

# ENG421 Design of Water Supply Systems

**School:** School of Science, Technology and Engineering

2021 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](http://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 teaches the fundamentals and design concepts of water supply systems and water treatment plants, as well as the processes involved with their operation. Topics covered include water supply systems, water quality issues, and water treatment processes and systems. After completing this course you will be able to design, construct, operate and manage water collection systems and water treatment plants.

### 1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
<b>BLENDED LEARNING</b>			
<b>Lecture</b>	3hrs	Week 1	13 times
<b>Tutorial/Workshop 1</b>	1hr	Week 1	13 times

### 1.3. Course Topics

- Water Systems, Water Quality
- Water Collection and distribution
- Pipes, valves and pumps
- Water quality management
- Water Treatment Plant Costs
- Screens and Grit Removal
- Coagulation and Flocculation
- Sedimentation
- Filtration
- Disinfection
- Adsorption and membrane processes
- Desalination, Waste Handling

## 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
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...
1 Understand engineering and technological processes by accessing information relevant to managing water supply	Knowledgeable Creative and critical thinker
2 Access and evaluate information regarding managing water supply and treatment sustainably	Knowledgeable Sustainability-focussed
3 Explain and understand the processes used to manage water supply and treatment and the socio-economic and environmental factors that influence it	Knowledgeable Sustainability-focussed
4 Discuss the implications of and outcomes from inappropriate application of engineering principles in managing water supply and treatment	Knowledgeable Creative and critical thinker
5 Illustrate a possible solution to a water supply and treatment problem or illustrate how engineering may be causing the problem	Creative and critical thinker Sustainability-focussed

## 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

ENG202 or ENG1100 (USQ)

### 5.2. Co-requisites

Not applicable

### 5.3. Anti-requisites

Not applicable

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

It is assumed that students have appropriate knowledge regarding the engineering design process

### 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 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	Written Piece	Individual	20%	1500 words	Week 4	Online Assignment Submission with plagiarism check
All	2	Written Piece	Individual	30%	2000 words	Week 11	Online Assignment Submission with plagiarism check
All	3	Examination - Centrally Scheduled	Individual	50%	2 hour	Exam Period	Exam Venue

#### All - Assessment Task 1: Water Supply Systems Assignment (20%)

<b>GOAL:</b>	This task is designed to model how a preliminary brief is prepared for a major water supply project. You will collect the primary data and produce an overview design (i.e. to flowchart detail only) of a water supply system for a small country town in rural Queensland. This design brief will then feed into Task 2.									
<b>PRODUCT:</b>	Written Piece									
<b>AUTHORSHIP STATEMENT:</b>										
<b>FORMAT:</b>	Individual submission, .doc or .docx file submitted via Blackboard. Brief report format: Overview: project description with appropriate diagrams, design capacity, anticipated stages, water treatment, distribution system. Contingencies: water quality, water losses and types of water uses. Assumptions: See Blackboard for project details.									
<b>CRITERIA:</b>	<table border="1"> <thead> <tr> <th>No.</th> <th>Learning Outcome assessed</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Accuracy of answer, including appropriate application of correct design methodologies and validity of assumptions</td> </tr> <tr> <td>2</td> <td>Identification of environmental, social and economic factors</td> </tr> <tr> <td>3</td> <td>Assessment criteria are mapped to the course learning outcomes. <span style="float: right;">1 2 3 4 5</span></td> </tr> </tbody> </table>	No.	Learning Outcome assessed	1	Accuracy of answer, including appropriate application of correct design methodologies and validity of assumptions	2	Identification of environmental, social and economic factors	3	Assessment criteria are mapped to the course learning outcomes. <span style="float: right;">1 2 3 4 5</span>	
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<b>GENERIC SKILLS:</b>										

### All - Assessment Task 2: Water Treatment Plant Assignment (30%)

<b>GOAL:</b>	You are to use your preliminary design brief from Task 1 and provide detailed designs of the water treatment unit processes in that design. Design data and assumptions from Assessment Task 1 may be used here. You should include preliminary costings in your report.	
<b>PRODUCT:</b>	Written Piece	
<b>AUTHORSHIP STATEMENT:</b>		
<b>FORMAT:</b>	Individual submission,.doc or .docx file submitted via Blackboard. Water Treatment Proposal format - follows industry standards and can be found on Blackboard	
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>
	1	Accuracy of answer, including appropriate application of correct design methodologies and validity of assumptions.
	2	Accurate and cogent application of sustainability principals
<b>GENERIC SKILLS:</b>		

### All - Assessment Task 3: End of Semester Exam (50%)

<b>GOAL:</b>		
<b>PRODUCT:</b>	Examination - Centrally Scheduled	
<b>AUTHORSHIP STATEMENT:</b>		
<b>FORMAT:</b>	Individual submission The final examination questions will require short essay style responses (diagrams and calculations may be required).	
<b>CRITERIA:</b>	<b>No.</b>	<b>Learning Outcome assessed</b>
	1	The ability to demonstrate understanding of the theoretical and practical components of the course materials
	2	The ability to analyse and evaluate information
	3	The ability to provide complete and accurate answers to the questions asked
<b>GENERIC SKILLS:</b>		

## 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
1  Nature of this course: aims, objectives and assessment What is a water supply system? Water Quality	LECTURE Attend library and IT skill tutorials if necessary.
2 Water collection and distribution	LECTURE TUTORIAL on Water supply systems and water quality Readings and resources detailed in Blackboard
3 Pipes, Valves, Pumps	LECTURE TUTORIAL on Pipes, valves and pumps Readings and resources detailed in Blackboard
4 Water Quality Management	LECTURE TUTORIAL on Water quality management Readings and resources detailed in Blackboard
5 Water Treatment Plant Costs	LECTURE TUTORIAL on Water collection and distribution Readings and resources detailed in Blackboard
6 Screens and Grit Removal	LECTURE TUTORIAL on Water Treatment Plant Costs Readings and resources detailed in Blackboard
7 Coagulation and Flocculation	LECTURE TUTORIAL on Screens and grit removal Readings and resources detailed in Blackboard
8 Sedimentation	LECTURE TUTORIAL on Coagulation and flocculation Readings and resources detailed in Blackboard
9 Filtration	LECTURE TUTORIAL on Sedimentation Readings and resources detailed in Blackboard
10 Disinfection	LECTURE TUTORIAL on Filtration Readings and resources detailed in Blackboard
11 Adsorption and membranes	LECTURE TUTORIAL on Disinfection Readings and resources detailed in Blackboard
12 Desalination and waste handling	LECTURE TUTORIAL on Adsorption and membranes Readings and resources detailed in Blackboard
13 Summary lecture	TUTORIAL

## 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

There are no specific requirements for ENG421

## 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](mailto:studentcentral@usc.edu.au)