

Summary Information

Module Code	5515NCCG
Formal Module Title	Computational Engineering
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	36
Workshop	24

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks

SEP-PAR	PAR	September	12 Weeks
SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	This module aims to demonstrate an understanding of where Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) can be used in the product development process. The student will be required to deal with complex issues, both systematically and creatively, to construct numerical models of physical systems, and critically evaluate the results of that analysis. The module will also provide a conceptual understanding of the principles of FEA and CFD, including introductory mathematical fundamentals as required.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explore the capabilities and limitations of computer-based models in meeting design fundamentals and their use in solving problems in engineering.
MLO2	2	Construct an appropriate finite element model of a physical system, and critically evaluate the results of that analysis.
MLO3	3	Construct an appropriate computation fluid dynamics model of a physical system, and critically evaluate the results of that analysis.
MLO4	4	Determine faults in the application of simulation techniques to evaluate the modelling method and data accuracy.

Module Content

Outline Syllabus	The FEA component covers: Introduction to FEA including applications; The Finite Element Formulation 1D and 2D; Practical Modelling Technique; Use of symmetry; Plane stress and plane strain elements; Convergence, and Error estimation. The CFD component covers: Introduction to CFD including applications; Overview of CFD Flow Solvers; The Finite volume method; Turbulence; Practical Modelling Technique; Boundary conditions; Grid generation; Sources of error, and Interpretation of results.
Module Overview	
Additional Information	

Assessments

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

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Christian Matthews	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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