarding procedures relating to emergency planning.

ACCESSIBILITY NEEDS

The University of Toronto is committed to accessibility. If you require accommodations for a disability or have any accessibility concerns about the course, the classroom or course materials, please contact The UTSC Accessibility Services as soon as possible: <http://www.uts.utoronto.ca/~ability/>

We also suggest you also refer to the following University of Toronto Scarborough Library link:

<http://uts.utoronto.ca/services/persons-disabilities>

PLAGIARISM

University of Toronto Code of Behaviour on Academic Matters states that "it shall be an offence for a student knowingly: to represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e., to commit plagiarism."

For accepted methods of standard documentation formats, including electronic citation of internet sources please see the Uoft writing website at <http://advice.writing.utoronto.ca/using-sources/documentation>.

The full Code of Behaviour regulations could be found from consulting <http://www.sgs.utoronto.ca/facultyandstaff/Pages/Academic-Integrity.aspx>

WRITTEN TERM ASSIGNMENT AND EXAMS

The mid-term and final exam will be open book and take home. You will be permitted to use the lecture slide deck, any handouts, your notes and anything handed out or referenced by the instructor during the term.

The term assignment will be completed in group of 5 or less people. The written paper has a limit of 25 pages including appendices, 1.5 line spacing, 11 point font. References must be included. The term assignment will be presented to the class, maximum 20 mins.

As well as the faculty writing support, please see English Language and writing support at University of Toronto:

<http://www.sgs.utoronto.ca/currentstudents/Pages/English-Language-and-Writing-Support.aspx>

Students have commented that they found the latter address extremely helpful for writing term papers.

The following are also useful:

Sylvan Barnett, *A Short Guide to Writing About Art*. 5-7th edition (New York: Harper-Collins, 1997)

William Strunk Jr., E.B. White. *The Elements of Style* (New York: MacMillan Publishing)

LATE WORK

All assignments are due at the specified time and date. Late submission may result in a 5% deduction (of each assignment's total grade) per business day, excluding weekends unless Instructor approval has been granted prior to such late submission. In the case of illness or other special circumstance, notification should be given to the instructors and the Program Office as soon as possible and before the deadline in question.

Late work submitted after the final day of classes, is not acceptable without prior written permission from the Instructor.

READINGS

Specific readings will be recommended from time to time and will be provided in class.

MID-TERM, FINAL EXAM and TERM ASSIGNMENT DATES

Mid-term examination (take home) required to be submitted at the beginning of Lecture 6.

Final examination (take home) required to be submitted on the last day of class.

Term assignment to be presented in Lecture 11 and written assignment to be submitted on the last day of class.