

## Module Information

2022.01, Approved

### Summary Information

Module Code	7326BEPG
Formal Module Title	Structural and Earthquake Engineering
Owning School	Civil Engineering and Built Environment
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

### Teaching Responsibility

LJMU Schools involved in Delivery
Civil Engineering and Built Environment

### Learning Methods

Learning Method Type	Hours
Lecture	24
Practical	3
Tutorial	11
Workshop	10

### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

### Aims and Outcomes

Aims	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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**After completing the module the student should be able to:**

### Learning Outcomes

Code	Number	Description
MLO1	1	Evaluate the dynamic response of structures using common analytical techniques and apply classical analytical methods to solve the dynamic response of simple structures
MLO2	2	Assess seismic hazard, characterise earthquake actions, and hence estimate earthquake loads and seismic risk to structures
MLO3	3	Design structural elements to Eurocode 8
MLO4	4	Critically evaluate structures and their response to dynamic loading
MLO5	5	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 Continuous systems: longitudinal/transverse vibration; Case studies: failure under earthquake conditions, earthquake ground motion; Eurocode 1998 (EC8): Design of structures for earthquake resistance.
Module Overview	This module introduces you to the design of structures under dynamic loading conditions. You will gain an understanding of:  earthquake generation and the quantification of earthquake effects  the behaviour of materials, structural elements and composite structures under earthquake loading  dynamic structural design and earthquake engineering.
Additional Information	This module provides an understanding of dynamic structural design and earthquake engineering

### Assessments

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

Essay	Report	30	0	MLO4
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## Module Contacts

### Module Leader

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

### Partner Module Team

Contact Name	Applies to all offerings	Offerings
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