

CVEN9885 TRANSPORT AND TRANSFORMATION OF CONTAMINANTS

COURSE DETAILS

Units of Credit	6
Contact hours	4 hours per week
Lecture	Wednesday, 12:00 – 3:00
Workshop	Wednesday, 3:00 – 4:00
Course Coordinator and Lecturer	Professor Denis O'Carroll email: d.ocarroll@unsw.edu.au office: CE303 at Kensington and Water Research Laboratory, Manly Vale

INFORMATION ABOUT THE COURSE

Prerequisites: Students are expected to have a basic understanding of chemistry.

HANDBOOK DESCRIPTION

See link to virtual handbook:

<https://www.handbook.unsw.edu.au/postgraduate/courses/2021/CVEN9885/>

OBJECTIVES

To familiarise you with the fundamental processes of:

- transport, diffusion and dispersion of solutes and solids common to all environmental media and
- transformation and fate of various pollutants.

Additionally, this course aims to enable you to develop critical skills for assessing environmental literature and data.

List of programme attributes:

- An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context
- Capacity for analytical and critical thinking and for creative problem solving
- Ability to engage independent and reflective learning
- Information literacy
- Skills for collaborative and multi-disciplinary work
- A respect for ethical practice and social responsibility
- Skills for effective communication

TEACHING STRATEGIES

Private Study	<ul style="list-style-type: none">• Review lecture material and textbook• Do set problems and assignments• Join Moodle discussions of problems• Reflect on class problems and assignments• Download materials from Moodle• Keep up with notices and find out marks via Moodle
Lectures	<ul style="list-style-type: none">• Find out what you must learn• See methods that are not in the textbook• Follow worked examples• Hear announcements on course changes
Workshops	<ul style="list-style-type: none">• Be guided by Demonstrators• Practice solving set problems• Ask questions
Assessments	<ul style="list-style-type: none">• Demonstrate your knowledge and skills• Demonstrate higher understanding and problem solving
Laboratory Work	<ul style="list-style-type: none">• Hands-on work, to set studies in context

EXPECTED LEARNING OUTCOMES

To enable the student, by in-depth process understanding, in critically and independently assessing data related to transport, dispersion, transformation and fate of pollutants in the environment. For each hour of contact it is expected that you will put in at least 1.5 hours of private study

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
1. <i>Understand the principles of contaminant transport, transformation and fate in the environment.</i>	PE1.1, PE1.2
2. <i>Apply physical relationships to quantitatively assess contaminant transport, transformation and fate in the environment.</i>	PE2.1, PE2.4
3. <i>Undertake literature review, identify appropriate and relevant literature resources and synthesise knowledge to aid in the assessment of transformation and fate of a particular type or class of contaminant</i>	PE1.1, PE1.3
4. <i>Communicate comprehensive knowledge regarding the transformation and fate of a particular contaminant in a technical report.</i>	PE3.2, PE3.4

For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

COURSE PROGRAM

Term 2 2021

Date	Lecture Content	Demonstration Content
02/06/2021 (Week 1)	Introduction—real world examples.	Discussion of examples.
09/06/2021 (Week 2)	Processes of contaminant transport (e.g., advection, dispersion, diffusion, reaction)	Solution of select contaminant transport examples.
16/06/2021 (Week 3)	Processes of contaminant transport continued. Colloid (e.g., bacteria and virus) fate and transport. Microplastic fate and transport.	Solution of select colloid transport examples
23/06/2021 (Week 4)	Contaminant sorption and reaction	Solution of select contaminant reaction examples.
30/06/2021 (Week 5)	Fugacity	Solution of select fugacity examples.
07/07/2021 (Week 6)	non-teaching	
14/07/2021 (Week 7)	Antimicrobial resistance	Discussion of antimicrobial resistance.
21/07/2021 (Week 8)	PFAS fate and transport	Solution of select PFAS fate and transport examples
28/07/2021 (Week 9)	Contaminant transport and dispersion in the atmosphere	Solution of select airborne contaminant transport examples.
04/08/2021 (Week 10)	Contaminants in enclosed systems	Solution of contaminants in enclosed systems examples

ASSESSMENT

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth 60% of the Final Mark if class work is included and 100% if class work is not included. The class work is worth 40% of the Final Mark if included. *A mark of at least 40% in the final examination is required before the class work (hand-in quizzes and online tasks) is included in the final mark. The formal exam scripts will not be returned but you are permitted to view the marked script.*

Students who perform poorly in the quiz and workshops are recommended to discuss progress with the lecturer during the term. Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are set out below.

Supplementary Examinations for Term 2 2021 will be held on Monday 06th September – Friday 10th September 2021 (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% per day after the due time and date have expired.

ASSESSMENT OVERVIEW

Item	Length	Weighting	Learning outcomes assessed	Assessment Criteria <i>(this needs to explicitly describe what students are expected to demonstrate in the task)</i>	Due date and submission requirements	Deadline for absolute fail	Marks returned
1. Online Quiz	15 minutes	5%	1	The Quiz is designed to gauge how well the student understands the early material in the course delivered during Weeks1-2). Marks are given for correct answers and summed to form an integrated measure.	11/06/2021	11/06/2021	15/06/2021
2. Contaminant transport assignment		15%	1, 2	Assess the extent of contaminant transport	25/06/2021	30/06/2021	13/07/2021
3. Fate of selected contaminant		20%	All in course	Investigate the fate of a selected contaminant	02/08/2021	05/08/2021	12/08/2021
4. Final Exam	2 hours	60 %	All in course	All course material	TBA	TBA	TBA

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>

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	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