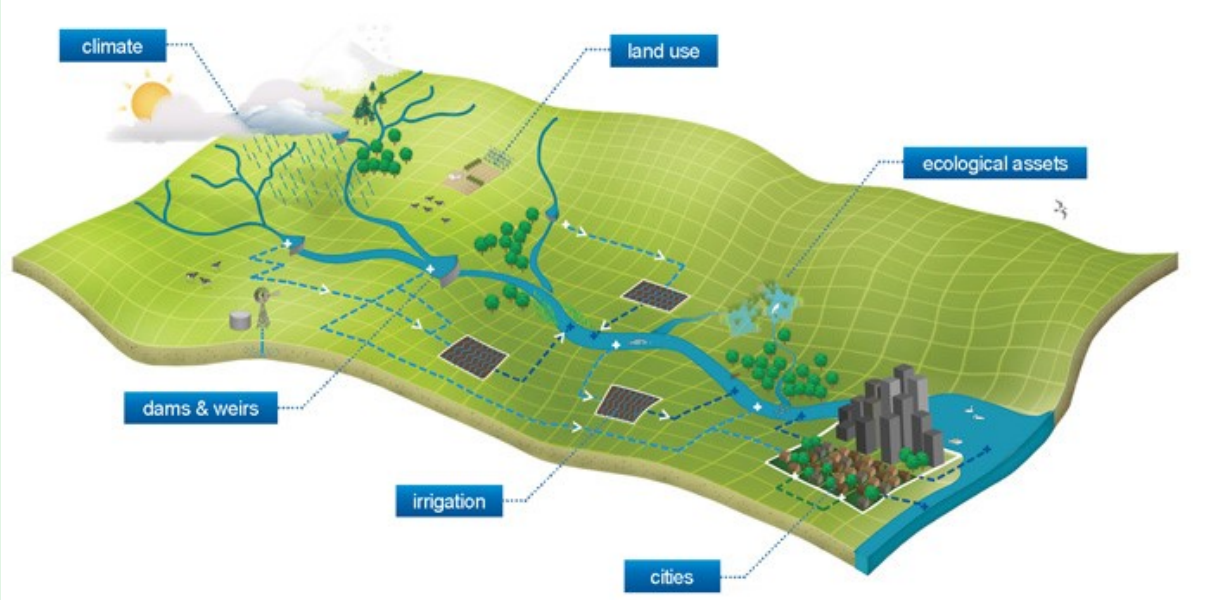
CVEN9612

Catchment and Water Resources Modelling

Term 3, 2022



Course Overview

Staff Contact Details

Convenors

Name	Email	Availability	Location	Phone
Ashish Sharma	a.sharma@unsw.edu.au	Teaching Consultation Tuesday 4-5	CVEN307	+61293855768

Lecturers

Name	Email	Availability	Location	Phone
Fiona Johnson	f.johnson@unsw.edu.au		CVEN309	9385 9769

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

Processes, generation and modelling of catchment surface runoff quantity and quality; a broad range of surface runoff and water quality models ranging from simple to process based will be considered; selection, calibration, validation and reliability of the various models is presented; water resources data, analysis and modelling including considerations of data sources, errors, time series analysis, stochastic models and extension of hydrological records; stochastic reservoir analysis; optimisation in water resources.

Course Aims

Objective of the course is to impart advanced knowledge in Water Engineering with a focus on Hydrology and Water Resources Engineering methodologies. The course consists of two halves. The first part focuses on catchment surface models, and the second part focuses on water resources management.

Course Learning Outcomes

1. It is expected that the student will have a clearer understanding of Water Engineering, its relevance inengineering design, and its application in water resources management.
2. The student will be familiar with the development and operation of rainfall-runoff models, be familiar with the range of observation and modeling tools available to the water resource manager, understand the limits of models and the importance of calibration/validation, and how to undertake data and modeling analysis using a range of statistical and other analytical approaches.
3. For each hour of contact it is expected that a student will put in at least 1.5 hours of private study

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Teaching Strategies

The teaching strategies that will be used include:

• Lectures that will focus on the development and application of the development of rainfall-runoff models, catchment hydrological characteristics and processes and approaches to time series analysis, optimization approaches and other statistical techniques for hydrological investigation.

• Workshop classes will concentrate on strategies for solving such problems. You will be encouraged, from time to time, to work alone as well as in small groups to solve problems.

• Computer Laboratory exercises will also be used to assess operational application of analytical

techniques and other concepts developed throughout the course.

Suggested approaches to learning in this course include:

• Regular participation in lectures and Workshops. Review lecture and Workshop material. Follow worked examples. • Reflect on class problems and quizzes. • Regular reading and reviewing of your learning. • Appropriate preparation for Workshop activities. • Planning your time to achieve all assessment requirements (see assessment) • We encourage you to work with your peers. A good way to learn the material is in small study groups. Such groups work best if members have attempted the problems individually before meeting as a group.

Assessment

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. If you apply for and receive special consideration for any of the assignments, a scaling of your final exam marks will be carried out. It is recommended that students who perform poorly in the assignments and workshops discuss progress with the lecturer during the trimester. The formal exam scripts will not be returned. The lecturer reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Supplementary Examinations will be held as advised by the school office should you be required to sit one. You are required to be available during these dates. Please do not make any personal or travel arrangements during this period.

Assessment task	Weight	Due Date	Course Learning Outcomes Assessed
1. Assignment 1: Rainfall runoff modelling (PART 1) and SMART (PART 2)	25%	04/10/2022 05:00 PM	1, 2, 3
2. Assignment 2: Reservoir Modelling Application	30%	21/11/2022 12:00 AM	1, 2, 3
3. Final Exam	45%	Exam period	1, 2, 3

Assessment 1: Assignment 1: Rainfall runoff modelling (PART 1) and SMART (PART 2)

Submission notes: Online submission via Moodle
Due date: 04/10/2022 05:00 PM

Assignment 1: Reservoir Modelling Application (Part 1) and SMART (Part 2)

Assignment consists of two parts with first part related to weeks 1-3 of course, and the second part related to weeks 4-5 of the course. Note different submission dates for the two parts.

Submission dates to be advised via Moodle.

Assessment 2: Assignment 2: Reservoir Modelling Application

Submission notes: See Moodle for submission details
Due date: 21/11/2022 12:00 AM

Assignment 2: Reservoir Modelling Application including climate change assessment.

Submission date to be advised via Moodle.

Assessment 3: Final Exam

Assessment length: 2 hours

Submission notes: Details to be advised
Due date: Exam period

Final Exam: online, 2-hour duration during the T3 examination period (26 Nov – 9 Dec)

Hurdle requirement

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

Week	Date	Lecturer	Topic	Assessments
1	13/09/2022	FJ	• Introduction to the course • Watershed concepts and characteristics • Catchment processes: rainfall, evaporation, infiltration, and runoff • Understanding the hydrograph • Flood routing approaches	Asst#1 Part1: Rainfall runoff modelling (due 4/10/2022)
2	20/09/2022	FJ	• Rainfall-runoff modelling: • The role of modelling • Objectives and concepts • Types of models • Model components and conceptualizations	
3	27/09/2022	FJ	• Rainfall-runoff modelling continued: • Sensitivity analysis • Uncertainty	
4	04/10/2022	AS	• Semi-distributed modelling (SMART) • Application of SMART, data requirements, realities and limitations	
5	11/10/2022	AS	• Application of SMART, data requirements, realities and limitations (continued)	Asst#1 Part2: SMART (due 26/10/2022)
		AS+SK	• **Workshop**: SMART	
6	***No lectures***			
7	25/10/2022	AS	• Introduction, reservoir design and operation • Reservoir simulation methods, definition of storage capacity	
8	01/11/2022	AS	• Storage capacity (continued) • Class workshop: reservoir design and storage	
			• Introduction to simple time series models • Class workshop: time series models	
9	08/11/2022	AS	• Climate change and bias correction	Asst#2: Reservoir modelling application

		AS+RM	• **Workshop**: climate change, bias correction, downscaling	(due 21/11/2022)
10	15/11/2022	AS	• Advanced time series simulation methods, seasonal models, downscaling models • Class workshop: time series models (continued)	

View class timetable

Timetable

Date	Type	Content
Week 4: 3 October - 7 October	Assessment	Assignment 1: Rainfall runoff modelling (PART 1) and SMART (PART 2): Online submission via Moodle
Study Week: 21 November - 24 November	Assessment	Assignment 2: Reservoir Modelling Application: See Moodle for submission details

Resources

Prescribed Resources

See lecture notes and related material as made available via Moodle

Recommended Resources

There is no subject textbook but a number of recommended reference books for this course are as follows:

- Handbook of Hydrology (1992), by D.R. Maidment (Editor in Chief); published by McGraw-Hill, Inc.
- Water Resources Engineering (2001), by L. W. Mays; published by John Wiley & Sons Inc.
- Applied Hydrology (1988), by Chow, Maidment and Mays; published by McGraw-Hill Inc.
- Hydrology, An Australian Introduction (2008), by Anthony Ladson; Oxford University Press.

Laboratory Workshop Information

Please refer to Moodle for additional information on workshops and computer laboratories

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 T3 2022 will be held online between 25th November - 8th December 2022 inclusive, and supplementary exams between 9th - 13th January 2023 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

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Acknowledgement of Country

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