

Course Outline (Higher Education)

School:	School of Science, Engineering and Information Technology
Course Title:	ENVIRONMENTAL GEOTECHNICS
Course ID:	ENGIN5204
Credit Points:	15.00
Prerequisite(s):	ENGIN2204
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED Code:	031199

Description of the Course :

Overview of concepts relating to groundwater resources and seepage, with emphasis on seepage containment in reservoirs, ponds, soil pollution and its avoidance, focusing on soil behaviour and its effect on seepage, groundwater percolation and migration of contaminant in the nearfield of waste containment facilities. Focus will also be on the function, design and construction of engineered soil barriers to prevent leakage from water reservoirs, ponds or to isolate different types of waste.

Grade Scheme: Graded (HD, D, C, etc.)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks..

Program Level:

AQF Level of Program						
	5	6	7	8	9	10
Level						
Introductory	■	■	■	■	■	■
Intermediate	■	■	■	■	✓	■
Advanced	■	■	■	■	■	■

Learning Outcomes:

To develop an understanding of the principles of environmental geoengineering and groundwater and their application to the analysis and design of surface impoundments and leachate ponds and to the design and

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construction of engineering soil barriers for controlling seepage and for water and waste isolation

Knowledge:

- K1.** Review the flow through porous media and related phenomena in geo-infrastructures.
- K2.** Appraise land and groundwater pollution and formulate remediation techniques.
- K3.** Differentiate between modes of underground contaminant transport.
- K4.** Appraise and review modern approaches to landfill, including environmental considerations and current trends in research and development.

Skills:

- S1.** Analyse 1D and 2D seepage flow and their effects.
- S2.** Interpret test data from groundwater circulation problems and evaluate aquifer properties.
- S3.** Critique land contamination levels and formulate solutions.

Application of knowledge and skills:

- A1.** Apply the knowledge, technical and analytical skills to independently analyse and design various environmental geotechnic systems and communicate the achieved outcome.
- A2.** Apply advanced technical knowledge and skills in research based problem solving exercises in environmental geotechnics.

Course Content:

- Principles of flow through porous media
- Seepage flow
- Soil compaction
- Groundwater flow
- Groundwater management
- Contaminant transport
- Compacted clay liners and geosynthetic barriers
- Contaminated site investigation and assessment
- Soil remediation
- Groundwater remediation

Values:

- V1.** Recognise the importance of sound understanding of fundamental principles in order to apply theory appropriately in practice.
- V2.** Recognise the important environmental issues associated with geotechnical engineering practices and the need for ongoing research to ensure a sustainable approach to future waste disposal.

Graduate Attributes:

FedUni graduate attributes statement. To have graduates with knowledge, skills and competence that enable them to stand out as critical, creative and enquiring learners who are capable, flexible and work ready, and responsible, ethical and engaged citizens.

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Attribute	Brief Description	Focus
Knowledge, skills and competence	The course will motivate students to appreciate the importance of life-long learning to expand their knowledge and expertise.	Medium
Critical, creative and enquiring learners	Students will rely on their abilities for the major part of this course in terms of acquiring and sorting out information needed for the assessment tasks.	Medium
Capable, flexible and work ready	Laws and regulations relevant to waste management and landfill construction will be discussed and reflected upon in this course.	Medium
Responsible, ethical and engaged citizens	The course will reflect on social responsibilities of civil engineers in terms making sure proposed development do not put existing resources and communities at risk.	Medium

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1 - K3, S1, S2, A1, A2	Carry out an assessments on flow through porous media, groundwater flow, contaminant transport and soil remediation	Coursework -Numerical problems / essay	30% - 40%
K1, K4, S1, A1, A2	Carry out laboratory experiment on hydraulic conductivity and compaction	Coursework - Essay + Numerical problems	10% - 20%
K1 - K4, S1 - S3	Invigilated examination (3 hours) :Students are required to achieve at least 45% in the total continuous assessment component (assignments, tests, mid-semester exams, laboratory reports) and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.	Examination (3 hours)	45% - 55%

Adopted Reference Style:

Other (IEEE)