

CIV202

Hydraulics and Hydrology

School: School of Science, Technology and Engineering

2026 | Trimester 1

UniSC Sunshine Coast
UniSC Moreton Bay

**BLENDDED
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 will introduce you to fundamental hydrological and hydraulic theories. The unit places particular emphasis on the fundamental basis for the estimation of flow in catchment and open channel flow hydraulics and estimating runoff for the design of drainage structures. You will develop the skills required to analyse and design urban drainage networks, water sensitive urban designs, and water supply systems.

1.2. How will this course be delivered?

| ACTIVITY | HOURS | BEGINNING WEEK | FREQUENCY |
|---|-------|----------------|-----------|
| BLENDDED LEARNING | | | |
| Learning materials – Asynchronous weekly learning material | 1hr | Week 1 | 12 times |
| Seminar – On campus | 1hr | Week 1 | Once Only |
| Tutorial/Workshop 1 – On campus | 2hrs | Week 1 | 12 times |
| Laboratory 1 – On campus | 2hrs | Week 2 | 5 times |

1.3. Course Topics

Topics may include:

- Pipeline and pumping systems, pipe networks; steady open channel flow, flow control and flow measurement.
- Design and analysis of hydraulic structures.
- Precipitation and its analysis; rainfall and runoff estimation; stormwater management and planning.
- Soil moisture and soil water movement; Groundwater; sediment characterisation and sediment transport.
- Flood plain management.

2. What level is this course?

200 Level (Developing)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

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 Describe the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number. | Knowledgeable | 1, 1, 1.3.a, 1.3.a, 1.3, 1.3 |
| 2 Describe the principles of methods for the estimation of peak discharges from a catchment and groundwater flows. | Knowledgeable | 1, 1, 1.3.a, 1.3.a, 1.3, 1.3 |
| 3 Evaluate the water supply for reservoirs from catchments, variation in supply and prediction of future changes in supply. | Creative and critical thinker | 2, 2, 2.1.a, 2.1.a, 2.1, 2.1 |
| 4 Perform laboratory experiments to calculate friction losses and measure flows in hydraulic structures. | Empowered | 2, 2, 2.2.e, 2.2.h, 2.2, 2.2 |
| 5 Apply the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems. | Empowered | 2, 2, 2.2.d, 2.2.e, 2.2, 2.2 |
| 6 Apply rainfall and runoff calculations and use appropriate procedures for the design of storm water drainage systems. | Empowered | 2, 2, 2.2.d, 2.2.e, 2.2, 2.2 |

* Competencies by Professional Body

| CODE | COMPETENCY |
|--|---|
| ENGINEERS AUSTRALIA STAGE 1 ENGINEERING TECHNOLOGIST COMPETENCY STANDARDS | |
| 1 | Elements of competency: Knowledge and Skill Base |
| 1.3.a | Knowledge and Skill Base - In-depth understanding of specialist bodies of knowledge within the technology domain: Proficiently applies advanced technical knowledge and skills to deliver engineering outcomes in specialist area(s) of the technology domain and associated industry, commercial and community sectors. |
| 1.3 | Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the technology domain. |
| 2 | Elements of competency: Engineering Application Ability |
| 2.1.a | Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Identifies, discerns and characterises salient issues, determines and analyses causes and effects, justifies and applies appropriate simplifying assumptions, predicts performance and behaviour, synthesises solution strategies and develops substantiated conclusions. |
| 2.2.e | Engineering Application Ability - Application of engineering techniques, tools and resources within the technology domain: Applies a wide range of engineering tools for analysis, simulation, visualisation, synthesis and design, assesses accuracy and limitations of such tools, and validates results. |
| 2.1 | Engineering Application Ability: Application of established engineering methods to broadly-defined problem solving within the technology domain. |
| 2.2 | Engineering Application Ability: Application of engineering techniques, tools and resources within the technology domain. |
| ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS | |

| CODE | COMPETENCY |
|-------|--|
| 1 | Elements of competency: Knowledge and Skill Base |
| 1.3.a | Knowledge and Skill Base - In-depth understanding of specialist bodies of knowledge within the engineering discipline: Proficiently applies advanced technical knowledge and skills in at least one specialist practice domain of the engineering discipline. |
| 1.3 | Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the engineering discipline. |
| 2 | Elements of competency: Engineering Application Ability |
| 2.1.a | Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Identifies, discerns and characterises salient issues, determines and analyses causes and effects, justifies and applies appropriate simplifying assumptions, predicts performance and behaviour, synthesises solution strategies and develops substantiated conclusions. |
| 2.2.h | Engineering Application Ability - Fluent application of engineering techniques, tools and resources: Safely applies laboratory, test and experimental procedures appropriate to the engineering discipline. |
| 2.2.d | Engineering Application Ability - Fluent application of engineering techniques, tools and resources: Applies a wide range of engineering tools for analysis, simulation, visualisation, synthesis and design, including assessing the accuracy and limitations of such tools, and validation of their results. |
| 2.1 | Engineering Application Ability: Application of established engineering methods to complex engineering problem solving. |
| 2.2 | Engineering Application Ability: Fluent application of engineering techniques, tools and resources. |

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

SCI107

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENG330

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

Early feedback will be provided through completion of weekly activities in workshops. Furthermore, feedback on each assessment will be provided which will be used to help with the following assessment.

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 - Technical and Scientific, and Written Piece | Group | 35% | Approximately five A4 pages including graphs, tables and explanations per student. | Week 7 | Online Assignment Submission with plagiarism check |
| All | 2 | Artefact - Technical and Scientific, and Written Piece | Group | 35% | Approximately five A4 pages including graphs, tables and explanations per student. | Week 12 | Online Assignment Submission with plagiarism check |
| All | 3 | Practical / Laboratory Skills, and Written Piece | Individual | 30% | Approximately three A4 pages including graphs, tables and explanation per student. | Refer to Format | Online Assignment Submission with plagiarism check |

All - Assessment Task 1: Design Flood Report

| | | |
|------------------------|---|----------------------------------|
| GOAL: | Produce a Design Flood Report that presents the flow characteristics of a Design Flood Event at a specified location to guide the design of an infrastructure asset (eg. Bridge, Road, Building). The report will consider the implications of future climate conditions on design outcomes. | |
| PRODUCT: | Artefact - Technical and Scientific, and Written Piece | |
| FORMAT: | Written Report and Computational Model. The standard will be that of a professional engineering report with appropriate headings, graphs, tables and explanations. | |
| CRITERIA: | <p>No.</p> <ol style="list-style-type: none"> 1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number. 2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows. 3 Evaluate the water supply for reservoirs from catchments, variation in supply and prediction of future changes in supply. 4 Application of the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems. 5 Application of rainfall and runoff calculations and use appropriate procedures for the design of storm water drainage systems. 6 Calculation of friction losses and measure flows in hydraulic structures. | Learning Outcome assessed |
| GENERIC SKILLS: | Communication, Problem solving, Organisation, Applying technologies, Information literacy | |

All - Assessment Task 2: Stormwater Management Plan

| GOAL: | Produce a Stormwater Management Plan for a proposed urban development. Analyse the surface water runoff of the existing and proposed development. Design drainage infrastructure to manage the stormwater across the Site in accordance with industry best practice. The report will consider the implications of future climate conditions on design outcomes. | | | | | | | | | | | | |
|---|--|-----|---------------------------|---|---|--|---|---|---|--|---|--|---|
| PRODUCT: | Artefact - Technical and Scientific, and Written Piece | | | | | | | | | | | | |
| FORMAT: | Written Report and Computational Model | | | | | | | | | | | | |
| CRITERIA: | <table border="1"> <thead> <tr> <th>No.</th><th>Learning Outcome assessed</th></tr> </thead> <tbody> <tr> <td>1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number.</td><td>1</td></tr> <tr> <td>2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows.</td><td>2</td></tr> <tr> <td>3 Evaluate the water supply for reservoirs from catchments, variation in supply and prediction of future changes in supply.</td><td>3</td></tr> <tr> <td>4 Application of the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems.</td><td>5</td></tr> <tr> <td>5 Application of rainfall and runoff calculations and use appropriate procedures for the design of storm water drainage systems.</td><td>6</td></tr> </tbody> </table> | No. | Learning Outcome assessed | 1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number. | 1 | 2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows. | 2 | 3 Evaluate the water supply for reservoirs from catchments, variation in supply and prediction of future changes in supply. | 3 | 4 Application of the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems. | 5 | 5 Application of rainfall and runoff calculations and use appropriate procedures for the design of storm water drainage systems. | 6 |
| No. | Learning Outcome assessed | | | | | | | | | | | | |
| 1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number. | 1 | | | | | | | | | | | | |
| 2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows. | 2 | | | | | | | | | | | | |
| 3 Evaluate the water supply for reservoirs from catchments, variation in supply and prediction of future changes in supply. | 3 | | | | | | | | | | | | |
| 4 Application of the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems. | 5 | | | | | | | | | | | | |
| 5 Application of rainfall and runoff calculations and use appropriate procedures for the design of storm water drainage systems. | 6 | | | | | | | | | | | | |
| GENERIC SKILLS: | Communication, Problem solving, Applying technologies, Information literacy | | | | | | | | | | | | |

All - Assessment Task 3: Laboratory Workshop Reports

| GOAL: | Produce a Lab Report summarising the laboratory workshop experiment and outcomes. | | | | | | | | |
|---|---|-----|---------------------------|---|---|--|---|--|---|
| PRODUCT: | Practical / Laboratory Skills, and Written Piece | | | | | | | | |
| FORMAT: | Produce a Lab Report summarising the laboratory workshop experiment and outcomes. Submit the report for any 3 of the 5 laboratory classes 2 weeks after the Laboratory classes, which are held in weeks 2, 4, 6, 8 and 10. | | | | | | | | |
| CRITERIA: | <table border="1"> <thead> <tr> <th>No.</th><th>Learning Outcome assessed</th></tr> </thead> <tbody> <tr> <td>1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number.</td><td>1</td></tr> <tr> <td>2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows.</td><td>2</td></tr> <tr> <td>3 Perform laboratory experiments to calculate friction losses and measure flows in hydraulic structures.</td><td>4</td></tr> </tbody> </table> | No. | Learning Outcome assessed | 1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number. | 1 | 2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows. | 2 | 3 Perform laboratory experiments to calculate friction losses and measure flows in hydraulic structures. | 4 |
| No. | Learning Outcome assessed | | | | | | | | |
| 1 Description of the various forms of energy that are relevant to the flow of fluids, concepts of hydrostatics and pressure measurement, and Reynolds number. | 1 | | | | | | | | |
| 2 Description of the principles of methods for the estimation of peak discharges from a catchment and groundwater flows. | 2 | | | | | | | | |
| 3 Perform laboratory experiments to calculate friction losses and measure flows in hydraulic structures. | 4 | | | | | | | | |
| GENERIC SKILLS: | Problem solving, Organisation, Information literacy | | | | | | | | |

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

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

| REQUIRED? | AUTHOR | YEAR | TITLE | EDITION | PUBLISHER |
|-------------|----------------|------|---------------------------------------|---------|-------------------------|
| Recommended | Anthony Ladson | 2008 | Hydrology: An Australian Introduction | n/a | Oxford University Press |

8.2. Specific requirements

Nil

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:

- (a) The final mark is in the percentage range 47% to 49.4%; and
- (b) The course is graded using the Standard Grading scale

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 submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:

- (a) One day: deduct 5%;
- (b) Two days: deduct 10%;
- (c) Three days: deduct 20%;
- (d) Four days: deduct 40%;
- (e) Five days: deduct 60%;
- (f) Six days: deduct 80%;
- (g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:

Less than 15 minutes: No penalty

From 15 minutes to 30 minutes: 20% penalty

More than 30 minutes: 100% penalty

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