UNSW Course Outline

CVEN4507 Advanced Water Engineering - 2024

Published on the 27 May 2024

General Course Information

Course Code : CVEN4507
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Civil and Environmental Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate, Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Advanced closed conduit and open channel hydraulic design, designing for peak pump efficiency, sedimentation engineering, reservoir behaviour and design, estimation of large and extreme floods, advanced topics in hydrological design.

Course Aims

- To build up your technical understanding of water engineering
- To understand large-scale water supply and flood engineering assessments.
- To be able to apply acquired theory to develop realistic mathematical models of water engineering systems
- To develop the critical abilities required to apply commercial software packages to large-scale water engineering problems.
- To design hydraulic structures

Relationship to Other Courses

Advanced hydrology course building off material taught in CVEN3501 (undergraduate) and CVEN9625 (postgraduate).

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Apply hydrologic models appropriately to a design problem.
CLO2 : Design and analyse reservoir sizing, with consideration of uncertainties and risks.
CLO3 : Describe the sources of uncertainty in hydrologic calculations, including the effects of climate change.
CLO4 : Describe the important characteristics of basic hydraulic structures and sediment transport processes in open channel flows.
CLO5 : Design basic hydraulic structures in open channel flows by performing relevant calculations.
CLO6 : Solve calculations of basic sediment transport processes in open channel flows.

Course Learning Outcomes	Assessment Item
CLO1 : Apply hydrologic models appropriately to a design problem.	• Assignment 2 • Final Exam
CLO2 : Design and analyse reservoir sizing, with consideration of uncertainties and risks.	• Assignment 2 • Final Exam
CLO3 : Describe the sources of uncertainty in hydrologic calculations, including the effects of climate change.	• Assignment 2 • Final Exam
CLO4 : Describe the important characteristics of basic hydraulic structures and sediment transport processes in open channel flows.	• Assignment 1 • Final Exam
CLO5 : Design basic hydraulic structures in open channel flows by performing relevant calculations.	• Assignment 1 • Final Exam
CLO6 : Solve calculations of basic sediment transport processes in open channel flows.	• Assignment 1 • Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

Additional Course Information

Please refer to Moodle for additional information about the course.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment 2 Assessment Format: Individual	20%	Due Date: 14/06/2024 12:00 AM
Quiz Assessment Format: Individual	5%	Due Date: Between 6 pm 08/06/2024 and 6 pm 09/06/2024
Assignment 1 Assessment Format: Individual	15%	Due Date: 02/08/2024 12:00 AM
Final Exam Assessment Format: Individual	60%	Start Date: see exam timetable

Assessment Details

Assignment 2

Assessment Overview

Students are expected to demonstrate their understanding of hydrologic modelling and reservoir design by performing calculations, running suitable models and explaining basic concepts. The marking of the assignment will be based upon the standard of the report, discussion and justification of modelling strategy and the accuracy of the simulations and calculations.

Course Learning Outcomes

- CLO1 : Apply hydrologic models appropriately to a design problem.
- CLO2 : Design and analyse reservoir sizing, with consideration of uncertainties and risks.
- CLO3 : Describe the sources of uncertainty in hydrologic calculations, including the effects of climate change.

Assignment submission Turnitin type

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

Quiz

Assessment Overview

The quiz will be a multiple choice quiz and students will be assessed on their knowledge of basic hydraulic engineering concepts and interpretation of results.

Submission notes

You will have 2 hours within a 24 hour time frame to complete the quiz (between 6 pm 8/6 and 6 pm 9/6).

Assignment submission Turnitin type

This is not a Turnitin assignment

Assignment 1

Assessment Overview

Students are expected to demonstrate their understanding of the design of basic hydraulic structures and sediment transport processes by performing calculations, drawings and explaining basic concepts. The marking of the assignment will be based upon completeness, neatness and logical working. Please explain your working and indicate your calculation steps.

Course Learning Outcomes

- CLO4 : Describe the important characteristics of basic hydraulic structures and sediment transport processes in open channel flows.
- CLO5 : Design basic hydraulic structures in open channel flows by performing relevant calculations.
- CLO6 : Solve calculations of basic sediment transport processes in open channel flows.

Assignment submission Turnitin type

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

Final Exam

Assessment Overview

The exam will be a 2 hour final exam held during the final examination period.

Students are expected to demonstrate their understanding of hydrological modelling, reservoir design and climate change and the design of basic hydraulic structures and sediment transport processes by performing calculations, drawings and explaining basic concepts.

Course Learning Outcomes

- CLO1 : Apply hydrologic models appropriately to a design problem.
- CLO2 : Design and analyse reservoir sizing, with consideration of uncertainties and risks.
- CLO3 : Describe the sources of uncertainty in hydrologic calculations, including the effects of climate change.
- CLO4 : Describe the important characteristics of basic hydraulic structures and sediment transport processes in open channel flows.
- CLO5 : Design basic hydraulic structures in open channel flows by performing relevant calculations.
- CLO6 : Solve calculations of basic sediment transport processes in open channel flows.

Assessment Length

2 hours

General Assessment Information

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 27 May - 2 June	Lecture	Week 1 Hydrology: Catchment Processes and Modelling
Week 2 : 3 June - 9 June	Lecture	Week 2 Monte Carlo Simulation Assignment 1 Issued
Week 3 : 10 June - 16 June	Lecture	Week 3 - Derived Flood Estimation using Monte Carlo Simulation Assignment 1 Part 1 Due
Week 4 : 17 June - 23 June	Lecture	Week 4 - Reservoir Design and Operation
Week 5 : 24 June - 30 June	Lecture	Week 5 - Climate change considerations Week 5 - Hydraulic Structures Assignment 1 Part 2 Due
Week 6 : 1 July - 7 July	Lecture	Break Week
Week 7 : 8 July - 14 July	Lecture	Week 7 - Hydraulic Structures Quiz 1
Week 8 : 15 July - 21 July	Lecture	Week 8 - Hydraulic Field Trip
Week 9 : 22 July - 28 July	Lecture	Week 9 - Sediment
Week 10 : 29 July - 4 August	Lecture	Week 10 - Sediment continued Assignment 2 due

Attendance Requirements

For undergraduate courses with Workshops and/or Labs, attendance for those classes is a necessary part of the course. You must attend at least 80% of the workshop/lab in which you are enrolled for the duration of the sessions.

General Schedule Information

First half focusses on hydrology and second half on hydraulics. Second half includes a field trip. More details available on Moodle.

Course Resources

Recommended Resources

There is no textbook for this course but a number of recommended reference books for this course are indicated below - there will be further recommended reading indicated within the lecture notes and course delivery

- Ladson, A. (2008). Hydrology - An Australian Introduction. Oxford University Press, South Melbourne, ISBN: 978019555358
- Maidment, D.R (1993). Handbook of Hydrology. McGraw-Hill. ISBN: 9780070397323
- White, F.M. (2011). Fluid Mechanics, 7th edition, McGraw-Hill, ISBN 978 07 1286 459.
- Chanson, H. (2004). ÒThe Hydraulics of open channel flow: an introductionÓ, Butterworth-Heinemann, Oxford, UK, 2nd edition (ISBN 0 7506 5978 5).
- Akan, A.O. (2006). Open Channel Hydraulics, Butterworth-Heinemann, ISBN 978 0 7506 6857 6.
- Van Rijn, L.C. (1993). Principles of Sediment Transport in Rivers, Estuaries and Coastal Seas, AQUA Publications, Amsterdam, ISBN 90 800356 2 9
- Henderson, F.M. (1966). Open Channel Flow, Macmillan, New York.
- Bos, M.G. (1989). ÒDischarge measurement structuresÓ - ILRI Publication 20, 3rd edition, Wageningen, The Netherlands, ISBN 9070754150

Course Evaluation and Development

We welcome all feedback from students during class, off line and via MyExperience. For example, past students asked for more worked examples throughout the lectures rather than a separate workshop period at the end and these are now implemented through all the topics. Your feedback helps us to improve the course for you and for future students.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Stefan Felder		Water Research Laboratory (Manly Vale)	02 8071 9861	Arrange via email	No	No
Convenor	Ashish Sharma		Room 307, CVEN	(02) 93855768	arrange via email	No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at

the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the 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 or your primary learning management system (LMS) 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/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also

be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific 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)

School-specific Information

Final Examinations

Final Exams in T2 2024 will be held on campus between the 9th - 22nd August, and Supplementary Exams between the 2nd - 6th September 2024. You are required to be available on these dates. Please do not to make any personal or travel arrangements during this period.

School Contact Information

For assistance with enrolment, class registration, progression checks and other administrative matters, please see the Nucleus: Student Hub. They are located inside the Library – first right as you enter the main library entrance. You can also contact them via http://unsw.to/webforms or reserve a place in the face-to-face queue using the UniVerse app.

For course administration matters, please contact the Course Coordinator.

Questions about the this course should normally be asked during the scheduled class so that everyone can benefit from the answer and discussion.