

Summary Information

Module Code	7312MECH
Formal Module Title	Structural Dynamics
Owning School	Engineering
Career	Undergraduate
Credits	10
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	11

Module Offering(s)

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

Aims and Outcomes

Aims	The module is aimed at extending students' knowledge of dynamics and applied finite element methods to an advanced level that will allow them to improve mechanical structures performance and design. 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	Use computer aided methods to setup efficient and accurate numerical (FE) models of a range of engineering components and systems under dynamic loading.
MLO2	2	Critically evaluate the response of linear dynamics analysis and the influence of different dynamic or geometric parameters for improved dynamic performance and a better use of materials.
MLO3	3	Apply knowledge of the basic theory that underpins linear dynamic and modal analysis to structures under dynamic loading conditions.
MLO4	4	Use computer aided methods and time and frequency response to validate numerical models against experimentally measured data.

Module Content

Outline Syllabus	General aspects of linear dynamic theory. Normal mode analysis and frequency extraction. Orthogonality of the modes and modal space dynamics. Modelling of damping. Mode-based dynamics and modal superposition. Use modal coordinates and computer-based methods to reduce the problem's size and simulation and analysis costs. Basic theory of FE model updating and validation against experimental data. Assess and improve product design in line with sustainable development and better use of materials.
Module Overview	
Additional Information	The module extends previous studies in engineering analysis and will provide students with a basic understanding of the application of linear dynamic analysis and product design in mechanical engineering. On successful completion of the module students will be able to use modelling assumptions and integrate (FE) dynamic analysis in design of mechanical structures in view of an improved performance and a better use of materials. The module provides the skills necessary for an analysis and design engineering or NVH role and covers basic aspects of dynamics of structures with application in automotive, aerospace or offshore engineering. This module includes content which relates to the following UN Sustainable Development Goal: SDG10 – This module will consider how engineering designers can consider sustainability and a more efficient use of materials at the same time as providing improved performance when developing new products.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	100	2	MLO1, MLO2, MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings

Dan Stancioiu	Yes	N/A
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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