School of Civil and Environmental Engineering
Term 2, 2020
CVEN9881 HAZARDOUS WASTE MANAGEMENT

COURSE DETAILS

<table>
<thead>
<tr>
<th>Units of Credit</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hours</td>
<td>4 hours per week</td>
</tr>
<tr>
<td>Class</td>
<td>Tuesdays, 11am-1pm online</td>
</tr>
<tr>
<td>Workshop</td>
<td>Thursdays, 2-4 pm online</td>
</tr>
</tbody>
</table>

Course Coordinator and Lecturer
Dr Ailar Hajimohammadi
email: ailar.hm@unsw.edu.au

Lecturer
Dr Ademir Prata
email: ademir@unsw.edu.au

Dr Richard Collins
Email: richard.collins@unsw.edu.au

Guest Lecturer
Ms Maryam Farzadkhoo
Email: maryam.farzadkhoo@unsw.edu.au

INFORMATION ABOUT THE COURSE

- No prerequisites, but it is suggested that CVEN9872 Solid Waste Management, CVEN9884 Environmental Engineering Science I (or equivalent course) be completed prior to this subject.
- Waste audits and characterisation of hazardous wastes in regions and industries.
- Control of generation and transport of hazardous waste, manifest systems.
- Waste minimisation; on-site treatment methods; integrated off-site treatment facilities; management of residues from treatment facilities.
- Introduction to planning of regional hazardous waste management systems.
- Characteristics of individual waste types (dioxins, PCBs, heavy metals etc) and waste management in individual industries (steel, pulp and paper, petro chemical etc) by way of assignments and seminars

HANDBOOK DESCRIPTION

See link to virtual handbook:
OBJECTIVES

The objectives of the course include:

- Provide an appreciation of the management of hazardous waste in a systems context;
- Understand the inter-relationships between the various functional elements of waste generation, minimisation, transport, treatment and residue disposal. Provide students with the knowledge and skills to be able to undertake investigations and prepare concept designs of key elements of:
  - Regional hazardous waste management systems including waste audits of industrial facilities
  - Assessment of waste generation in a region
  - Assessment of waste minimisation opportunities
  - Outline designs of treatment and disposal facilities.

TEACHING STRATEGIES

Private Study

- Review lecture material and course readings
- Contribute to group discussions and assessments
- Prepare for quiz/workshops
- Download materials from Moodle
- Keep up with notices and find out marks via Moodle

Lectures

- Prepare for the lecture and workshops before attending
- Take notes from guest lectures
- Review recommended references on Moodle
- Hear announcements on course changes

Workshops

- Be active in workshops and group activities
- Participate in guest lecture/workshop activities
- Ask questions on assessment tasks

Assessments

- Demonstrate your knowledge and skills in assignments
- Demonstrate higher understanding and problem solving on real world problems and develop into sustainable solutions
- Demonstrate time management skills through group work and distribution of projects tasks
- Seek informal discussions via guest lectures and lecturers

EXPECTED LEARNING OUTCOMES

At the completion of the course, you will be able:

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>EA Stage 1 Competencies</th>
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</thead>
<tbody>
<tr>
<td>1. To describe the basic principles underpinning the management of hazardous</td>
<td>PE1.1, PE1.5, PE 1.6</td>
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<tr>
<td>wastes including generation, minimisation, transport, treatment and residue</td>
<td></td>
</tr>
<tr>
<td>disposal.</td>
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<tr>
<td>2. To apply these principles for different hazardous waste types in an Australian</td>
<td>PE2.1, PE2.2, PE2.3, PE2.4</td>
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<tr>
<td>context in general and NSW in particular.</td>
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<tr>
<td>3. To present the results and understanding in written and spoken formats</td>
<td>PE3.2, PE3.4</td>
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## COURSE PROGRAM

### Term 2 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Lecture Content</th>
<th>Demonstration Content</th>
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</thead>
<tbody>
<tr>
<td>01/06/2020</td>
<td>Introduction and background/ Classification of Hazardous Waste</td>
<td>Ailar Hajimohammadi</td>
<td>Introduction, assessment, assignment and rubric</td>
</tr>
<tr>
<td>(Week 1)</td>
<td></td>
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<tr>
<td>08/06/2020</td>
<td>Characterisation of Hazardous Waste</td>
<td>Ailar Hajimohammadi</td>
<td>Characterisation of Hazardous Waste</td>
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<td>(Week 2)</td>
<td></td>
<td></td>
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<tr>
<td>15/06/2020</td>
<td>Basel convention and National Pollutant Inventory</td>
<td>Ailar Hajimohammadi</td>
<td>Basel convention and National Pollutant Inventory</td>
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<tr>
<td>(Week 3)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(Week 4)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>29/06/2020</td>
<td>Cleaner Production and Waste Minimisation</td>
<td>Ademir Prata</td>
<td>Cleaner Production and Waste Minimisation</td>
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<td>(Week 5)</td>
<td></td>
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<tr>
<td></td>
<td><strong>Break</strong></td>
<td></td>
<td><strong>Flexibility week for all courses (non-teaching)</strong></td>
</tr>
<tr>
<td>13/07/2020</td>
<td>Integrated Off-site Hazardous Waste Treatment Facilities 1</td>
<td>Ademir Prata</td>
<td>Integrated Off-site Hazardous Waste Treatment Facilities 1</td>
</tr>
<tr>
<td>(Week 7)</td>
<td></td>
<td></td>
<td></td>
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<td>(Week 8)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>27/07/2020</td>
<td>Scheduled Waste and Immobilisation</td>
<td>Ademir Prata</td>
<td>Schedule Waste and Immobilisation</td>
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<td>(Week 9)</td>
<td></td>
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<tr>
<td>03/08/2020</td>
<td>Radioactive waste</td>
<td>Richard Collins</td>
<td>Radioactive waste</td>
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<td>(Week 10)</td>
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## ASSESSMENT

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Description</th>
<th>Weight of final Grade</th>
<th>Max possible mark</th>
<th>Results Source (explained below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>Research, analysis and discussion</td>
<td>30%</td>
<td>100</td>
<td>Moodle</td>
</tr>
<tr>
<td>Weekly Quizzes</td>
<td>Online quiz about last week lecture</td>
<td>25%</td>
<td>100</td>
<td>Moodle</td>
</tr>
</tbody>
</table>
Attendance to activities | Class and workshop activities | 15% | 100 | In class/ Moodle
--- | --- | --- | --- | ---
Participation in discussions | Participation in discussions and answering questions | 0 | 5 Bonus marks | In class
Presentation | Video submission (screen capture recording) | 30% | 100 | Moodle

Supplementary Examinations for Term 2 2020 will be held on Monday 7th September – Friday 11th September (inclusive) should you be required to sit one. You are required to be available during these dates. Please do not to make any personal or travel arrangements during this period.

**PENALTIES**

Late work will be penalised at the rate of 10% (of the total mark) per day after the due time and date have expired.
<table>
<thead>
<tr>
<th>Item</th>
<th>Length</th>
<th>Weighting</th>
<th>Learning outcomes assessed</th>
<th>Assessment Criteria</th>
<th>Due date and submission requirements</th>
<th>Deadline for absolute fail</th>
<th>Marks returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quizzes</td>
<td>10 min</td>
<td>25%</td>
<td>Understanding of each week lectures</td>
<td>Multiple choice questions. Assessment will be based on selecting the correct answer/s. The quizzes are directly related to the content previously taught in lectures and workshops.</td>
<td>Online (every week)</td>
<td>NA</td>
<td>Moodle</td>
</tr>
<tr>
<td>2. Assignment</td>
<td>30 pages max</td>
<td>30%</td>
<td>Group work, data research and collection, study, discussion and understanding</td>
<td>This is a group assignment. Students work in groups of 3 to provide a high-quality engineering report which includes legal, technical and economic considerations for the management of selected hazardous wastes and provide some recommendations. The aim is to demonstrate students capacity to work as a team, understand hazardous waste management at a regional level and provide recommendation to the Federal Government.</td>
<td>3rd of August</td>
<td>9th of August</td>
<td>Moodle</td>
</tr>
<tr>
<td>3. Class activities</td>
<td>10 min each</td>
<td>15%</td>
<td>Participation in lecture and workshop activities</td>
<td>In-class activities must be completed within 24 hours of relevant lecture and workshop.</td>
<td>Online (every week)</td>
<td>NA</td>
<td>Moodle</td>
</tr>
<tr>
<td>4. Presentation</td>
<td>10 min</td>
<td>30%</td>
<td>The ability to explain the learnings in few minutes</td>
<td>This is a 10 minutes presentation about students’ understanding of the course. The level of understanding of hazardous waste management will be assessed. Also, students will demonstrate their time management, creativity, and presentation skills.</td>
<td>10th of August</td>
<td>16th of August</td>
<td>Moodle</td>
</tr>
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There will be 5 Bonus marks for three most active students who volunteer to answer questions during lectures, class activities and workshops.
RELEVANT RESOURCES

- Additional materials provided on Moodle.
- Recommended Internet sites.

DATES TO NOTE

Refer to MyUNSW for Important Dates available at:
https://student.unsw.edu.au/dates

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person’s work or ideas as if they were your own. When it is necessary or desirable to use other people’s material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:
https://student.unsw.edu.au/plagiarism

ACADEMIC ADVICE

For information about:

- Notes on assessments and plagiarism;
- Special Considerations: student.unsw.edu.au/special-consideration;
- General and Program-specific questions: The Nucleus: Student Hub
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC/SURVSOC/CEPCA

Refer to Academic Advice on the School website available at:
https://www.engineering.unsw.edu.au/civil-engineering/student-resources/policies-procedures-and-forms/academic-advice
### Program Intended Learning Outcomes

#### PE1: Knowledge and Skill Base
- **PE1.1** Comprehensive, theory-based understanding of underpinning fundamentals
- **PE1.2** Conceptual understanding of underpinning maths, analysis, statistics, computing
- **PE1.3** In-depth understanding of specialist bodies of knowledge
- **PE1.4** Discernment of knowledge development and research directions
- **PE1.5** Knowledge of engineering design practice
- **PE1.6** Understanding of scope, principles, norms, accountabilities of sustainable engineering practice

#### PE2: Engineering Application Ability
- **PE2.1** Application of established engineering methods to complex problem solving
- **PE2.2** Fluent application of engineering techniques, tools and resources
- **PE2.3** Application of systematic engineering synthesis and design processes
- **PE2.4** Application of systematic approaches to the conduct and management of engineering projects

#### PE3: Professional and Personal Attributes
- **PE3.1** Ethical conduct and professional accountability
- **PE3.2** Effective oral and written communication (professional and lay domains)
- **PE3.3** Creative, innovative and pro-active demeanour
- **PE3.4** Professional use and management of information
- **PE3.5** Orderly management of self, and professional conduct
- **PE3.6** Effective team membership and team leadership