

### Summary Information

Module Code	7112MECH
Formal Module Title	Structural Dynamics
Owning School	Engineering
Career	Postgraduate Taught
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

### Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

### Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	3
Tutorial	22

### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

### Aims and Outcomes

Aims	The module is aimed at extending students' knowledge of dynamics and applied finite element method to an advanced level. The module is intended to be practical in nature providing students with the skills to analyse and solve engineering dynamics problems by means of computational and analytical methods.
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**After completing the module the student should be able to:**

### Learning Outcomes

Code	Number	Description
MLO1	1	Set up and validate efficient and accurate FE models of a range of engineering components under dynamic loading
MLO2	2	Critically evaluate the output from linear dynamic FE analysis and the influence of different dynamic or geometric parameters upon the accuracy of the result
MLO3	3	Critically evaluate and analyse the FE dynamics outputs and appreciate different methods of presentation
MLO4	4	Appreciate the basic theory that underpins linear aspects of dynamics and its relevance on the solution method selection

### Module Content

Outline Syllabus	Practical aspects of FE Analysis. Element and solution method selection. General aspects of linear dynamics. Boundary value and initial value problems. Normal mode analysis. Properties of normal modes of undamped systems. Natural frequencies and modes. Presentation and analysis of the results. Basic cross-validation methods and FE updating. Frequency response function in dynamic response estimation. Basic theory related to direct frequency response analysis. Basic theory related to modal superposition and normal modes response analysis. Structural and modal damping. Direct integration and modal-based analysis.
Module Overview	The module is aimed at extending your knowledge of dynamics and applied finite element method to an advanced level.
Additional Information	The module extends previous studies in engineering analysis and will provide students with a deep understanding of the application of linear dynamics FE analysis in engineering.

### Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Test	VLE test	40	0	MLO1, MLO2, MLO4
Report	FEA Project	60	0	MLO1, MLO3

### Module Contacts

#### Module Leader

Contact Name	Applies to all offerings	Offerings
Dan Stancioiu	Yes	N/A

**Partner Module Team**

Contact Name	Applies to all offerings	Offerings
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