COURSE OUTLINE

ENG422 Design of Roads and Drainage

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

In this course you focus on more traditional civil engineering skills such as: how to interpret and use survey data; how to design roads and draft road plans; how to plan and calculate bulk earthworks; and how to design and construct pavements and road drainage systems. The course is very "hands-on" and you will learn many useful and interesting civil engineering skills that you will need in your career as a civil engineer.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Lecture	2hrs	Week 1	13 times
Tutorial/Workshop 1	2hrs	Week 1	13 times

1.3. Course Topics

- Introduction to Survey Field Practice
- Survey Drafting Techniques
- Road Survey and Set Out
- Designing Road Centrelines, Vertical and Horizontal Curve
- Bulk Earthwork Calculations (Cut & Fill)
- Designing Road Drainage Systems
- Drafting Roads and Drainage Systems
- Professional Drafting of Plans using AutoCA
- Road Drainage Design using DRAINS software

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 Completing these tasks successfully will contribute to you becoming...
1	Explain, describe and apply theory of surveying and road design	Knowledgeable
2	Apply practical knowledge and skills in the design of roads and drainage systems for sub-developments	Creative and critical thinker
3	Produce engineering designs and plans and conduct engineering investigations as a result of collaboration with others in a team project environment	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

Not applicable

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENV3104 (USQ equivalent course)

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

A good understanding of basic trigonometry is required in this course

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 feedback will be provided for this course by moderation of students’ progress with the weekly formative tutorial exercises. The course coordinator will offer added assistance to students in need.

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	0%	Answers to 2-5 Questions/Tasks per week - formative assessment only	Throughout teaching period (refer to Format)	In Class
All	2	Examination - not Centrally Scheduled	Individual	20%	2 hrs	Week 6	In Class
All	3	Report	Individual	40%	Undertake all necessary design calculations and supply all design drawings	Week 8	In Class
All	4	Report	Individual	40%	DRAINS and AutoCAD project files and Construction Drawings	Week 13	Online Submission

All - Assessment Task 1: Answers to Weekly Tutorial Questions and Tasks (0% - formative assessment only)

GOAL:	The goal of this self-directed formative assessment task is to prepare you with the skills and knowledge to successfully undertake assessment tasks 2-4.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	A number of tutorial questions and drawing tasks will be set each week (Weeks 1-8 only) from the material covered in the lectures and course notes. You should use the theory and practice introduced each week to solve each week's tutorial questions and complete the drawing tasks. This is a formative assessment task only (not compulsory), i.e., this means that it is intended to help you understand the material and give you feedback on how you are advancing. You are not required to submit the solutions to your tutorials for assessment. However, If you would like some feedback on your work, you are very welcome to do so.
CRITERIA:	**No.** / **Learning Outcome assessed** 1 — Computational Accuracy - Use of correct methodology and formulae (showing all working) Demonstrated technical drawing skills competency (correctness & neatness!) 2 — Assessment criteria are mapped to the course learning outcomes. — 1 2 3
GENERIC SKILLS:	

All - Assessment Task 2: Mid-semester exam (2hrs - 20% of final grade)

GOAL:	The mid-semester exam is designed to assess your understanding of the Course topics up until and including Week 6. You will need to do some simple calculations and drawings. Bring Drawing gear!
PRODUCT:	Examination - not Centrally Scheduled
AUTHORSHIP STATEMENT:	
FORMAT:	The duration of the mid-semester exam will be 2 hours. It will be held during the Week 6 Lecture time slot.You will be required to solve a number of typical geometric road survey questions similar to those given in the weekly tutorial questions to date. You will also be required to produce a drawing of a road.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 — • Computational Accuracy • Use of correct methodology and formulae (showing all working) • Demonstrated technical drawing skills competency (correctness & neatness!)
GENERIC SKILLS:	

All - Assessment Task 3: Design Project 1 - Rural Road Design (40% of final grade)

GOAL:	This self-directed learning design project will allow you to put the theoretical and practical knowledge you have learned into practice by designing a real two-lane rural roadway
PRODUCT:	Report
AUTHORSHIP STATEMENT:	
FORMAT:	Design Project 1 will involve the preliminary design of a new two-lane rural road through undulating terrain (design speed 60km/h). The roadway will consist of a number of straight sections that are joined by horizontal curves. You will need to undertake all necessary design calculations for the road and supply all necessary drawings. All design drawings for this project must be individually hand drawn. AutoCAD drawings will not be accepted for this project.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 — Accuracy of Roadway Design including bearings, distances and chainages 2 — Use of correct methodology and formulae (showing all working) 3 — Appropriateness of design grades and curves 4 — Accuracy of earthwork calculations and cross-sections 5 — Demonstrated technical drawing skills competency (correctness & neatness!)
GENERIC SKILLS:	

All - Assessment Task 4: Design Project 2 - DRAINS and AutoCAD Design (40% of final grade)

GOAL:	In this self-directed learning design project you will learn how to create professional engineering drawings using AutoCAD.You will also learn how to design an open-channel stormwater drainage system to drain a new housing sub-development.
PRODUCT:	Report
AUTHORSHIP STATEMENT:	
FORMAT:	This self-directed learning design project will familiarise you with how drafting plans are created in the design office. You will use AutoCAD to redraw some of the information from Design project 1 that you drew by hand. You will produce a number of drawings for this project including a PLAN (with Longitudinal Section) drawing; a CROSS Sections drawing; a Drainage Layout Plan (showing all drainage lines and pits); and Long Sections for each of your drainage lines. Part of Design Project 2 will also involve the design of a stormwater drainage system to successfully drain your new road during a 10% AEP storm using the DRAINS program.
CRITERIA:	**No.** — **Learning Outcome assessed** 1 — Appropriateness & Accuracy of Drainage Design 2 — Accuracy of Hydrological Model (all 10% AEP stormwater collected in pipes) 3 — Use of correct methodology and formulae 4 — Quality of AutoCAD construction drawings (design drawings professional?)
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

> There are no required/recommended resources for this course.

8.2. Specific requirements

You will need to purchase and bring the following equipment with you to class from Weeks 1-8:
Engineering Scale Rule (1:100, 1:200, 1:250, 1:500)
Simple 300 mm ruler
Protractor (full 360 degree, 15cm diameter)
Compass (cheap one from supermarket)
2 pencils, soft and hard (e.g. HB and 3H) and one 0.4 - 0.5mm tip black felt pen
Pencil sharpener
Eraser
Scientific Calculator with Degrees, Minutes and Seconds (Polar-Rectangular conversion) function

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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