School of Civil and Environmental Engineering

Term 3, 2020

CVEN9620
CHANNELS, RIVERS & ESTUARIES

COURSE DETAILS

Units of Credit	6	
Contact hours	4 hours per week	
Lecture	Tuesday, 10:00– 13:00*	online
Workshop	Tuesday, 13:00 – 14:00*	**Online***

*Workshops run interspersed with the lectures during the 4-hr period. This provides breaks as well as opportunity to work on problems as they are learned.

Course Coordinator and Lecturer

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Lecturer

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INFORMATION ABOUT THE COURSE

The assumed knowledge for this course is undergraduate Civil and Environmental Engineering fluid mechanics (ENGG2500/CVEN2501, CVEN 3501, CVEN 3502).

Those enrolled in the Master of Engineering Science (CVENZS8338) or the Master of Engineering (CVENYS8621) programs are expected to have completed Fundamentals of Water Engineering (CVEN9625) prior to commencing this course or show relevant undergraduate courses equivalent to UNSW.

Students currently enrolled or who have taken Advanced Water Engineering (CVEN4507) will further benefit.

HANDBOOK DESCRIPTION

https://www.handbook.unsw.edu.au/postgraduate/courses/2020/CVEN9620

OBJECTIVES

Channels, Rivers, and Estuaries (CVEN 9620) aims to develop an appreciation of theory of hydrodynamics, hydraulics, hydrology and sediment transport related to our natural and manmade waterways. The course aims to allow students to be competent in the aspects of measurement, analysis and prediction of sediment transport, contaminant fate and water movement. We also focus on environmental aspects including the current best practice for tidal restoration and rehabilitation on tidal wetlands and estuaries.

The field work component of this course aims to give students real-world experience, analytic skills, as well as collaborative and effective communication skills.

The latter part of the course aims to introduce and familiarize students with numerical modelling of sediment transport and estuarine processes to provide them with skills needed in professional workforce. The individual self-learning topic of an estuary/river of your choice aims to link what has been learned in class to the broader world and for students to develop clear and effective written communication.

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	• Review lecture material and textbook • Do set problems and assignments • Join Moodle/Teams discussions of problems • Reflect on class problems and assignments • Download materials from Moodle • Keep up with notices and find out marks via Moodle
Lectures	• Consider and actively answer any questions posed during the course of the lecture • Follow worked examples • In class discussion of topics and student interaction • Hear announcements on course changes
Workshops	• Much of your learning can take place in the course workshops. If you work actively in this time, it will free you up for other activities outside of class. • Practice solving set problems, understand solution strategies • Ask questions • Be guided by your demonstrators
Assessments	• Demonstrate your knowledge and skills • Demonstrate higher understanding and problem solving
Field Trip/ Work	• Hands-on work, field data collection, to set studies in context

Online (Moodle)	• Access/download all relevant material for weekly lectures/workshops • Use discussion forums to work with fellow students and discuss problems/topics • Review lectures • All quizzes and assignments will be administered in Moodle.

PLEASE NOTE THAT ALL LECTURE AND OTHER MATERIALS FOR THIS COURSE ARE DISTRIBUTED VIA MOODLE. NO PAPER COPIES ARE PROVIDED IN CLASS. IT IS ESSENTIAL THAT ALL STUDENTS DOWNLOAD AND BRING TO CLASS EACH WEEK THE RELEVANT MATERIAL.

EXPECTED LEARNING OUTCOMES

At the end of this course, students should be familiar with the engineering approach to channel design, river management, sediment transport, estuarine processes and contaminant fate. Students should be competent in performing analytical practices, collecting field data, numerical modelling methods, sampling techniques, and communicating effectively. The course combines both lectures, workshops, field work and self-directed learning.

For each contact hour, it is expected that students put in at least 1.5hrs 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.	*Gain an understanding of material on the function of estuaries, the dynamic nature of channels and the linkages between hydrology, hydraulics and hydrodynamics in these settings*	*PE1.1, PE1.2, PE1.5, PE2.1, PE2.2, PE2.3, PE3.1, PE3.4*
2.	*Gain a professional understanding of the key engineering aspects associated with channels, rivers and estuaries*	*PE1.1, PE1.2, PE1.5, PE2.1, PE2.2, PE2.3, PE3.1, PE3.4*
3.	*Gain an understanding of numerical and data-driven models for routing flows along the channels and rivers in a catchment drainage network*	*PE1.1, PE1.2, PE1.3, PE2.1, PE2.2,*
4.	*Numerical models for routing flows along the channels and rivers in a catchment drainage network, relevant forcing mechanisms and mixing such as plug-flow methods and advection-dispersion models in both a coupled and uncoupled situation*	*PE1.1, PE1.2, PE1.3, PE2.1, PE2.2,*

COURSE PROGRAM

Date	Topic	Lecture/Workshop Content	Lecturer
15/09/2020 (Week 1)	Course introduction Introduction to hydraulics, hydrology, hydrodynamics	We provide a general overview of the course and a big picture of river and estuaries. Specific topics covered include: Open channel flow and Channel design and Mixing **Students will be asked to describe a River/Estuary of their choice during the interactive portion of the lecture.**	WG
22/09/2020 (Week 2)	Sediment Transport Theory	Thresholds of sediment motion Bed load Suspended load *livestreaming of sediment transport lab	KS
29/09/2020 (Week 3)	Rivers	River geomorphology Floodplain modelling *livestreaming of river lab ** The following content which would normally be in week 4 will be pre-recorded to allow for a field trip in Week 9 River engineering structures River management Natural channel design	KS
07/10/2020 (Week 4) ***Quiz 1 is this week**	*Geospatial methods for river and estuarine management	** Week 9 content will be presented here to allow for a field trip in week 9. Remote sensing approaches for quantifying floodplain inundation dynamics, river width, bathymetry, river flow, water quality (e.g. algal blooms) and estuarine geomorphology. Data-driven modelling and analysis techniques for integrated river and estuary management.	Guest Lecture
13/10/2020 (Week 5) ***Assignment 1 is released**	Inlets and estuaries	Tides Tidal inlet and stability Estuarine classification and processes	KS
20/10/2020 (Week 6)		***Flexibility week for all courses (non-teaching)***	
27/10/2020 (Week 7)	Inlets and estuaries	Introduction to Estuarine Hydrodynamics and Hydraulic Modelling	WG

03/11/2020 (Week 8)	Water quality/ Contaminant fate	Salinity, turbidity Estuarine Water Quality	WG
10/11/2020 (Week 9)	**FIELD TEACHING**	A day on Sydney Harbour to collect data on an estuary and to put theory to practice from weeks 5-8	KS/WG/VH
17/11/2020 (Week 10) ***Assignment 1 Due this week**	Tidal wetlands and estuaries	Restoration practice in tidal systems Climate change in estuaries	WG

ASSESSMENT

Overall rationale for assessment components and their association with course objectives.

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 50% of the Final Mark if class work is included and 100% if class work is not included. The class work is worth 50% of the Final Mark if included. A mark of at least 40% in the final examination is required before the class work (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 quick quizzes and workshops are recommended to discuss progress with the lecturer during the term. There will be hand-in problems and quick quizzes. 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 3 2020 will be held on Monday 11th January – Friday 15th January 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. Online quizzes must be done during the time allocated. There is no makeup for online Quizzes unless Special Consideration is given.

ASSESSMENT OVERVIEW

Item	**Length**	**Weighting**	**Learning outcomes assessed**	**Assessment Criteria** *(this needs to explicitly describe what students are expected to demonstrate in the task)*	**Due date and submission requirements**	**Deadline for absolute fail**	**Marks returned**
1.Quizzes							
Quiz 1	2-hr quiz in a 24-hr period	20	1,2	Knowledge weeks 1-4 See Moodle for full details	Quiz will occur in WEEK 4. 24 hr period runs from Wednesday Oct. 7 @ 5pm to Thursday Oct. 8 @ 5pm	Thursday Oct. 8 @ 5pm (local Sydney Time)	Friday 9/10/2020
2. Assessments							
1.Individual Report 2. video summary presentation Understanding and modelling estuarine processes	15 pages 3 minutes	25 5	1-4 1-4	Ability to do a literature review of relevant research Ability to succinctly analyse data from various sources Ability to apply knowledge/theory learned in the classroom to a real-world problem Ability to concisely write an engineering report Ability to present your work clearly to a prospective client See Moodle and assignment handout for full details	BOTH tasks are due: Monday 16/11/2020 @ 11:59 pm (week 10) Submitted online via Moodle	Saturday 21/11/2020 @ 11:59pm	Friday 27/11/2020
2. Final Exam	2hrs	50	1-4	Knowledge from weeks 1-9	TBA	TBA	TBA

RELEVANT RESOURCES

- There is no required text book for this course.
- Students are encouraged to review documents and textbooks suggested in moodle.
- Please see the Moodle page for details on relevant textbooks, notes, materials and internet sources

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