

ES3G1-15 Geotechnical Engineering I

21/22

Department

School of Engineering

Level

Undergraduate Level 3

Module leader

Mohammad Rezania

Credit value

15

Module duration

24 weeks

Assessment

50% coursework, 50% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

ES3G1-15 - Geotechnical Engineering I

[Module web page](#)

Module aims

All Civil Engineers require a sound understanding of geotechnical engineering. This module gives a basic geological and geotechnical knowledge base and introduces a number of fundamental principles and key applications appropriate to the level of the module and the framework of the course.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Soil & rock description and classification

Geological structures and maps

Introduction on origin and types of soil

Soil as a 3-phase material (phase relationships)

Basic water in the soil and permeability
Basic soil mechanics
Shear stress and strength of soils
Frictional model
Principle of Effective Stress
Soil compressibility and compaction

Learning outcomes

By the end of the module, students should be able to:

- Identify the importance and role of geotechnical engineering within the Civil Engineering profession.
- Construct and interpret geological maps, extending their skills of graphical and spatial interpretation.
- Compare a range of soil and rock types, adopting professionally recognised systems for categorisation and description.
- Apply soil shear strength concept in determination of its behaviour and predict soil response under different loading condition.
- Apply the Principle of Effective Stress to a range of typical geotechnical problems in order to predict the ground response under different conditions of loading, soil type and groundwater states.
- Analyse problems of soil compaction and apply laboratory compaction results to predict the level of ground compaction at field.
- Communicate in a professional and scientific manner.

Indicative reading list

Recommended

- Barnes, GE. 2010. Soil Mechanics: Principles and Practice. 3rd edition, Macmillan.
- Knappett, JA and Craig, RF. 2012. Craig's soil mechanics. 8th edition, Spon Press.
- Smith I. 2014. Smith's Elements of Soil Mechanics. 9th edition, Wiley.

Additional

- Das, BM and Sobhan, K. 2013. Principles of geotechnical engineering. 8th edition, CL Press.
- Murthy VNS. 2002. Geotechnical Engineering: Principles and Practices of Soil Mechanics and Foundation Engineering. CRC Press.
- Azizi, F. 1999. Applied Analyses in Geotechnics. CRC Press.
- Muir Wood, D. Soil Mechanics: A One-Dimensional Introduction, 1st edition, Cambridge University Press, 2009.

[View reading list on Talis Aspire](#)

Subject specific skills

Lectures, example classes, laboratory sessions, geological maps, fieldwork.

Transferable skills

No transferable skills defined for this module.

Study

Study time

Type	Required
Lectures	18 sessions of 1 hour (12%)
Practical classes	5 sessions of 1 hour (3%)
Fieldwork	8 sessions of 1 hour (5%)
Other activity	7 hours (5%)
Private study	112 hours (75%)
Total	150 hours

Private study description

106 hours of guided independent learning (including VLE use and support from Employer)

Other activity description

5 hours of examples classes
2 hours of revision classes

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group C1

	Weighting	Study time
Coursework	50%	
Coursework (specification and outline design of geotechnical project), 10 pages length (plus tables and figures) so that we do not exhaust the students in this submission.		
Online Examination	50%	

Weighting

Study time

~Platforms - AEP,QMP

- Online examination: No Answerbook required
- Students may use a calculator
- Engineering Data Book 8th Edition
- Graph paper

Feedback on assessment

Coursework: individual feedback returned.
Feedback in class during example classes.
Model solutions to questions for exam preparation.
Cohort level feedback on examination.

[Past exam papers for ES3G1](#)

Availability

Pre-requisites

1 (core module)

Post-requisite modules

If you pass this module, you can take:

- ES3G4-15 Geotechnical Engineering II

Courses

This module is Core for:

- Year 3 of DESA-H221 Undergraduate Civil and Infrastructure Engineering (Non-integrated Degree Apprenticeship)