

**Summary Information**

<b>Module Code</b>	7303CIV
<b>Formal Module Title</b>	Structural and Earthquake Engineering
<b>Owning School</b>	Civil Engineering and Built Environment
<b>Career</b>	Postgraduate Taught
<b>Credits</b>	20
<b>Academic level</b>	FHEQ Level 7
<b>Grading Schema</b>	50

**Module Contacts****Module Leader**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
Georgios Kamaris	Yes	N/A

**Module Team Member**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
Yaser Jemaa	Yes	N/A

**Partner Module Team**

<b>Contact Name</b>	<b>Applies to all offerings</b>	<b>Offerings</b>
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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	3
Tutorial	11
Workshop	11

### Module Offering(s)

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

### Aims and Outcomes

<b>Aims</b>	The aim of this module is to introduce students to the design of structures under dynamic loading conditions. Students will gain an understanding of earthquake generation and the quantification of earthquake effects. Students will gain a knowledge of the behaviour of materials, structural elements and composite structures under earthquake loading.
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### Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Evaluate the dynamic response of structures using common analytical techniques and apply classical analytical methods to solve the dynamic response of simple structures.
MLO2	Assess seismic hazard, characterise earthquake actions, and hence estimate earthquake loads and seismic risk to structures.
MLO3	Design structural elements to Eurocode 8.
MLO4	Critically evaluate structures and their response to dynamic loading.
MLO5	Select materials and structural forms from an understanding of sustainability and the behaviour of building materials, structural elements and global structures under cyclic (earthquake) loading.

## Module Content

### Outline Syllabus

Introduction: types and sources of dynamic loads, structural vibration and consequences, the excitation of structures by time varying loads; basic seismology, earthquake measurement and recurrence rates, ground motions, risk and hazard Single degree of freedom (SDOF) systems: motion, natural frequency, undamped/damped free vibration, excitation response, numerical analysis, Duhammel integral. Multi-degree of freedom (MDOF) systems: property matrices, eigenvalues, mode shapes, mode superposition; Foundations and isolation methods. Case studies: failure under earthquake conditions, earthquake ground motion; Eurocode 1998 (EC8): Design of structures for earthquake resistance.

### Module Overview

#### Additional Information

This module provides an understanding of dynamic structural design and earthquake engineering.

### Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Centralised Exam	Examination	70	3	MLO2, MLO5, MLO1, MLO3, MLO4
Report	Report	30	0	MLO4