

Module Details	
Module Title:	Advanced Geotechnics
Module Code:	CSE7009-B
Academic Year:	2019-20
Credit Rating:	20
School:	Department of Civil and Structural Engineering
Subject Area:	Civil and Structural Engineering
FHEQ Level:	FHEQ Level 7 (Masters)
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	Hours
Lectures	36
Seminar	6
Tutorials	6
Directed Study	152

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 1 (Sep - Jan)

Module Aims
To extend the application of the fundamental concepts and principles of soil behaviour introduced in Soil Mechanics and Geotechnical and Civil Engineering Design modules, with particular emphasis on analysis and design of dewatering schemes, soil improvement techniques and temporary ground support systems. To develop solutions to advanced geotechnical engineering problems by a process of analysis and validation using specialist software where appropriate.

Outline Syllabus

Soil modelling approaches. Groundwater flow: design of wells in confined and unconfined aquifers under steady and unsteady state flow, methods, control and design of dewatering systems. Groundwater flow through heterogeneous and anisotropic soils. Ground support techniques during temporary works, design of sheet piling walls and working platforms. Analysis of soil improvement techniques including grouting, vertical drains, dynamic compaction, vibro-compaction and vibro-replacement. Design and construction of soil reinforcement: Bearing capacity of reinforced earth, Reinforced earth walls and slopes.

Learning Outcomes

1	Critically evaluate soil behaviour in the analysis and design of advanced geotechnical problems.
2	Apply geotechnical quantitative methods to analyse and design earthworks
3	Use where appropriate software to solve and design ground support problems
4	Use fundamental soil parameters in design and analysis of ground water flow, soil improvement, reinforced slopes and soils.
5	Demonstrate systematic application of scientific methods for creative problem solving in the geotechnical context.
6	Interpret data from a variety of sources and present a technical solution to problems.

Learning, Teaching and Assessment Strategy

The essential concepts and principles are introduced and developed in the formal lectures. Tutorial sessions provide the basis for further in-depth discussion, application, critical analysis and design.

The formal lectures include several worked examples in which students apply the theory and receive formative feedback. Deeper understanding is then acquired during tutorial classes in which students practice the application of concepts and theories to solve systematically advanced geotechnical design problems.

Oral feedback is given during the seminar sessions to assist and guide students to effectively address the geotechnical coursework challenge.

Directed time is for students to consolidate and enhance their learning through further reading and practice of a range of practical problems from the recommended reading list.

Assessment is based on a formal exam and team-based course work which takes the form of report. The formal examination will assess all the learning outcomes expressed in the descriptor. The technical report will assess the application of practical skills and broadening of knowledge relevant to the selected geotechnical engineering problem as stated by Learning Outcomes 5 and 6

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Examination - closed book	Examination - closed book	3 hours	70%
Referral	Examination - closed book	Supplementary examination		100%

Summative	Coursework	Technical report		30%
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Reading List

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>.

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.