Liverpool John Moores University

Title:	GEOTECHNICS AND FOUNDATION ENGINEERING
Status:	Definitive
Code:	**5250BEUG** (125660)
Version Start Date:	01-08-2020
Owning School/Faculty:	Civil Engineering and Built Environment
Teaching School/Faculty:	Civil Engineering and Built Environment

Team	Leader
Raj Shah	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	57
Total Learning Hours:	200	**Private Study:**	143		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	33
Practical	11
Tutorial	11

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS2	Examination - Open Book	50	2
Report	AS1	Technical Report	50	

Aims

To study the physical and mechanical properties of engineering soils and their application in design and construction of shallow and deep foundations.
To study the effects of standing and flowing groundwater on the deformation and failure of engineering earth structures and other forms of construction particularly in retaining walls and shallow foundations.

Learning Outcomes

After completing the module the student should be able to:

1	Identify the various prerequisites involved in ground and site investigations.
2	Describe the common rock and soil types, their mode of formation, geographical and geological distribution.
3	Evaluate the significance of water in soils, its movement and effects upon soil properties and strength paraemeters
4	Identify and explain the theory involved in assessing the stability of slopes, foundations and earth retaining structures and the effective stress in foundation design and construction.
5	Analyse the stability and displacements for long-term loading of earth structures, earth retaining walls and shallow foundations.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAMINATION - OPEN BOOK	1	2	3	4	5
REPORT	1	2	3	4	5

Outline Syllabus

Site investigation: purpose and benefits; types of site; ground investigation techniques; sampling methods; in-situ testing; the use of geophysical prospecting methods; safety and supervision; site investigation reports.
Engineering classification of soils: index properties, particle size distribution, soil properties and phase relationships.
Earth-fill: compaction theory, standard laboratory testing and field compaction techniques.
Shear strength of soils: shear strength theory, laboratory testing and in-situ determination of shear strength parameters.
Ground water: Held water, equilibrium water content, soil suction, phreatic surface, permeability, seepage and flow nets, pore-water pressure, and stability and seepage forces.
Principles of Effective Stress: Compressibility and consolidation; influence of conditions on failure, stress paths, stress history and its effects.
Retaining walls: Long-term lateral pressures from soil and groundwater; stability and modes of failure; Coulomb wedge method.
Embankments and Cuttings: short and long term stability of earth structures in submerged and partially drained conditions, instrumentation and long-term changes.
Shallow Foundations: Pressure distribution; consolidation of soil layers; long-term and time-dependent settlement; effect of standing water on application of bearing capacity equations; pile design.

Learning Activities

Lectures, tutorials, practicals. Industrial case studies and data will be used.

Notes

The module provides an introduction through practical work in the laboratory to the composition, deposition and behaviour of engineering soil. This module highlights and investigates the important influence of water on ground behaviour for the stability of civil engineering structures in addition to their applications in analysis, design and construction over short and long-term conditions.