CVEN9640

Coastal Engineering

Term 1, 2022

Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Ian Turner	ian.turner@unsw.edu.au	email	UNSW Water Research Laboratory, Manly Vale	

Lecturers

Name	Email	Availability	Location	Phone
Ian Turner	ian.turner@unsw.edu.au	email	UNSW Water Research Laboratory, Manly Vale	
Kristen Splinter	k.splinter@unsw.edu.au	email	UNSW Water Research Laboratory, Manly Vale	

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

Waves in coastal waters including theory, measurement, analysis, forecasting, growth, refraction, diffraction, shoaling and breaking processes; coastal and beach processes including tides, storms, currents, elevated water levels, morphology, sediment transport mechanisms, beach erosion and nourishment, longshore transport, prediction and modelling of shoreline change; wave forces on coastal and ocean structures with application to engineering design including harbours, breakwaters, seawalls, piles, decks and marinas.

Course Aims

This course aims to develop an appreciation of theory of periodic waves in coastal waters, wave growth, refraction, diffraction, shoaling and breaking processes, and to introduce aspects of the measurement, analysis and prediction of waves. Coastal and beach processes are introduced, including tides, storms, currents and elevated water levels, beach morphology, coastal hazards and onshore/alongshore sediment transport. The course will also provide students with theory of wave forces on coastal and ocean structures, with hands-on application to practical engineering design of breakwaters, seawalls, piles, decks, and marinas.

Course Learning Outcomes

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

Learning Outcome	EA Stage 1 Competencies
1. Be familiar with the coastal engineering approach to wave measurement, analysis, growth and propagation from deep to shallow water;	PE1.1, PE1.2, PE1.3, PE2.1
2. Have gained an understanding of beach morphology, coastal hazards and sediment onshore/offshore transport; and	PE1.6, PE1.4, PE3.1
3. Developed competence in applying standard coastal engineering approach to calculating wave and current forces on coastal and ocean structures with particular attention to practical performance of breakwaters and seawalls, piles, floating marine units, and solid, slatted or partial depth vertical walls.	PE1.1, PE1.3, PE2.1, PE3.2, PE3.4

Teaching Strategies

Private Study

• Review lecture material and recommended texts

• Do set problems and assignments

• Reflect on class problems and assignments

Weekly Seminars/Workshops

• Find out what you must learn

• See methods that are not in the lecture materials

• Follow worked examples

• Hear announcements on course changes

Practical Exercises • Practice solving set problems

Assessments

(hand-in assignments, exam)

• Demonstrate your knowledge and skills

• Demonstrate higher understanding and problem solving

Field trip (optional – recommended)

• Sites inspection, to set studies in context

Additional Course Information

Please note that all seminar and workshop materials for this course are distributed electronically via Moodle.

Assessment

The three assignments (1 x online/timed quiz; 2 x hand-in reports) provide the opportunity for students to develop and demonstrate their understanding across the 3 main themes of this course: waves, sediment transport and coastal structures.

The open book exam enables students to demonstrate their gained knowledge and understanding across the breadth of materials covered in the course.

Students who perform poorly in the assignments and practical exercises are recommended to discuss progress with the Lecturer during the Term.

*Applying for special consideration: **https://student.unsw.edu.au/special consideration***

***Note:** The Coordinator and/or Lecturer reserves the right to adjust the final scores by scaling if agreed to by the Head of School.*

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Wave Theory	10%	Week 3	1
2. Sediment Transport	30%	WEEK 7	2
3. Breakwater Design	30%	WEEK 10	3
4. Final Exam	30%	During the exam period	1, 2, 3

Assessment 1: Wave Theory

Assessment length: 2-hour online quiz
Submission notes: Moodle quiz
Due date: Week 3

This assessment is designed to capture how well the student understands the course material to the use and appropriate application of linear and other wave theories. Marks are given for correct answers and summed up to form an assessment grade. Specific marking criteria are provided.

Additional details

Online quiz in week 3. Available for 24 hrs; one attempt permitted, and once commenced a maximum of 2 hours to complete.

Further details to be provided in Moodle and in weekly seminars/workshops.

Assessment 2: Sediment Transport

Assessment length: ~10-page report (pdf)
Submission notes: Due Week 7 – refer assignment sheet that is available in Moodle for further details.
Due date: WEEK 7

This assignment is designed to capture how well the student understands the course material relating to sediment transport processes. Marks are given for correct answers and summed up to form an assignment grade. Specific marking criteria are provided with the assignment.

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

Assessment 3: Breakwater Design

Assessment length: ~10 page report (pdf)
Submission notes: Due Week 10 – refer assignment sheet that is available in Moodle for further details.
Due date: WEEK 10

This assignment is designed to capture how well the student understands the course material relating to design of coastal breakwater and revetment structures. Marks are given for correct answers and summed up to form an assignment grade. Specific marking criteria are provided with the assignment.

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

Assessment 4: Final Exam

Assessment length: 2 hours
Submission notes: Upload pdf of hand-written exam solutions
Due date: During the exam period

The final examination is open book, and is designed to capture the student's knowledge of the breadth of materials covered in this course. The marks for each individual question are indicated on the exam.

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: 7 February - 11 February		
Week 1: 14 February - 18 February		Topic: Waves I (Lecturer: Ian Turner)
Week 2: 21 February - 25 February		Topic: Waves II (Lecturer: Ian Turner)
Week 3: 28 February - 4 March		Topic: Beaches, Hazards, Climate Change (Lecturer: Ian Turner) Assessments Due: ASSESSMENT #1 (Online Quiz)
Week 4: 7 March - 11 March		Topic: Sediment Transport I (Lecturer: Kristen Splinter)
Week 5: 14 March - 18 March		Topic: Sediment Transport II (Lecturer: Kristen Splinter)
Week 6: 21 March - 25 March		**NO CLASSES THIS WEEK**
Week 7: 28 March - 1 April		Topic: Breakwaters and Revetments I (Lecturer: Ian Turner) Assessments Due: ASSIGNMENT #2 (pdf Report - Turnitin)
Week 8: 4 April - 8 April		**SITE INSPECTIONS** (off campus)
Week 9: 11 April - 15 April		Topic: Breakwaters and Revetments II (Lecturer: Ian Turner)
Week 10: 18 April - 22 April		Topic: Coastal/Marine Structures (Lecturer: Kristen Splinter) Assessments Due: ASSIGNMENT #3 (pdf Report - Turnitin)

Resources

Prescribed Resources

Specific coure resources and references will be provided during the Term.

Recommended Resources

The following texts are recommended as generally useful:

- *Shore Protection Manual*, 2 volumes, US Army Coastal Engineering Research Center, 4th Edition, 1984.
- Coastal Engineering Manual (CEM) – down load individual chapters for free at (use the search term: 'coastal'): **http://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals/**

Course Evaluation and Development

Course evaluation will be sought from all students through *myExperience*. This is used to continually improve the outcomes and experience for students.

Laboratory Workshop Information

This seminar/workshop course will be delivered live and in the classroom each week. For students in the Distance mode of course delivery, weekly recordings will be made available via Moodle, and all students are encouraged to use the online Discussion Forum to ask questions and exchange information and ideas.

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 T1 2022 will be held online between 29th April - 12th May inclusive, and supplementary exams between 23rd - 27th May 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
- 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

Photo Credit: Ian Turner

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	