COURSE OUTLINE

CIV600 Geotechnics and Geohydrology

School: School of Science, Technology and Engineering

2027 | Trimester 1

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.
Online	ONLINE	You can do this course without coming onto campus, unless your program has specified a mandatory onsite requirement.

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 provides you with an overview of concepts relating to groundwater resources, their percolation and migration and relationship to geotechnical behaviour. It will introduce you to key factors in functional design and construction of engineered soil barriers used to prevent leakage from water reservoirs and ponds or to isolate different types of waste.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous weekly learning material	1hr	Week 1	12 times
Seminar – Online	1hr	Week 1	3 times
Tutorial/Workshop 1 – On campus	2hrs	Week 1	10 times
Laboratory 1 – Mandatory on-campus intensive	10hrs	Break week	Once Only
ONLINE			
Learning materials – Asynchronous weekly learning material	1hr	Week 1	12 times
Seminar – Online	1hr	Week 1	3 times
Tutorial/Workshop 1 – Online	2hrs	Week 1	10 times
Laboratory 1 – Mandatory on-campus intensive	10hrs	Break week	Once Only

1.3. Course Topics

Topics may include:

- Principles of flow through porous media.
- Soil compaction.
- Groundwater flow and management.
- Contaminant transport.
- Compacted clay liners and geosynthetic bariers.
- Contaminated site investigation and assessment.
- Soil and groundwater remediation.
- Detailed soil behaviour.
- Geological mapping and geotechnic classification.
- Phase relationships, stress and strain, stress paths, shear failure and design of shallow foundations.
- Groundwater percolation and migration.

2. What level is this course?

600 Level (Specialised)

Demonstrating a specialised body of knowledge and set of skills for professional practice or further learning. Advanced application of knowledge and skills in unfamiliar contexts.

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 MAPPING Completing these tasks successfully will contribute to you becoming...	PROFESSIONAL STANDARD MAPPING * Engineers Australia Stage 1 Professional Engineer Competency Standards
1 Investigate and synthesise information and concepts in the selection of landfill liner construction materials and methods to synthesise solutions for various applications.	Creative and critical thinker	2, 2.1.a, 2.1.d, 2.1
2 Critically examine and apply expert judgement when assessing and establishing the design philosophy to be adopted for storm water drainage systems, flood mitigation problems and water resources systems.	Creative and critical thinker	2, 2.1.a, 2.1
3 Propose and plan a site investigation for a small to medium scale geotechnical engineering project.	Empowered	2, 2.4.d, 2.4
4 Design and analyse major components of stormwater systems, focusing on traditional detention basin design, but with alternative contemporary solutions stemming from integrated water cycle management (such as grass swales and wetlands).	Empowered Sustainability-focussed	2, 2.3.a, 2.3
5 Communicate technical results from independent analyses and design of various geotechnical engineering systems and the site investigation in a professional technical report to technical and non-technical audiences	Engaged	3, 3.2.a, 3.2.b, 3.2
6 Demonstrate advanced technical knowledge of soil behavior and geological mapping to classify geotechnical properties for functional design and construction.	Knowledgeable	1, 1.3.a, 1.3

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER 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 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.
2.1.d	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Investigates complex problems using research-based knowledge and research methods.

CODE	COMPETENCY
2.4.d	Engineering Application Ability - Application of systematic approaches to the conduct and management of engineering projects: Proficiently applies basic systems engineering and/or project management tools and processes to the planning and execution of project work, targeting the delivery of a significant outcome to a professional standard.
2.3.a	Engineering Application Ability - Application of systematic engineering synthesis and design processes: Proficiently applies technical knowledge and open ended problem solving skills as well as appropriate tools and resources to design components, elements, systems, plant, facilities and/or processes to satisfy user requirements.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
2.3	Engineering Application Ability: Application of systematic engineering synthesis and design processes.
2.4	Engineering Application Ability: Application of systematic approaches to the conduct and management of engineering projects.
3	Elements of competency: Professional and Personal Attributes
3.2.a	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Is proficient in listening, speaking, reading and writing English.
3.2.b	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Prepares high quality engineering documents such as progress and project reports, reports of investigations and feasibility studies, proposals, specifications, design records, drawings, technical descriptions and presentations pertinent to the engineering discipline.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.

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

Enrolled in GC002, GD002 or MC002 or MC010

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

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	Report	Group	45%	3500 words	Week 7	Online Assignment Submission with plagiarism check
All	2	Oral	Group	30%	15 minutes	Week 10	Online Assignment Submission with plagiarism check
All	3	Report	Group	25%	1750 words	Exam Period	Online Assignment Submission with plagiarism check

All - Assessment Task 1: Report

GOAL:	Develop a solution to the selected engineering problem.
PRODUCT:	Report
FORMAT:	Intermediate team based development of a solution to the selected engineering problem. This will be presented as a draft report mid way through the study period.
CRITERIA:	

No.		Learning Outcome assessed
1	Investigation and synthesis of information and concepts in the selection of landfill liner construction materials and methods to synthesise solutions for various applications.	1
2	Critical examination and application of expert judgement when assessing and establishing the design philosophy to be adopted for storm water drainage systems, flood mitigation problems and water resources systems.	2
3	Proposal and planning of a site investigation for a small to medium scale geotechnical engineering project.	3
4	Design and analysis of major components of stormwater systems, focusing on traditional detention basin design, but with alternative contemporary solutions stemming from integrated water cycle management (such as grass swales and wetlands).	4

GENERIC SKILLS:	Communication, Collaboration, Problem solving, Information literacy

All - Assessment Task 2: Presentation

GOAL:	Final solution for the group project
PRODUCT:	Oral
FORMAT:	Final solution for the group project
CRITERIA:	

No.		Learning Outcome assessed
1	Investigation and synthesis of information and concepts in the selection of landfill liner construction materials and methods to synthesise solutions for various applications.	1
2	Critical examination and application of expert judgement when assessing and establishing the design philosophy to be adopted for storm water drainage systems, flood mitigation problems and water resources systems.	2
3	Proposal and planning of a site investigation for a small to medium scale geotechnical engineering project.	3
4	Design and analysis of major components of stormwater systems, focusing on traditional detention basin design, but with alternative contemporary solutions stemming from integrated water cycle management (such as grass swales and wetlands).	4
5	Demonstration of advanced technical knowledge of soil behavior and geological mapping to classify geotechnical properties for functional design and construction.	6

GENERIC SKILLS:	Communication, Collaboration, Organisation

All - Assessment Task 3: Report

GOAL:	Group report demonstrating the appropriateness of the solution.
PRODUCT:	Report
FORMAT:	Group report demonstrating the appropriateness of the solution.
CRITERIA:	

No.		Learning Outcome assessed
1	Investigation and synthesis of information and concepts in the selection of landfill liner construction materials and methods to synthesise solutions for various applications.	1
2	Critical examination and application of expert judgement when assessing and establishing the design philosophy to be adopted for storm water drainage systems, flood mitigation problems and water resources systems.	2
3	Proposal and planning of a site investigation for a small to medium scale geotechnical engineering project.	3
4	Design and analysis of major components of stormwater systems, focusing on traditional detention basin design, but with alternative contemporary solutions stemming from integrated water cycle management (such as grass swales and wetlands).	4
5	Production of a technical report to an acceptable professional standard reporting results from independent analyses and design of various geotechnical engineering systems and the site investigation to effectively communicate the outcomes to technical	5
6	Demonstration of advanced technical knowledge of soil behavior and geological mapping to classify geotechnical properties for functional design and construction.	6

GENERIC SKILLS:	Communication, Collaboration, Problem solving, Applying technologies

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?

Risk assessments have been performed for all field activities and a low level of health and safety risk exists. Some risks concerns may include working in an unknown environment as well as slip and trip hazards. 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