COURSE OUTLINE

CIV400 Water Supply and Wastewater Treatment systems

School: School of Science, Technology and Engineering

2023 | Semester 1

UniSC Sunshine Coast
UniSC Moreton Bay

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 usc.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 teaches the important concepts and fundamental principles of water supply and wastewater treatment systems, as well as the processes involved in their operation. Topics covered include water and wastewater characteristics, design of water supply and wastewater collection systems, processes involved in the treatment of raw water and wastewater, and treatment and disposal of bio-solids. After completing this course you will be able to design, construct, operate and manage water supply and wastewater collection systems, as well as water and wastewater treatment plants.

1.2. How will this course be delivered?

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

1.3. Course Topics

- Water Quality and Characteristics of Wastewater
- Water Collection and Distribution
- Wastewater Collection Systems
- Pipes, valves and pumps
- Water and Wastewater Treatment Plant Costs
- Preliminary Treatment of Water and Wastewater
- Primary Treatment of Water and Wastewater
- Secondary Treatment of Water
- Secondary Treatment of Wastewater – Activated Sludge, Anaerobic Treatment, Trickling Filters
- Tertiary Treatment of Water and Wastewater – Disinfection, Membrane processes, Desalination
- Sludge Treatment, Waste Handling and Disposal

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	GRADUATE QUALITIES MAPPING	PROFESSIONAL STANDARD MAPPING *
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...	Competencies from multiple Professional Bodies (see below) *
1 Demonstrate knowledge of engineering and technological processes by accessing information relevant to managing water supply and treating wastewater.	Knowledgeable	1.5, 6.1.5, 6.2.1, 6.3.2
2 Evaluate information regarding managing and treating water and wastewater sustainably.	Sustainability-focussed	2.3, 6.3.5
3 Apply processes used to manage and treat water and wastewater and the socio-economic factors that influence it.	Empowered	1.5, 6.1.3, 6.2.2, 6.2.5
4 Discuss the implications of and outcomes from inappropriate application of engineering principles in managing and treating water and wastewater.	Creative and critical thinker	1.5, 6.2.1, 6.3.4
5 Design a possible solution to a water and wastewater management and treatment problem or illustrate how engineering may be causing the problem.	Engaged	2.3, 11.1.2, 11.1.4, 11.2.4, 11.3.1

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1.5	Knowledge and Skill Base: Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
2.3	Engineering Application Ability: Application of systematic engineering synthesis and design processes.
EDUCATION FOR SUSTAINABLE DEVELOPMENT GOALS	
6.1.5	The learner understands the concept of Integrated Water Resources Management (IWRM) and other strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management.
6.2.1	The learner is able to participate in activities of improving water and sanitation management in local communities.
6.3.2	The learner is able to contribute to water resources management at the local level.
6.3.5	The learner is able to evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.
6.1.3	The learner knows about the global unequal distribution of access to safe drinking water and sanitation facilities.

CODE	COMPETENCY
6.2.2	The learner is able to communicate about water pollution, water access and water saving measures and to create visibility about success stories.
6.2.5	The learner is able to question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.
6.3.4	The learner is able to plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety.
11.1.2	The learner is able to evaluate and compare the sustainability of their and other settlements' systems in meeting their needs particularly in the areas of food, energy, transport, water, safety, waste treatment, inclusion and accessibility, education, integration of green spaces and disaster risk reduction.
11.1.4	The learner knows the basic principles of sustainable planning and building, and can identify opportunities for making their own area more sustainable and inclusive.
11.2.4	The learner is able to contextualize their needs within the needs of the greater surrounding ecosystems, both locally and globally, for more sustainable human settlements.
11.3.1	The learner is able to plan, implement and evaluate community-based sustainability projects.

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

MEC200 or ENG211

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

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

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 all tutorials, throughout semester, students will be asked to complete sample examination questions. Students will then discuss possible answers before being shown sample answers. Students will also be encouraged to raise any issues they have regarding any assessment task.

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	Artefact - Professional	Individual	30%	Max. 1500 words excl. Appendices.	Week 5	Online Assignment Submission with plagiarism check
All	2	Artefact - Professional	Group	40%	BIM model of the entire wastewater or water treatment system with costings and each element of the process clearly outlined. An oral presentation of your design will be made in week 11 - maximum 15 minutes.	Week 11	Online Assignment Submission with plagiarism check
All	3	Quiz/zes	Individual	30%	2 x 1 hour quizzes	Throughout teaching period (refer to Format)	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Preliminary study and Design brief of a water system

GOAL:	This task is designed to model how a preliminary overview design is prepared for a water supply and wastewater collection system. You will collect the primary data and produce an overview design (i.e. to flowchart detail only) of a water supply and wastewater collection system for a small country town in rural Queensland. This design brief will then feed into Task 2.
PRODUCT:	Artefact - Professional
FORMAT:	Individual submission: Report submitted via Canvas. Your report includes a description of your water and wastewater collection system, as well as water distribution system design proposal, appropriate diagrams, anticipated components and design capacity, consideration and discussion of water quality and wastewater contaminants, flow variations and other relevant issues. It will be necessary to make assumptions and these should be clearly stated.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 Accuracy of answer, including appropriate application of correct design methodologies and validity of assumptions — 1 5 2 Identification of environmental, social and economic factors — 3 4

All - Assessment Task 2: Detailed design of water systems

GOAL:	Using a BIM model you will provide detailed designs of a water or wastewater treatment unit processes. Design data and assumptions from Assessment Task 1 may be used here. You should include preliminary costings in your report. As part of your group work, you may be required to actively participate to Peer Assessment, review, feedback and debriefing activities.
PRODUCT:	Artefact - Professional
FORMAT:	Group submission of the BIM model through Canvas.

CRITERIA:	No.		Learning Outcome assessed
	1	Accuracy of answer, including appropriate applications of correct design methodologies and validity of assumptions.	1 4 5

All - Assessment Task 3: Quizzes

GOAL:	The final exam assesses the material covered in the course (lectures, tutorials and assignments) and the self-study material (e.g. prescribed reading). You will demonstrate your understanding of the Design of Water Systems and solve various issues relating to Water System topics.
PRODUCT:	Quiz/zes
FORMAT:	Individual submission. The quizzes will be a mixture of calculations, multiple choice and short answer (diagrams and calculations may be required). weeks 6 and 13

CRITERIA:	No.		Learning Outcome assessed
	1	Accurate representation of the theoretical and practical components of engineering water and wastewater treatment systems.	1
	2	Correct analysis and evaluation of information.	2
	3	Provision of complete and accurate answers to the questions asked.	1

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.

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

There are no required/recommended resources for this course.

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. SafeUniSC

UniSC is committed to a culture of respect and providing a safe and supportive environment for all members of our community. For immediate assistance on campus contact SafeUniSC by phone: 07 5430 1168 or using the SafeZone app. For general enquires contact the SafeUniSC team by phone 07 5456 3864 or email safe@usc.edu.au.

The SafeUniSC Specialist Service is a Student Wellbeing service that provides free and confidential support to students who may have experienced or observed behaviour that could cause fear, offence or trauma. To contact the service call 07 5430 1226 or email studentwellbeing@usc.edu.au.

10.5. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the Learning Advisers web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.6. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to Student Hub, email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.7. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, AccessAbility Services can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to Student Hub, email AccessAbility@usc.edu.au or call 07 5430 2890.

10.8. 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

10.9. 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.

10.10. 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