School of Environmental and Life Sciences

ENVS2009: Catchment and Water Resource Management

Callaghan and Ourimbah Semester 2 - 2023



OVERVIEW

• • - • • • • - •	-	
Course Description	The management of inland water resources requires a holistic understanding of the basic ecology of freshwater systems, factors that impact water quality and the balance between water use by humans and maintenance of healthy aquatic habitats. In this course, students will examine ways to assess water and aquatic habitat quality and management of water resources. The course will include local and regional case studies and examples.	
Requisites	This course replaces SRMT2030. If you have successfully completed SRMT2030 you cannot enrol in this course.	
Assumed Knowledge Contact Hours	ENVS1001 and BIOL1002 and BIOL1003 (or BIOL1070) Field Study * Face to Face Off Campus 6 hour(s) per Term Full Term Field study will include a full day field trip offered on two days. Students will choose one of those days. Lecture Face to Face on Campus 2 hour(s) per Week for Full Term Practical Face to Face on Campus 3 hour(s) per Week for 9 Weeks * This contact type has a compulsory requirement.	
Unit Weighting	10	
Workload	Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10-unit course.	



www.newcastle.edu.au CRICOS Provider 00109J



CONTACTS

Course Coordinator

Callaghan and Ourimbah

Dr Craig Evans <u>Craig.Evans@newcastle.edu.au</u> (02) 4921 5630 Consultation: By appointment

Teaching Staff Other teaching staff will be advised on the course Canvas site.

School Office

School of Environmental and Life Sciences

Room C228 Chemistry Building Callaghan <u>Science-SELS@newcastle.edu.au</u> +61 2 4921 5080 9am-5pm (Mon-Fri)

School of Environmental and Life Sciences SO-104 / SO-105 Science Offices OURIMBAH Science-SELS@newcastle.edu.au 4349 4568 / 4348 4115 9am-5pm (Mon-Fri)

SYLLABUS

Course Content	 Hydrological cycle and Australia's water resources Key physical and chemical processes in running and standing waters Basic ecology of running and standing waters Ecological impacts of water development and water pollution Methods for assessing water quality for ecological health and human consumption Source water treatment and supply Wastewater treatment, disposal, and recycling Urban stormwater management and water sensitive urban design Policies and legislation for water management
Course Learning Outcomes	On successful completion of this course, students will be able to:
	 Demonstrate knowledge of the ecological principles underlying the management of freshwater systems.
	 Critically evaluate the current issues and challenges related to the management of freshwater resources.
	3. Demonstrate practical skills in freshwater habitat and water quality assessment including data collection, analyses, and interpretation.
	4. Clearly report findings and make evidence-based recommendations about the condition of aquatic habitats and water quality.



Course Materials

Lecture Materials:

The lecture notes on Canvas are made available as an additional learning resource. They
do not represent a comprehensive record of material that will be presented in lectures
and should not be used as a substitute for attending lectures or reading from other
assigned sources.

Recommended Reading:

Boulton, A. J. et al (2014) *Australian Freshwater Ecology: Processes and Management (2 Ed.)* Wiley Blackwell, New Jersey.

Calow, P. and G.E. Petts. (1994). *The Rivers handbook: Hydrological and Ecological Principles, Volumes I & II.* Blackwell Scientific Publications, Boston, MA

Gooderham, J and Tsyrlin, E. (2002) *The Waterbug Book: A guide to freshwater macroinvertebrates of temperate Australia,* CSIRO Publishing, Collingwood, Vic.

Gray, N.F. (2017), *Water Science & Technology: An Introduction.* (4 Ed.) CRC Press, Oxford, UK

Hammer, M.J. and Hammer, M.J. Jr. (2004), *Water and Wastewater Technology*, Fifth Edition, John Wiley and Sons, New York.

Lester, J.N. and Birkett, J.W. (1999) *Microbiology and Chemistry for Environmental Scientists and Engineers*, Taylor and Francis, London

Loeb, S.L. and A. Spacie A. (1994). *Biological Monitoring of Aquatic Systems.* Lewis Publishers, Boca Raton, Florida.

Mason, C.F (2002). *Biology of Freshwater Pollution, 4th Edition*. Prentice Hall, Sydney, NSW.

Pigram, J.J. (2006) *Australia's Water Resources from Use to Management,* CSIRO Publishing, Collingwood.

Tebbutt, T.H.Y (1998) *Principles of Water Quality Control*, Butterworth-Heinemann, Oxford.

Required Reading:

Required readings may be derived from various sources and will be advised in advance where applicable



COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL the following compulsory requirements:

Contact Hour Requirements:

- Field Study There is a compulsory attendance requirement in this course. This course has a compulsory course component of a full day field excursion. Students will be permitted to miss the excursion only in cases of documented adverse circumstances. Due to the need to book transport and organise field sampling equipment and academic staff to supervise the field activities, it will not be possible for students who miss the scheduled trip to participate in the activity at a later date. In these cases, students will be expected to conduct a more extensive literature review and develop an expanded methods section and discussion for the written report in lieu of participating in the trip.
- Field Study Induction Requirement Students must attend and pass the induction requirements before attending these sessions. In order to participate in this course, students must complete a compulsory Health and Safety requirement.

Week	Week Begins	Торіс	Learning Activity	Assessment Due
1	17 Jul	Distribution of water and availability of freshwater resources in Australia	No practical	
2	24 Jul	Properties of water/ Physical features and processes in flowing water systems	Campus catchment water quality - habitat assessment, field measurement and sample collection	
3	31 Jul	Chemical & biological processes in flowing water systems (I)	Campus catchment water quality - sample analysis. Field excursion preparation	Practical assignment 1 (complete)
4	7 Aug	Chemical & biological processes in flowing water systems (II)	Compulsory field excursion - Williams River water quality and habitat assessment	
5	14 Aug	Standing water systems / Human impacts on water quality and aquatic ecosystems	Field trip water and macroinvertebrate sample processing	
6	21 Aug	Issues in catchment management	Macroinvertebrate identification and data compilation from field trip	Online quiz #1
7	28 Aug	Public water supply - storage, treatment & distribution of water for potable use	Microbial water quality indicators and disinfection of drinking water (I)	
8	4 Sep	Drinking water quality monitoring - pathogens and microbial quality indicators	Microbial water quality indicators and disinfection of drinking water (II)	
9	11 Sep	Urban rainwater harvesting - water quality, usage and environmental benefits	No practical - free week for preparation of field trip report.	Practical assignment 2
10	18 Sep	Urban storm water management & water sensitive urban design.	Constructed wetland design for storm water quality improvement	Assessment 1: Williams River field trip report. Practical assignment 3a
		Mid Terr	m Break	
		Mid Terr	m Break	
11	9 Oct	Wastewater management and treatment processes.	Details to be advised	
12	16 Oct	Wastewater disposal, re-use & land application.	Concepts in land application of liquid wastes by irrigation.	Practical assignment 3b. Online quiz #2
13	23 Oct	Study week		
Examination Period				
Examination Period				

SCHEDULE



ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Essays / Written Assignments	Week 10 - Monday 18/09/23	Individual	30%	1, 2, 3, 4
2	Examination: Formal	Formal examination period	Individual	40%	1, 2
3	Online Quizzes	Weeks 6 and 12	Individual	10%	1, 2
4	Practical Exercises	Assignment 1: Part A - practical session Week 2; Full assignment - end of Week 3 Assignment 2: End of Week 9 Assignment 3: 2 parts - completed in class and submitted at the end of practical sessions in Weeks 10 & 12	Individual	20%	1, 3, 4

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Essays / Written Assignments

Assessment Type	Written Assignment
Purpose	The data summary and water quality assessment report derived from field excursion activities
	evaluates student capacity in learning objectives 1, 2, 3 and 4 and will convey
	evidence-based understanding of key concepts and topics. Practical skills will be acquired in
	generating the necessary data, while a theoretical understanding of water quality assessment
	will be evaluated through presentation of data and synthesis of literature.
Description	Written report involving data analysis, presentation, and interpretation
Weighting	30%
Length	9 pages (approx.)
Due Date	Week 10 - Monday 18/09/23
Submission Method	Assignment Boxes
	Electronic via Canvas AND hard copy to ENVS2009 assignment box
Assessment Criteria	Provided via Canvas
Return Method	Specific Location
Feedback Provided	Returned Work. Individual feedback will be provided with each marked assignment

Assessment 2 - Examination: Formal

Assessment Type Purpose	Formal Examination The final formal examination is designed to test the individual student's knowledge of the breadth of course material and their ability to describe, analyse and hypothesise from this material. Marks are awarded in accordance with Table 1 from the Workload Assessment Marking and Grading Policy (Policy 000649) at <u>http://www.newcastle.edu.au/policy/000649.html</u>
Description	Written examination
Weighting	40%
Length	2 hours
Due Date	Formal examination period
Submission Method	Formal Exam
Assessment Criteria	Provided via Canvas
Return Method	Not Returned
Feedback Provided	No Feedback.



Assessment 3 - Online Quizzes

Assessment Type Purpose	Quiz The purpose and benefit of the online quizzes is to promote review of lecture material and provide students with feedback on their understanding of key concepts. These tests further represent valuable preparation for the end of semester formal exam, as they comprise the style of questions students used in that assessment task. Each of the online quizzes are weighted at 5% (combined total = 10%) of the overall course assessment.
Description Weighting Length Due Date Submission Method Assessment Criteria Return Method Feedback Provided	Multi-choice style questions 10% 20 questions; 40 minutes Weeks 6 and 12 Online Quizzes completed and submitted online Provided with the quiz. Online Online

Assessment 4 - Practical Exercises

Assessment Type	Tutorial / Laboratory Exercises
Purpose	The practical exercises will evaluate student comprehension of basic theory and skills in water quality assessment and use of water as a resource. Between them, they address 3 of the 4 learning objectives of the course.
	Practical assignments 1 & 3 are weighted at 5% each and assignment 2 at 10% (combined total = 20%) of the overall course assessment.
Description	Assignment 1 - Desktop review, data generation, interpretation and written answers based on field and lab work in weeks 2 & 3.
	Assignment 2 - Written assignment based on work done during lab sessions in weeks 7 & 8 Assignment 3 - Two (2) part written answer exercise on work done during practical sessions in weeks 10 & 12
Weighting	20%
Due Date	Assignment 1: Part A - practical session Week 2; Full assignment - end of Week 3 Assignment 2: End of Week 9
	Assignment 3: 2 parts - completed in class and submitted at the end of practical sessions in Weeks 10 & 12
Submission Method	Specific Location
	Hard copy to be submitted during practical class
Assessment Criteria	Provided during class and via Canvas where applicable
Return Method	Specific Location
Feedback Provided	Returned Work. Individual feedback will be provided with each marked assignment.



ADDITIONAL INFORMATION

	Range of	Grade	Description
	Marks 85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
	75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
	65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
	50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
	0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.
	*Skills are th	ose identified	for the purposes of assessment task(s).
Attendance	Attendance/p - Field - Practi	participation w Study (Method cal (Method o	ill be recorded in the following components: d of recording: Student to sign class attendance sheet) f recording: Student to sign class attendance sheets)
Communication Methods	Communicat - Canva annou - Email - Face	ion methods u as Course Site incements on : Students will to Face: Comr	used in this course include: e: Students will receive communications via the posting of content or the Canvas course site. I receive communications via their student email account. munication will be provided via face-to-face meetings or supervision.
Course Evaluation	Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.		
Oral Interviews (Vivas)	As part of the (viva) may be material sub conducted in In cases whe own work the	e evaluation p e conducted. T omitted in res accordance v ere the oral ex e case will be	rocess of any assessment item in this course an oral examination The purpose of the oral examination is to verify the authorship of the sponse to the assessment task. The oral examination will be with the principles set out in the <u>Oral Examination (viva) Procedure</u> . comination reveals the assessment item may not be the student's dealt with under the <u>Student Conduct Rule</u> .
Academic Misconduct	All students standards re Academic In all locatio https://policie	are required t inforce the in tegrity policies ns. For es.newcastle.e	o meet the academic integrity standards of the University. These nportance of integrity and honesty in an academic environment. apply to all students of the University in all modes of study and in the Student Academic Integrity Policy, refer to adu.au/document/view-current.php?id=35.



Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:			
	 the assessment item is a major assessment item; or the assessment item is a minor assessment item, and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system; you are requesting a change of placement; or 			
	4. the course has a compulsory attendance requirement.			
	Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:			
	https://policies.newcastle.edu.au/document/view-current.php?id=236			
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at			
	https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures			
	that support a safe and respectful environment at the University.			
Other Information	Attendance and/or Other Class Requirements The practical component of the course and the associated field excursions are compulsory. Attendance at practical classes will be recorded each week. Practical work sheets/exercises must be submitted by the due date, or late penalties will apply. It will not be possible to complete missed practical work at a later date. If practical sessions are missed the student must discuss the situation with the course co-ordinator or apply for Adverse Circumstances consideration (see above) and attach the required documentary evidence as per the normal process. For ALL practical sessions and field activities students must bring along writing materials (notebook and pen/pencil) and a calculator and must wear fully enclosed footwear. For the 'wet' laboratory practicals students must bring along these items and wear fully enclosed shoes, a laboratory coat and safety glasses . Students should also wear enclosed shoes and appropriate clothing for field activities. The cost for the field excursion varies within the range of \$40 - \$55 per student, dependent upon the final number of students enrolled in the course.			
	Risk Assessment and Health & Safety Requirements The issue of safety for staff and students is taken very seriously by the University. Students studying courses requiring completion of a Risk Assessment Safety Induction or other Health & Safety requirement MUST complete all safety components. These will generally occur in the first week of each course or prior to a placement or field trip. Students will be advised of Risk Assessment and Health & Safety requirements by the Course Coordinator at the beginning of the semester.			

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified, and an amended course outline will be provided in the same manner as the original.

© 2023 The University of Newcastle, Australia