

### Summary Information

<b>Module Code</b>	5303CIV
<b>Formal Module Title</b>	Geotechnics II
<b>Owning School</b>	Civil Engineering and Built Environment
<b>Career</b>	Undergraduate
<b>Credits</b>	10
<b>Academic level</b>	FHEQ Level 5
<b>Grading Schema</b>	40

### Module Contacts

#### Module Leader

Contact Name	Applies to all offerings	Offerings
Georgios Nikitas	Yes	N/A

#### Module Team Member

Contact Name	Applies to all offerings	Offerings
Maria Ferentinou	Yes	N/A

#### Partner Module Team

Contact Name	Applies to all offerings	Offerings
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### Teaching Responsibility

<b>LJMU Schools involved in Delivery</b>
Civil Engineering and Built Environment

### Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	4
Tutorial	11

### Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-CTY	CTY	January	12 Weeks

### Aims and Outcomes

<b>Aims</b>	To gain an advanced understanding of soil behaviour in shear, consolidation, induced and to apply this to the design of earth structures.
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### Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Identify and analyse geotechnical failure mechanisms.
MLO2	Evaluate the significance of water in soils, its movement and effects upon soil properties and strength parameters under drained or undrained conditions.
MLO3	Proficiently assess the stability earth retaining structures under effective stress conditions.

### Module Content

Outline Syllabus
<p>Consolidation: determination of pre-consolidation pressure stress. Calculation of coefficient of compressibility <math>C_c</math> and <math>m_v</math> over a given stress interval. Interpretation of experimental data, and determination of time factor. Calculation of one-dimensional settlement of foundations on clay. Design of vertical drains and the effect of the time of construction. Soil behaviour in shear: Stress Element analysis, an introduction to continuum mechanics, soil as a frictional material, the Mohr-Coulomb model, Mohr – Coulomb failure criterion, effect of drainage conditions on shear strength, laboratory shear tests, the direct shear test, the triaxial test, types of triaxial test, unconfined compressive test, undrained strength. Induced stresses: due to shallow foundations, bearing capacity and limit analysis. Ultimate limit state design using EC7. Retaining structures: limiting lateral earth pressures, Rankine's theory of earth pressure, earth pressure at rest, gravity retaining structures, resultant thrust, Coulomb's theory of earth pressure, reinforced soil.</p>

### Module Overview

### **Additional Information**

The module develops knowledge and understanding of geotechnics, particularly with regard to long term conditions and the important influence of water on ground behaviour for civil engineering applications in analysis, design and construction. The module makes extensive use of mathematics and engineering principles, this is supported by lectures, case studies, tutorials and analytical exercises.

### **Assessments**

<b>Assignment Category</b>	<b>Assessment Name</b>	<b>Weight</b>	<b>Exam/Test Length (hours)</b>	<b>Learning Outcome Mapping</b>
Centralised Exam	Examination	100	1.5	MLO3, MLO2, MLO1