

Liverpool John Moores University

Title: Design and Manufacture
Status: Definitive
Code: **5524ENGSBC** (120269)
Version Start Date: 01-08-2018

Owning School/Faculty: Maritime and Mechanical Engineering
Teaching School/Faculty: Maritime and Mechanical Engineering

Team	Leader
Russell English	Y

Academic Level: FHEQ5
Credit Value: 20
Total Delivered Hours: 72
Total Learning Hours: 200
Private Study: 128

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	20
Practical	40
Tutorial	12

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	Rpt1	Report 1	35	
Test	Test	VLE Test (FEA)	20	
Report	Rpt2	Report 2 + Artefact	45	

Aims

The aim of this module is to give students an opportunity to experience the process of carrying out a design to manufacture project. It integrates subject areas of computer-aided design and analysis, and computer-aided manufacture (CAD/CAM).

Learning Outcomes

After completing the module the student should be able to:

- 1 Undertake a systematic design procedure to progress a design from the brief to a solution
- 2 Use CAD/CAM systems during the design process and to prove manufacture
- 3 Use finite element analysis during the design process to help prove and optimise a design solution
- 4 Produce components with the aid of computer assisted manufacture, to specification using safe working practices

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Report 1	1		
VLE Test (FEA)	3		
Report 2 + Artefact	2	3	4

Outline Syllabus

Design process: Design brief; specification; conceptual design and embodiment design.

Design for economic manufacture, assembly and inspection. Applying tolerances and dimensions.

3D CAD modelling; rapid prototyping; CAD/CAM data transfer; computer assisted part programming; cutter path simulation; computer aided machining and inspection.

Finite element analysis. Practical aspects: modelling strategy, type of analysis, geometry, material models, loading, boundary conditions, element and mesh consideration, solvers, post-processing and results checking. Analysis types: static, thermal and thermal stress, modal dynamics, contact. Theoretical aspects: general FEA principles (application to one dimensional problems), incorporation of loads and boundary conditions, solution.

Learning Activities

A practical, hands-on approach to learning is adopted. Case studies of examples of the theory in practice will be provided. Tutorial sessions will be used to focus upon the theoretical aspects of the module.

Notes

This module will integrate subject material studied on the programme through the application of a design to manufacture exercise. Students will apply established design methodology, and use industry standard software to help in the design, analysis and manufacture of a engineering or consumer product.