

Module Title:	Geotechnical Engineering I	
Language of Instruction:	English	
Credits:	10	
NFQ Level:	7	
Module Delivered In	1 programme(s)	
Teaching & Learning Strategies:	Projects Practicals Continuous assessments Terminal exam Private study	
Module Aim:	The aims of the module are: (1) to provide the graduate with appropriate technical skills in analysis, design and construction work in the geotechnical area; (2) to work effectively as an individual and in teams. (3) to provide the graduate with the opportunity to progress to honours degree level in civil engineering.	
Learning Outcomes		
On successful completion of this module the learner should be able to:		
LO1	Provide certain parameters related to soil behaviour to a structural or civil engineer for design purposes including the health and safety implications of design	
LO2	Analyse and evaluate stresses in soil in selected areas;	
LO3	Analyse the stability of simple slopes/excavations, earth retaining structures, shallow foundations including the responsibilities and roles of relevant parties	
LO4	Have an understanding of Eurocode 7 and its application	
Pre-requisite learning		
Module Recommendations		
This is prior learning (or a practical skill) that is recommended before enrolment in this module.		
6566	ENGR H3503	Geotechnical Engineering I
Incompatible Modules		
These are modules which have learning outcomes that are too similar to the learning outcomes of this module.		
No incompatible modules listed		
Co-requisite Modules		
No Co-requisite modules listed		
Requirements		
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.		
No requirements listed		

Module Content & Assessment

Indicative Content
(1) Stresses in a Soil Mass (10 hours) (a) Stresses due to overburden (b) Stresses due to applied loads, rectangular and circular
(2) Geology (30 hours) (a) Rock forming minerals and crystallography (b) Elementary petrology (c) Stratigraphy and palaeontology (d) Earth building forces (e) Weathering and landscape change (f) Erosion and deposition
(3) Settlement (18 hours) (a) Immediate settlement based on elastic theory (b) Consolidation settlement (c) One dimensional consolidation test
(4) Shear Strength (25 hours) (a) Review of Coulomb theory and undrained shear test (b) Consolidated undrained triaxial test with porewater pressure measurement
(5) Foundations (20 hours) (a) Ultimate & serviceability limit state design (b) Introduction to piles and piling (c) Ultimate & serviceability limit state design of shallow foundations (d) Understanding the difference between undrained and drained analysis
(6) Retaining Walls (20 hours) (a) Types of retaining walls (b) Wall types – permanent vs. temporary, gravity, cantilever, basement, buttress/counterfort walls, propped, anchored (c) Selection criteria for retaining wall types (d) Retaining wall construction/installation (e) Drainage of walls (f) Modes of Failure (g) Lateral earth pressures and forces (i) Stability–overturning, sliding (h) Application of software packages
(7) Health and safety and risk associated with geotechnical design (10 hours) (a) Health and safety in geotechnical investigation, design and construction. (b) Risk assessment of geotechnical investigation. (c) Responsibilities of duty holders (d) Safety file (e) Health and Safety Plan
(8) Stability of Slopes(12 hours) (a) Stability of cuttings and embankments (b) Application of software packages
(9) Ground Improvement (5 hours) (a) Compaction (b) Chemical stabilization and grouting (c) Geotextiles and geomembranes

Assessment Breakdown	%
Continuous Assessment	10.00%
Project	15.00%
Practical	15.00%
End of Module Formal Examination	60.00%

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	n/a	2,3,4	10.00	n/a

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Analysis and design projects	1,2,3	15.00	n/a

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Written Lab Report	1,2,3	15.00	n/a

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	No Description	1,2,3,4	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Contact Hours	30 Weeks per Stage	5.00
Estimated Learner Hours	30 Weeks per Stage	5.00
Total Hours		300.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering - Ab Initio	3	Mandatory