

CVEN9855

Water and Wastewater Analysis and Quality Requirements

Term 2, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
James McDonald	jamesmcdonald@unsw.edu.au	email to make appointment	Water Research Centre H22 room 102	

Lecturers

Name	Email	Availability	Location	Phone
Richard Stuetz	r.stuetz@unsw.edu.au	email to make appointment		

School Contact Information

[Engineering Student Support Services](#) – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

[Engineering Industrial Training](#) – Industrial training questions

[UNSW Study Abroad](#) – study abroad student enquiries (for inbound students)

[UNSW Exchange](#) – student exchange enquiries (for inbound students)

[UNSW Future Students](#) – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

Course Details

Units of Credit 6

Summary of the Course

This course will address the presence and implications of impurities in water and wastewater. It will consider both chemical and microbial substances that may contaminate various types of waters. Specific attention will be devoted to analytical methods for the detection and monitoring of water and wastewater contaminants.

Course Aims

The objective of the course is to provide students with a sound understanding of the rationale behind water quality standards set for potable water supply and wastewater disposal. The course is intended to equip students with basic knowledge of laboratory and online analytical methods used for water analysis and quality assessment. With this, students are expected to be able to properly understand and interpret chemical and microbiological water quality data.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Understand concepts relevant to the sampling and analysis of water and wastewater treatment objectives and verification	PE1.1, PE1.3, PE1.6
2. Have an appreciation for the rationale of water quality guidelines and practical aspects of water quality monitoring for potable water supplies, water reuse applications and wastewater disposal	PE1.1, PE1.3
3. Undertake independent study of relevant literature through on-line resources	PE1.1, PE2.2, PE3.1, PE3.2, PE3.5
4. Demonstrate the ability to analyse water quality data and prepare concise reports on its meaning	PE1.1, PE1.2, PE1.3, PE1.4

Teaching Strategies

Private Study

- Review lecture material and additional reading
- Complete lab report and assignments
- Download materials from UNSW Moodle
- Keep up with notices and find out marks via UNSW Moodle

Lectures/Workshops

- Find out what you must learn
- Summarise essential course material from lectures and associated reading
- Hear announcements on course changes

Assessments (examinations, assignments, laboratory reports)

Laboratory Work

- Be guided by discussion questions and additional reading
- Ask questions
- Enhance your knowledge by undertaking necessary research to complete these tasks
- Demonstrate your knowledge and skills
- Demonstrate higher understanding and problem solving
- Do not copy sections from textbooks, always use appropriate references for sourced material
- Hands-on activities to set lecture materials and other studies in context
- Students must record results during the lab session and complete a laboratory report with these findings discussed.
- Ask questions for clarification during laboratory classes.

Additional Course Information

As there are no pre-requisites for this course, no background knowledge is assumed of the course content. For each hour of contact it is expected that you will be required to undertake at least an equivalent amount of time of private study.

Assessment

The final grade for this course will be based on the sum of the scores from each of the assessment tasks. A mark of at least 40% (i.e. 20/50) in the final examination is required before the class work (quizzes and assignment 1) is included in the final mark. The formal exam scripts will not be returned but you will be permitted to view the marked script.

Quizzes not completed before the due date and time will be assigned 0 marks.

Late submission of the assignment (assessment 2) will receive a 5% penalty per day or part thereof. The deadline for absolute fail (0 marks) for the assignment is 5 days after the submission deadline. Any requests for extensions or special consideration need to be submitted through the special considerations portal on myUNSW. Further information describing this process is described here: <https://student.unsw.edu.au/special-consideration>.

The exam date is set by the Exams Team and will be confirmed in Week 8 of the term. You will be able to access the time and date of the exam via Moodle

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Quizzes	15%	6/06/2022, 13/06/2022, 20/06/2022, 23/06/2022	1, 2, 3
2. Field and Laboratory Report	35%	25/07/2022 05:00 PM	1, 2, 3, 4
3. Final Exam	50%	Not Applicable	1, 2, 3, 4

Assessment 1: Quizzes

Start date: 1/06/2022, 6/06/2022, 13/06/2022, 20/06/2022

Assessment length: 30 minutes each

Due date: 6/06/2022, 13/06/2022, 20/06/2022, 23/06/2022

The 4 online Quizzes (15% of overall course mark) will assess students understanding of fundamental information covered in the course from weeks 1 to 4. Students who perform poorly in these quizzes and who struggle with the course content are recommended to discuss progress with the course coordinator as soon as possible (i.e. before the UNIVERSITY CENSUS DATE – 26th June 2022). The first two are aimed at preparing you for the field and laboratory classes and you must obtain 100% for these quizzes to attend these classes

This is not a Turnitin assignment

Assessment 2: Field and Laboratory Report

Start date: 30/06/2022 12:00 PM

Assessment length: Due date: 25/07/2022 05:00 PM

The report is an independent assignment to be completed by all students. It will test the students' understanding of laboratory reporting and data interpretation skills. Students who are unable to attend the field trip and laboratory classes will still be able (and required) to complete this report. All necessary information to achieve this will be provided to all students. Key marking criteria include demonstration of capacity for critical thinking, understanding of concepts presented in lectures, evidence of independent research, the relevance of information presented and the use of a logical and cohesive technical report writing style. A marking rubric will be provided with the assignment when it is released in week 5.

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

Assessment 3: Final Exam

Assessment length: 2 hours

The Exam (50% of overall course mark) will be a 2-hour closed book on-line assessment during the normal exam period and will focus on testing students understanding of the material presented throughout the course. The questions in the exam will generally be similar to the exercises provided in the course.

Hurdle requirement

Example: A mark of at least 40% in the final examination is required before the class work is included in the final mark.

Attendance Requirements

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

Course Schedule

[View class timetable](#)

Timetable

Date	Type	Content
O-Week: 23 May - 27 May		
Week 1: 30 May - 3 June	Lecture	Course introduction; rationale for water quality monitoring; national water quality guidelines.
	Workshop	Water sampling protocols and field trip preparation
	Assessment	Quiz - Field Trip (2.5%)
Week 2: 6 June - 10 June	Fieldwork	Water sampling at Centennial Parklands
	Assessment	Quiz - Laboratory Class - (2.5%)
Week 3: 13 June - 17 June	Lecture	Water Quality - Bulk Parameters
	Workshop	Bulk Parameters - discussion and exercises
	Assessment	Quiz - Water Quality - (5%)
Week 4: 20 June - 24 June	Lecture	Water Quality - Trace Organic Contaminants
	Workshop	Trace Organic Contaminants - discussion and exercises
	Laboratory	Sample Preparation and Analytical Instrumentation Part 1
	Assessment	Quiz- Water Analysis Instrumentation (5%)
Week 5: 27 June - 1 July	Lecture	Water Quality - Trace Metals
	Workshop	Trace Metals - discussion and exercises
	Laboratory	Analytical Instrumentation Part 2
Week 6: 4 July - 8 July		
Week 7: 11 July - 15 July	Lecture	Statistics of Water Quality Data
		Guest presentation by Dr Stuart Khan

	Workshop	Analysing water quality data (statistics)
Week 8: 18 July - 22 July	Lecture	Online (continuous monitoring) analytical techniques Guest Presentation by Dr Richard Stuetz
	Workshop	Online (continuous monitoring) analytical techniques
Week 9: 25 July - 29 July	Lecture	Odour analyses Guest Presentation by Dr Richard Stuetz
	Workshop	Odour analyses
	Assessment	Field and Laboratory Report
Week 10: 1 August - 5 August	Lecture	Microbiology and microbiological analyses
	Workshop	Microbiology and microbiological analyses

Resources

Recommended Resources

Relevant reading, databases and internet sites will be provided on UNSW Moodle during the course. While there are no specific textbooks required for this course, a thorough compendium of methods used to analyse water and wastewater can be found in the following textbook available in the UNSW library.

APHA, AWWA, WEF (2017) Standard methods for the examination of water and wastewater, 23rd edition. American Public Health Association, Washington, D.C., USA.

Course Evaluation and Development

This course has evolved in response to both formal (i.e. MyExperience) and informal student feedback (during classes) and in response to fluctuating student enrolments. As an example, informal student feedback resulted in the recent re-introduction of hands-on activities to the course involving water sampling and laboratory analyses. This also necessitated creating digital content for these hands-on activities so as not to disadvantage distance students that cannot attend them in person.

Students are encouraged to use these formal and informal avenues of providing feedback on the course to improve the student learning experience.

Laboratory Workshop Information

Refer to Moodle for all field, laboratory, lecture and workshop information.

Submission of Assessment Tasks

Please refer to the Moodle page of the course for further guidance on assessment submission.

UNSW has a standard late submission penalty of:

- 5% per day, for all assessments where a penalty applies, capped at five days (120 hours), after which a student cannot submit an assessment, and no permitted variation.

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

Final Examinations:

Final exams in T2 2022 will be held online between 12th - 25th August 2022 inclusive, and supplementary exams between 5th - 9th September 2022 inclusive. You are required to be available on these dates. Please do not to make any personal or travel arrangements during this period.

ACADEMIC ADVICE

- Key Staff to Contact for Academic Advice (log in with your zID and password): <https://intranet.civeng.unsw.edu.au/key-staff-to-contact-during-your-studies-at-unsw>
- [Key UNSW Dates](#) - eg. Census Date, exam dates, last day to drop a course without academic/financial liability etc.
- CVEN Student Intranet (log in with your zID and password): <https://intranet.civeng.unsw.edu.au/student-intranet>
- Student Life at CVEN, including Student Societies: <https://www.unsw.edu.au/engineering/civil-and-environmental-engineering/student-life>
- Special Consideration: <https://student.unsw.edu.au/special-consideration>
- General and Program-Specific Questions: [The Nucleus: Student Hub](#)
- Book an Academic Advising session: <https://app.acuityscheduling.com/schedule.php?owner=19024765>

Disclaimer

This course outline sets out description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle should be consulted for the up to date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline (as updated in Moodle), the description in the Course Outline/Moodle applies.

Image Credit

my photo

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	