

Module Information

2022.01, Approved

Summary Information

Module Code	7507PGSL
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
LJMU Partner Taught

Partner Teaching Institution

Institution Name
International College of Business and Technology

Learning Methods

Learning Method Type	Hours
Lecture	24
Practical	3
Tutorial	12
Workshop	12

Module Offering(s)

Display Name	Location	Start Month	Duration Number	Duration Unit
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JAN-PAR	PAR	January	12 Weeks
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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 and Duhamel integral. Multi-degree of freedom (MDOF) systems: property matrices, eigenvalues, mode shapes and mode superposition. Foundations and isolation methods. Continuous systems: longitudinal/transverse vibration. Case studies: failure under earthquake conditions and 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)	Module Learning Outcome Mapping
Exam	Examination	70	2	MLO1, MLO2, MLO3, MLO4, MLO5
Report	Investigative report	30	0	MLO4

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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