COURSE OUTLINE

ENG411 Reservoir and Stormwater Engineering

School: School of Science, Technology and Engineering

2022 | Semester 1

UniSC Sunshine Coast | BLENDED LEARNING | Most of your course is on campus but you may be able to do some components of this course online.

Please go to unisc.edu.au for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

This course prepares you to analyse hydrology data and design water storage and conveyance systems. Topics include the capacity-yield and behavioural characteristics of surface reservoirs, stormwater system design including detention and retention storage designs and the capabilities of urban rainfall-runoff models for simulating the quantity and quality environmental impacts of stormwater runoff. Included in the course are the methods employed to design decentralised water management systems (Water Sensitive Urban Design), which is increasingly a requirement for new developments in SE Qld.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous learning material	1hr	Week 1	13 times
Tutorial/Workshop 1 – On campus workshop	2hrs	Week 1	13 times

1.3. Course Topics

- Extent of natural water resources globally and in Australia
- River and Reservoir Yield
- Yield of unregulated streams
- Storage Behavioural analysis
- Reservoir sedimentation
- Water Sensitive Urban Design (WSUD)
- Stormwater Drainage Design
- Detention and Retention Storage

2. What level is this course?

400 Level (Graduate)

Demonstrating coherence and breadth or depth of knowledge and skills. Independent application of knowledge and skills in unfamiliar contexts. Meeting professional requirements and AQF descriptors for the degree. May require pre-requisites where discipline specific introductory or developing knowledge or skills is necessary. Normally undertaken in the third or fourth full-time study year of an undergraduate program.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...	GRADUATE QUALITIES MAPPING Completing these tasks successfully will contribute to you becoming...	PROFESSIONAL STANDARD MAPPING * Engineers Australia Stage 1 Professional Engineer Competency Standards
1 Assess, manage, and design water resources in the context of sustainable development	Sustainability-focussed	1.3, 1.6, 2.2
2 Demonstrate understanding of engineering and technological processes by accessing information relevant to managing and utilising water resources.	Knowledgeable	1.4, 1.6
3 Use critical thinking to analyse the impact and implications of engineering issues in the context of sustainable and ethical management of water resources.	Creative and critical thinker Ethical Sustainability-focussed	1.6, 3.1, 3.4
4 Identify how managing water resources may be influenced by socio-economic, cultural, organisational and political factors and requires critical engagement with the latest research and practice.	Creative and critical thinker Ethical Sustainability-focussed	1.3, 3.1, 3.4
5 Identify current issues affecting managing water resources	Knowledgeable Sustainability-focussed	1.4, 1.5
6 Demonstrate understanding by explaining the processes used to manage surface water resources	Knowledgeable Empowered	1.3, 2.2

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1.3	Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the engineering discipline.
1.4	Knowledge and Skill Base: Discernment of knowledge development and research directions within the engineering discipline.
1.5	Knowledge and Skill Base: Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
1.6	Knowledge and Skill Base: Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.
2.2	Engineering Application Ability: Fluent application of engineering techniques, tools and resources.
3.1	Professional and Personal Attributes: Ethical conduct and professional accountability.
3.4	Professional and Personal Attributes: Professional use and management of information.

5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

(MTH202 or MTH104) and (ENS314 or ENG330 or CIV330)

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

5.4. Specific assumed prior knowledge and skills (where applicable)

Not applicable

5.5. Microcredential Information

Not applicable

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

In week 4 the first quiz will test your knowledge of the material covered in the first three weeks of the course. A practice quiz will be provided in week 3.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Quiz/zes	Individual	20%	Two x 60 minute quizzes	Refer to Format	Online Test (Quiz)
All	2	Written Piece	Individual	40%	6 x A4 pages including graphs, tables and explanation.	Week 9	Online Assignment Submission with plagiarism check
All	3	Oral and Written Piece	Group	40%	6xA4 pages including design specification, calculations (30%) and explanation (group) and individual presentations (10%).	Week 12	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Two on-line quizzes

GOAL:	Demonstrate your understanding of the material covered.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	Multiple-choice quizzes completed at home for each of two quizzes, which will be open for a total of 60 minutes at an agreed time in Weeks 4 & 7. Practice questions will be provided in Wk 3.
CRITERIA:	

No.		Learning Outcome assessed
1	Demonstration of your depth of understanding of the material covered.	2 3 6

GENERIC SKILLS:	Problem solving, Information literacy

All - Assessment Task 2: River and Reservoir Report and Analysis Tool

GOAL:	The goal of this task is to analyse the impact and implications of engineering issues in the context of sustainable and ethical management of water resources.
PRODUCT:	Written Piece
AUTHORSHIP STATEMENT:	
FORMAT:	In this assessment task you will design or analyse stormwater infrastructure in the context of sustainably and ethically managing water resources. A report and spreadsheet library of analyses methods (or appropriate software) and a professional engineering report with appropriate headings, graphs, tables and explanations, showing all the steps for the final design/analysis. The maximum length of the report is 6 x A4 pages.
CRITERIA:	

No.		Learning Outcome assessed
1	Identification of how managing water resources may be influenced by socio-economic, cultural, organisational and political factors	1 5
2	Identification of current issues affecting managing stormwater	4
3	Data collection and quality assurance	2
4	Analysis and interpretation	2 3
5	Communication of concepts in a report format	6

GENERIC SKILLS:	Problem solving, Applying technologies

All - Assessment Task 3: Water storage analysis and design

GOAL:	Implement a solution to a water storage problem.
PRODUCT:	Oral and Written Piece
AUTHORSHIP STATEMENT:	
FORMAT:	An engineering design specification report to a standard expected in professional practice (group) and individual presentations on your input into the assignment
CRITERIA:	

No.		Learning Outcome assessed
1	Demonstrated understanding and application of engineering and technological processes applied to water storage challenges	1 3 6
2	Analysis of data and information	1 2

GENERIC SKILLS:	Collaboration, Problem solving, Applying technologies

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Student workload is calculated at 12.5 learning hours per one unit.

7.1. Schedule

PERIOD AND TOPIC	ACTIVITIES
PART 1: Reservoir Engineering: Weeks 1 to 5	Learning material and workshops on catchment and reservoir yield concepts, sizing storages and sedimentation
PART 2: Stormwater engineering: weeks 6 to 13	Learning material and workshops on stormwater drainage design, detention and retention storages and implementation of Water Sensitive Urban Design

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

You need regular access to the resource(s) below. Many texts are available as ebooks through the Library at no additional cost.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Recommended	Argue, J.R	1999	Source Control – Stormwater Management Design Procedures	n/a	Urban Water Resource Centre, University of South Australia
Recommended	T. A. McMahon,R. G. Mein	1986	River and Reservoir Yield	n/a	Water Resources Publications, LLC
Recommended	Stephan J. Nix	1994	Urban Stormwater Modeling and Simulation	n/a	CRC Press
Recommended	Institute of Public Works Engineering Australia	2017	Queensland Urban Drainage Manual	fourth	IPWEAQ

8.2. Specific requirements

Not applicable

9. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the health and safety risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

10.2. Assessment: Additional Requirements

Eligibility for Supplementary Assessment Your eligibility for supplementary assessment in a course is dependent of the following conditions applying: The final mark is in the percentage range 47% to 49.4% The course is graded using the Standard Grading scale You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may be penalised at the following maximum rate: - 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task. - 10% (of the assessment task's identified value) for the third day - 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task. - A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task. Weekdays and weekends are included in the calculation of days late. To request an extension you must contact your course coordinator to negotiate an outcome.

10.4. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.5. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.6. General Enquiries

In person:

- **UniSC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **UniSC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **UniSC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **UniSC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **UniSC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **UniSC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au