COURSE OUTLINE

ENG211 Fluid Mechanics and Hydraulics

School: School of Science, Technology and Engineering

2026 | 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

Fluid Mechanics and Hydraulics concerns the continuous deformation of gases and liquids under shear stress. First we establish the properties of fluids and introduce hydrostatic principles before delving into dynamics of flow for incompressible fluids (mainly) water. In Fluid Mechanics and Hydraulics you will learn how to formulate and solve fluid hydrostatics and pressure problems, analyse pipe flow situations using the Bernoulli equation, determine appropriate pump sizes for pipe systems, and analyse open channel flow situations using Manning's equation.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Tutorial/Workshop 1	3hrs	Week 1	13 times
Laboratory 1	2hrs	Not applicable	4 times

1.3. Course Topics

- Fluid Properties and Hydrostatics
- Static Pressure Forces
- Fluid Dynamics & Bernoulli Equation
- Flow Measurement
- Forces and Momentum of Moving Fluids
- Viscous Pipe Flows
- Pumps and Turbines
- Open Channel Hydraulics

You will be introduced to an exciting and innovative teaching and learning style in this course. A new topic will be introduced each week before the allocated lecture time in a new "***eLecture***" format (narrated PowerPoint shows). The new*eLecture* format allows you to work through the material at your own pace, whenever you like, and as often as you like. You are required to work through each week's *eLecture* material and answer a number of preliminary online questions related to the *eLecture* **before** you attend each week's lecture. Answers to the *eLecture* questions are graded and form part of your assessment.

Traditional lecture sessions will be replaced with "*workshops"* (2 hours/week) where you will participate in class activities and discussions around applying the theory you learnt in the *eLecture.* The *workshop* sessions will be used to further reinforce and expand the on the knowledge that you gained by working through the *eLecture* before the *workshop*. You will use your internet enabled device (iPhone, tablets, laptops, etc) to answer online *workshop* problems. You will do this using classroom response system (CRS) software, however, this will be explained in detail before semester starts. Your answers to the *workshop* questions will not be graded, however, they will provide you with immediate feedback on your general understanding of each week's topic. It is highly recommended that you attend and participate in all *workshops* (and answer all *eLecture*, *workshop* and *tutorial* questions). A 1-hour tutorial will directly follow the 2-hour workshop each week. You can use these tutorial sessions to ask for further clarification on any issues that you had with that week's material or to ask any other questions.

You will be required to answer a final set of online weekly tutorial questions after each week's workshop. You can use the tutorial session to work together on these weekly quiz questions if you like. However, attendance at the tutorials is not mandatory. The weekly *eLecture* and *tutorial* questions will be graded and will contribute to up to 30% of your final mark. Students must also complete 4 laboratory practicals and submit individual reports for each. The practicals are designed as hands-on demonstrations of some of the fundamental fluid mechanics concepts and theory learned in the course. The format of the 4 reports must follow the guidelines provided in the course.

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 On successful completion of this course, you should be able to...		GRADUATE QUALITIES Completing these tasks successfully will contribute to you becoming...
1	Explain, describe and apply hydraulic theory and how fluid properties are used to predict hydraulic behaviour in fluids and pipe systems	Knowledgeable
2	Explain and describe how fluid shear stresses resist forces such as gravity and momentum	Creative and critical thinker
3	Interpret experimental and test results and present these in an appropriate engineering report format	Creative and critical thinker
4	Collaborate with others in a team project environment to conduct engineering investigations and produce engineering reports	Engaged

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

(ENG102 or CIV1501 (USQ equivalent course)) and enrolled in Program SC383, SC384, SC410, SC411, SC425, SC430

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENV2103 (USQ equivalent course)

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

Basic Y12 maths knowledge is assumed.

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

Early assessment will initially be provided in this course by monitoring student responses to the online quiz questions from Week 1. The course coordinator will contact students that may be having difficulties to see whether extra assistance is required.

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	30%	Responses to weekly eLecture workshop and tutorial quiz questions (10 x 3%ea)	Throughout teaching period (refer to Format)	Online Test (Quiz)
All	2	Practical / Laboratory Skills	Individual	20%	Project output and associated report (max 250 words + appropriate diagrams)	Refer to Format	In Class
All	3	Examination - not Centrally Scheduled	Individual	50%	2 hrs	Refer to Format	In Class

All - Assessment Task 1: Answer weekly eLecture, workshop CRS and tutorial questions (10 x 3% = 30% Total)

GOAL:	Using classroom response systems (CRS) increases student engagement and improves student learning outcomes. Working through the content in the eLectures, participation in the weekly workshops using the CRS and answering weekly quizzes will reinforce your learning and provide you with immediate feedback on your understanding.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	This assessment task calls for both individual and groupwork participation. Weekly eLecture and tutorial quiz questions will be answered individually by all students outside of class and will be graded for assessment. Workshop questions will be answered both individually and in groups, in class, however, the workshop questions will not be graded as these questions provide an opportunity for formative self-assessment. Submit: weeks 1 to 13
CRITERIA:	

No.		Learning Outcome assessed
1	Correctness of your responses to the various weekly eLecture and tutorial questions	
2	Your individual responses to the questions are anonymous to other students and are only available to the lecturer	
3	Your answers to the quiz questions will demonstrate your understanding of the lecture materials and will identify areas for further study.	
4	Assessment criteria are mapped to the course learning outcomes.	1 2 3 4

GENERIC SKILLS:	

All - Assessment Task 2: Laboratory Practicals and Reports - (4 x 5% = 20% Total)

GOAL:	The four laboratory practicals and design projects are designed as hands-on activities that demonstrate the theory presented in the course material to help you to gain a deep understanding of the underlying fluid mechanics principles.
PRODUCT:	Practical / Laboratory Skills
AUTHORSHIP STATEMENT:	
FORMAT:	Submit: At next practical class (or 2 weeks later). (You MUST wear covered shoes in the laboratory - thongs etc are not allowed!)The four practicals (5% each) will be completed by small groups of students. However, the reports are to be submitted individually by all students. Reports should NOT be longer than 5 pages (see Report Writing Guidelines in Practical folder on Portal). Report writing is a very important skill for engineering graduates to have and producing these reports will help you hone these skills.
CRITERIA:	

No.		Learning Outcome assessed
1	Degree to which the report adheres to the specified structure;	
2	Completeness of all components of the report within specified word count	
3	Completeness and accuracy of data	
4	Depth of discussion and reflection on the project.	

GENERIC SKILLS:	

All - Assessment Task 3: Two Mini-exams - 2 hrs (2 x 25% = 50% of final grade)

GOAL:	The two mini-exams will allow you to demonstrate your understanding of the theory learnt during the course and your ability to use the theory to solve Fluid Mechanics problems
PRODUCT:	Examination - not Centrally Scheduled
AUTHORSHIP STATEMENT:	
FORMAT:	Submit: Week 6 and 13. The first mini-exam will take place in the Week 6 workshop session. This mini-exam will assess the content of lectures covered in Weeks 1-5. The second mini-exam will take place in the Week 13 workshop session. This mini-exam will assess the content of lectures covered in Weeks 6-12. You will be required to solve a number of typical Fluid Mechanics problems similar to those given in the eLectures, workshops and tutorial questions throughout the semester. Your exam solutions will be used to evaluate your understanding of the total course material. The duration of the two mini-exams will be 2 hours each (closed book, programmable calculators are NOT permitted to be used but a formula sheet will be provided).
CRITERIA:	**No.** / **Learning Outcome assessed** 1 Correct answers to the problems 2 Use of correct methodology 3 Demonstrated understanding through use of correct formulae 4 Inclusion of all workings showing a logical sequence to the problem solution
GENERIC SKILLS:	

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

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	n/a	0	Students are advised to refer to the many high quality Fluid Mechanics textbooks in the USC and other libraries when needing further clarification on included topics.	n/a	n/a

8.2. Specific requirements

Fully enclosed shoes must be worn in the engineering laboratory (i.e. no thongs or sandals). If you do not have the correct shoes you will not be allowed to do the practical. You must also undertake the laboratory induction before you can undertake any practical.

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

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