Module Proforma

Approved, 2022.02

Summary Information

Module Code	6302MECH
Formal Module Title	Finite Element Analysis
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 6
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Andrew Naylor	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings

Partner Module Team

Contact Name	Applies to all offerings	Offerings

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours

Lecture	11
Tutorial	11

Module Offering(s)

Offering Code	Location	Start Month	Duration
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	This module acts as a point of introduction to Finite Element theory, using relevant software to carry out Finite Element studies.

Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Identify and apply boundary conditions to simulate a variety of single component static problems.
MLO2	Apply boundary conditions and define component interaction to simulate a variety of multi-component assembly problems.
MLO3	Apply boundary conditions to simulate steady-state and transient thermal phenomena.

Module Content

Outline Syllabus
Finite Element Theory: Mathematical principles underpinning the Finite Element Method.Arithmetic methods for solving one dimensional stress and displacement problems.Different element geometries and how they are incorporated into a mesh.Software Application:Loads, fixtures, and mesh density for single-part components.Component interaction for multiple-part assemblies.Boundary conditions for steady state and transient thermal problems.2D simplification methods (planar and axi-symmetric).Selecting edges and faces for local mesh control.Symmetric boundary conditions for partial models.

Module Overview

Additional Information
This module includes content which relates to the following UN Sustainable Development Goals:SDG09 – This module considers how Finite Element Analysis (FEA) can be used to accelerate product design lifecycles, and how this can bring products to market at a faster rate, boosting industrial productivity in a sustainable manner. SDG12 – This module considers how FEA can reduce the need for fabrication and testing of multiple prototype iterations, ultimately reducing waste, and limiting carbon expenditure in product development environments.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Centralised Exam	Computer Exam	100	3	MLO2, MLO1, MLO3