ENGG*6670 HAZARDOUS WASTE MANAGEMENT
(0.5 Credits)
Fall 2014

School of Engineering
(Revision 0: 04 Sept. 2014)

1 INSTRUCTIONAL SUPPORT

1.1 Instructor
Instructor: Richard G. Zytner, Ph.D., P.Eng., FEC
Office: 2337
Email: rzytner@uoguelph.ca
Office hours: As needed.

1.2 Lab Technician - Not Applicable

1.3 Teaching Assistants - Not Applicable

2 LEARNING RESOURCES

2.1 Course Website
Course material, news, announcements, and grades will be regularly posted to the ENGG*6670 Courselink site. You are responsible for checking the site regularly. As per University regulations, all students are required to check their <uoguelph.ca> e-mail account regularly; e-mail is the official route of communication between the University and students.

2.2 Required Resources
No text has been selected for this course.

2.3 Additional Resources

Lecture: Some notes will be made available for this course. Additional supporting information will be posted on Courselink site.

Projects: Download the assignments according to the schedule given in this handout and posted on Courselink.

2.4 Turnitin
Accounts are available to students on Turnitin to help with the editing of their submissions to ensure that plagiarism did not take place. Go to http://www.turnitin.com/en_us/home and create an account. For F14 ENGG*6670, Class ID is 8278297 with HWF14 as the password. The School has been assured by the College that Turnitin does not store student work, so please take advantage of this tool when preparing your written submissions.
3 ASSESSMENT

3.1 Dates and Distribution

The final grade will be determined from the individual and team work submitted to the course instructor. The submitted work will be evaluated according to the grading sheets posted on Courselink, with the assessment weighted as follows:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
<th>Dates/TBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments 50%</td>
<td></td>
<td>Dates TBD – posted on Courselink (D2L)</td>
</tr>
<tr>
<td>4 Group-submitted to D2L Dropbox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Individual-submitted to D2L Dropbox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Project with oral Presentation 30%</td>
<td></td>
<td>Nov. 20 &amp; 27 during class</td>
</tr>
<tr>
<td>Topic submitted via e-mail by Sept. 18, 2014 @ 17:00 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive Summary submitted to D2L Dropbox by Nov. 19, 2014 @ 12:00 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project submitted to D2L Dropbox by Nov. 19, 2014 @ 17:00 h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Examination 20%</td>
<td></td>
<td>Dec. 4 in RICH 3527 from 09:00 to 11:00 h.</td>
</tr>
</tbody>
</table>

3.2 Course Grading Policies

**Passing grade:** In order to pass the course, students must obtain an overall grade of 65% or higher for the course work outlined in Section 3.1.

**Missed Assessments:** When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the graduate calendar for information on regulations and procedures:
http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1400.shtml

**Accommodation of Religious Obligations:** If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor at the start of the semester to make alternate arrangements. See the graduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:

**Late Reports:** There will be no extension of the deadlines for submissions, except for serious health or compassionate reasons, with the appropriate documentation. Just like the consulting world where projects are not awarded if the proposals are late, a grade of zero will be given for late submissions.

**Drop Date:** The last date to drop one-semester courses, without academic penalty, is Friday Oct. 31, 2014. Refer to the Graduate Calendar for the schedule of dates.

3.3 Course Format

The course will be taught in the Learner Based Learning format also known as Problem Based Learning (PBL), where material is understood through the completion of group and individual assignments and subsequent discussion in class. Supporting lectures will be scheduled for Thursdays, with additional PBL work days during the scheduled lectures to permit group activity. The course instructor will be available in the office that day for consultation if needed. It is expected that the average student will spend between 10 to 15 h per week on the course.

Group assignments will be worked on by teams of 2, 3 or 4, based on enrollment. The teams will be decided during the introductory class.

The Project is an individual activity. It is worth 30% of the course grade and is on a topic selected by the student. The Project’s intent is to cover an aspect of hazardous waste management that includes
background on the problem being studied and how the hazardous waste is handled and treated. Topic needs to be approved by the instructor so that a variety of topics are covered. Complete details are on Courselink.

4 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

4.1 Calendar Description

This course will define the different types of hazardous waste that currently exist and outline the pertinent legislation governing these wastes. Information will be presented on the various ways to handle, treat, and dispose the hazardous waste, including separation, segregation, minimization, recycling, landfilling and chemical, physical, biological and thermal treatment.

A major emphasis of the course will be the selection, design and operation of soil remediation projects. Case histories will be discussed where possible.

Prerequisite(s): Graduate standing in Engineering or consent of the instructor.

4.2 Course Aims

Course will provide graduate students and practicing engineers the information necessary to identify the different sources and types hazardous waste and suggest solutions as how best to handle and remediate this waste. This includes contaminated sites.

4.3 Learning Outcomes

The University of Guelph Learning Outcomes have a goal to prepare students to deal with open-ended, multi-faceted design problems similar to those that they will encounter as working professionals. This includes critical and creative thinking, literacy, global understanding, communicating and professional and ethical behaviour. Specific details for ENGG*6670 are as follows:

- Understand hazardous waste regulations as they exist in Ontario and in other jurisdictions.
- Understand and apply Ontario Guidelines for Site Remediation
- Complete a contaminated site assessment and prepare a remediation plan for a Brownfield site.
- Collect and analyze information on the safe operation of hazardous waste handling facilities, including incinerators and landfills.
- Collect, analyze and interpret information on the various ways of to remediate contaminated soil.
- Prepare a final project on the handling of hazardous waste (topic selected by the student). Project is summarized in a written and graphical form as a final report, and orally presented to the entire class.

4.4 Instructor’s Role and Responsibility to Students

The instructor’s role is to develop and deliver course material in ways that facilitate learning for a variety of students. Selected lecture notes will be made available to students on Courselink/D2L but these are not intended to be stand-alone course notes. During lectures, the instructor will expand and explain the content of notes and provide example problems that supplement posted notes. Scheduled classes will be the principal venue to provide information and feedback for tests and project.

4.5 Students’ Learning Responsibilities

Students are expected to take advantage of the learning opportunities provided during lectures and tutorials. Students, especially those having difficulty with the course content, should also make use of other resources recommended by the instructor. Students who do (or may) fall behind due to illness, work, or extra-curricular activities are advised to keep the instructor informed. This will allow the instructor to recommend extra resources in a timely manner and/or provide consideration if appropriate.
5 TEACHING AND LEARNING ACTIVITIES

5.1 Timetable

Lectures: Thursday from 09:00 to 12:00 in RICH 3527

5.2 Lecture Schedule

<table>
<thead>
<tr>
<th>Week No.</th>
<th>Classroom Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Discuss Legislation: Reg 347, Clean-up Guidelines for Site Remediation, Superfund and Brownfields</td>
</tr>
<tr>
<td>3</td>
<td>Work on PB-1 project – Preparation of Brownfield Remediation Plan.</td>
</tr>
<tr>
<td>4</td>
<td>Discuss Transportation of Dangerous Goods, Waste Minimization and PBL-2 Project.</td>
</tr>
<tr>
<td>5</td>
<td>Work on PBL-2 project - Hazardous Waste Treatment</td>
</tr>
<tr>
<td>6</td>
<td>Discuss Hazardous Waste Treatment alternatives, including solidification and stabilization.</td>
</tr>
<tr>
<td>7</td>
<td>Discuss Soil Remediation treatment options, both in-situ and ex-situ.</td>
</tr>
<tr>
<td>8</td>
<td>Work on PBL-3 Project - Soil Remediation</td>
</tr>
<tr>
<td>9</td>
<td>Continue discussion on Soil Remediation options. Supported by a discussion on the legal and technical aspects presented in the Erin Brockovich movie. Movie concerns the clean-up of a PCE contaminated site.</td>
</tr>
<tr>
<td>10</td>
<td>Discuss Occupation Health and Safety Issues as related to Hazardous Waste Sites</td>
</tr>
<tr>
<td>11-12</td>
<td>Project Presentation with supplementary discussion on landfills.</td>
</tr>
<tr>
<td>12</td>
<td>Project Presentation with supplementary discussion on incinerators.</td>
</tr>
</tbody>
</table>

5.3 Student Milestones

<table>
<thead>
<tr>
<th>Week No.</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Confirm scope of final project with course instructor</td>
</tr>
<tr>
<td>3-10</td>
<td>Work on PBL projects/assignments and major project</td>
</tr>
<tr>
<td>11-12</td>
<td>Make a 20 minute class presentation on project topic.</td>
</tr>
</tbody>
</table>

6 LAB SAFETY

There is no lab in this course. However, safety is critically important to the School and is the responsibility of all members of the School: faculty, staff and students. If you take a lab course, you are responsible for taking all reasonable safety precautions and following the lab safety rules specific to the lab you are working in. In addition, when present in a lab and observe unsafe practices, you are responsible for reporting all safety issues to the laboratory supervisor, GTA or faculty responsible.

7 ACADEMIC MISCONDUCT

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community - faculty, staff, and students - to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. The
Academic Misconduct Policy is detailed in the Graduate Calendar.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member.

7.1 Resources

The Academic Misconduct Policy is detailed in the Graduate: https://www.uoguelph.ca/registrar/calendars/graduate/2014-2015/genreg/sec_d0e1780.shtml.

A tutorial on Academic Misconduct produced by the Learning Commons can be found at: http://www.academicintegrity.uoguelph.ca/

The School of Engineering has adopted a Code of Ethics that can be found at: http://www.uoguelph.ca/engineering/undergrad-counselling-ethics.

The Graduate Calendar is the source of information about the University of Guelph’s procedures, policies and regulations which apply to graduate programs: http://www.uoguelph.ca/registrar/calendars/graduate/current/.

8 ACCESSIBILITY

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community’s shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities as soon as possible. For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: https://www.uoguelph.ca/csd/7

9 RECORDING OF MATERIALS

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.