Liverpool John Moores University

Title: SOIL MECHANICS
Status: Definitive
Code: **5018BEHN** (102325)
Version Start Date: 01-08-2016

Owning School/Faculty: Civil Engineering
Teaching School/Faculty: Civil Engineering

Team	Leader
William Atherton	Y
Gary Lamb	

Academic Level:	FHEQ5	**Credit Value:**	12	**Total Delivered Hours:**	58
Total Learning Hours:	120	**Private Study:**	62		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	24
Off Site	8
Practical	12
Tutorial	12

Grading Basis: BTEC

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	unseen	70	2
Test	AS2	assignment	15	
Test	AS3		15	

Aims

Identify the principles involved in assessing the stability of slopes.
Analyze the effects of lateral earth pressure.
Identify the principles involved in stress analysis

Identify the principles involved in the design of foundations and earth retaining structures.
Identify the effects of seepage and compressibility on soil and structures.

Learning Outcomes

After completing the module the student should be able to:

1   Identify various techniques and apply them to solving problems associated with slope stability.
2   Describe the effects of lateral earth pressure and apply this knowledge in the design of earth retaining structures.
3   Identify the effect of imposing loads on soil and the methods of analyzing the stress increases due to such loads.
4   Apply these principles in conjunction with their knowledge of soil properties to solve geotechnical problems.
5   Identify various techniques for ground improvement and consolidation.
6   Identify the effects of ground water and seepage on geotechnical design.

Learning Outcomes of Assessments

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

EXAM   1   2   3   4

TEST 1   6

TEST 2   5

Outline Syllabus

Stability of Slopes Above The Water Table: Circular rotational failure in purely cohesive soils. Translational failure modes in purely frictional soils. The analysis of slopes in frictional/cohesive materials using the method of slices.
Earth Pressure and Earth Retaining Structures: Principles of active and passive earth pressure. Earth pressure at rest. Derivation of Rankine's and Bell's equations. Coulomb Wedge theory. Stability analysis of simple gravity and embedded earth retaining structures.
Stress analysis: The distribution of vertical pressure in a soil mass from surface loading in homogeneous isotropic material. Boussinesq theory, pressure bulb concept, Fadum's method and Newmark chart.
Stability of shallow foundations: Types of foundation and modes of failure. The use of design formulae and charts including, Terzaghi, Hansen, Skempton and bearing capacity factors. Methods of determining bearing capacity from in-situ tests. Introduction to seepage.
Determination of the compressibility of soil

Learning Activities

Lectures, tutorials and laboratory sessions.

Notes

The module is intended to develop the skills and knowledge required to assess and analyze test results to an appropriate level, the engineering characteristics and use of rock and soils.   Students must have access to appropriate laboratory resources including examples of the common types of rock and soil. Students require access to current Codes of Practice and computer facilities for the analysis of test data.