



CVEN9885

Transport and Transformation of Contaminants

Term Three // 2020

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Helen Rutlidge	h.rutlidge@unsw.edu.au	Email to organise consult	WRL, Manly Vale	+61403193254

School Contact Information

Student Services can be contacted via unsw.to/webforms.

Course Details

Credit Points 6

Summary of the Course

Processes controlling transformation and fate of chemicals in the environment. Measurement and prediction of contaminant behaviour in natural and engineered systems. Fundamentals of dispersion common to all environmental media (air, water, soil). Air chemistry; interaction and degradation of gaseous pollutants in the atmosphere. Dispersion processes; nature of dispersion processes, advection and diffusion. Modelling of dispersion in the atmosphere water bodies and soils.

Course Aims

To familiarise you with the fundamental processes of (a) transport, diffusion and dispersion of solutes and solids common to all environmental media and (b) transformation and fate of various pollutants. Additionally, this course aims to enable you to develop critical skills for assessing environmental literature and data.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Understand and quantify transport, dispersion, transformation and fate of solutes and solids pollutants in the environment.	PE1.1, PE1.2
2. Apply physical relationships to quantitatively assess contaminant transport, transformation and fate in the environment.	PE2.1, PE2.4
3. 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.	PE1.1, PE1.3
4. Communicate comprehensive knowledge regarding the transformation and fate of a particular contaminant in a technical report.	PE3.2, PE3.4

Teaching Strategies

Teaching in this course is centred on your attending the lectures, completing the exercises and assignments.

Additional Course Information

Prerequisites: Students are expected to have a basic understanding of chemistry. It is recommended that students have successfully completed CVEN9884 Environmental Engineering 1.

Part 1 of this course replaces CVEN7827: Contaminant Transport in the Environment.

Part 2 of this course replaces CVEN7828: Transformation and Fate of Contaminants.

Assessment

Students who perform poorly during the class work are recommended to discuss progress with the lecturer. The formal exam scripts will not be returned. Note: The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Please note that all assessments are individual tasks.

Assessment Tasks

Assessment task	Weight	Due Date	Student Learning Outcomes Assessed
Quiz	5%	02/10/2020 06:00 PM	2
Assignment 1: Physical Processes	20%	29/10/2020 02:00 PM	1, 2
Assignment 2: Chemical Processes	15%	19/11/2020 02:00 PM	1, 3, 4
Final Exam	60%	Not Applicable	1, 2

Assessment Details

Assessment 1: Quiz

Start date: 01/10/2020 06:00 PM

Length: 1-3 pages

Details: The Quiz is designed to gauge how well the student understands the early material in the course delivered during Weeks 1-2). Marks are given for correct answers and summed to form an integrated measure.

Additional details:

Quiz with true/false and/or short answers to gauge a student's understanding of the fundamentals of the transformation and fate of contaminants.

Turnitin setting: This is not a Turnitin assignment

Assessment 2: Assignment 1: Physical Processes

Start date: 15/10/2020 02:00 PM

Length: 10-20 pages

Details: This assignment is designed to capture how well the student understands the course material delivered during part 1. Marks are given for correct answers and summed to form an integrated measure.

Additional details:

This assignment gauges how well a student understands and applies the quantitative concepts of contaminant transport, diffusion and dispersion by solving several problems.

Turnitin setting: This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Assessment 3: Assignment 2: Chemical Processes

Start date: 05/11/2020 02:00 PM

Length: 5-15 pages

Details: This assignment is designed to capture how well the student understands the course material delivered during part 2. Marks are given for correct answers and summed to form an integrated measure.

Additional details:

This assignment gauges how well a student understands and applies the principles of transformation and fate of a contaminant. Marks are given for appropriate and correct identification of transport, transformation and fate mechanisms for the selected contaminant. Marks are also given for total understanding of the scenario.

Turnitin setting: This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Assessment 4: Final Exam

Start date: Not Applicable

Details:

The exam is 2 hours long and consist of 2 parts that reflect the material learned during the course. Pre-allocated marks are given for correct answers. Total marks are summed up to form an integrated measure of the student's understanding of contaminant transport, transformation and fate in the environment.

Additional details:

This will be an open book exam in the Final Exam period. The first part contains an assessment of the student's understanding of contaminant transport in the environment. The second part assesses the student's ability to identify and apply the learned principles of contaminant transformation and fate.

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

[View class timetable](#)

Timetable

Date	Type	Content
Week 1: 14 September - 18 September	Lecture	Introduction, mass balance (Unit 1); Advection, dispersion & turbulent diffusion (Unit 2)
	Tutorial	Unit 1 & 2 Exercises
Week 2: 21 September - 25 September	Lecture	Transport and dispersion in estuaries and the coastal zone (Unit 4)
	Tutorial	Unit 4 Exercises
Week 3: 28 September - 2 October	Lecture	Guest Lecture - Data Collection (Unit 12) with Peter Tate
	Tutorial	Data Collection Workshop
Week 4: 5 October - 9 October	Lecture	Transport and dispersion in enclosed water bodies (Unit 3)
	Tutorial	Unit 3 Exercises
Week 5: 12 October - 16 October	Lecture	Guest Lectures - Emerging Contaminants with Prof Denis O'Carroll and Dr Mark Browne
	Tutorial	Emerging Contaminants Exercises
Week 6: 19 October - 23 October	Homework	Flexibility Week - no lectures or tutorials
Week 7: 26 October - 30 October	Lecture	The fugacity approach (Unit 5) Fate of waste particles (Unit 6)
	Tutorial	Unit 5 & 6 Exercises
Week 8: 2 November - 6 November	Lecture	Transformation and Fate of Trace Metals on Ocean Disposal of Wastes (Unit 7)
	Tutorial	Unit 7 Exercises
Week 9: 9 November - 13 November	Lecture	Transformation and fate of nutrients (Unit 8) Transformation and fate of organic contaminants (Unit 9)
	Tutorial	Unit 8 & 9 Exercises
Week 10: 16 November - 20 November	Lecture	Transport and dispersion in the atmosphere (Unit 10) Atmospheric chemistry: The case of ozone breakdown by CFC's (Unit 11)
	Tutorial	Unit 10 & 11 Exercises

Resources

Prescribed Resources

Textbook: There is no particular textbook for this course. The Lecture Notes are reasonably detailed and numerous references are cited in them which can be sought from UNSW library.

Recommended Resources

Moodle: Lectures and other material will be made available on the UNSW eLearning website: <https://moodle.telt.unsw.edu.au/login/index.php>

Library: You will be required to independently seek literature for Assignment 2 in this course. To obtain materials, external students may request books and articles from the UNSW Library and/or other libraries through interlibrary loans. For off-campus students wishing to use the Inter Library Loan (ILL) service for books, journal articles, conference papers and other resources which are not available electronically, you need to go to: <http://www.library.unsw.edu.au/borrowing/offcampus.html>

If you are unsure which databases to use to find articles, a good place to start is the UNSW Library [Subject guides](#). If you are unsure whether you have found everything on a topic, you can obtain personal support by booking a **research consultation**. This provides a one to one session with a subject librarian. To book, complete the online [Research Consultation form](#).

For help with any other library matter send an email and [Ask a Question](#) or [Contact](#) the library by phone. If you are at Kensington, library staff in the Help Zone on level 2 are available to assist you personally.

Course Evaluation and Development

Students will be emailed by the University during the term to complete a myExperience survey regarding their experience in the course. Feedback will be provided to the coordinator to further develop the course for future terms.

Academic Honesty and 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 Information

Supplementary Examinations:

Supplementary Examinations for Term 3 2020 will be held on Monday 11th September – Friday 15th January (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.

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>

Image Credit

Synergies in Sound 2016

CRICOS

CRICOS Provider Code: 00098G

Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.

Appendix: Engineers Australia (EA) Professional Engineer Competency Standard

Program Intended Learning Outcomes	
Knowledge and skill base	
PE1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	✓
PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline	✓
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	✓
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	
PE1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline	
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline	
Engineering application ability	
PE2.1 Application of established engineering methods to complex engineering 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	✓
Professional and personal attributes	
PE3.1 Ethical conduct and professional accountability	
PE3.2 Effective oral and written communication in 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	