

Liverpool John Moores University

Warning: An incomplete or missing proforma may have resulted from system verification processing

Title: Product Analysis
Status: Definitive
Code: **5165PDE** (121753)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: Engineering

Team	Leader
Jamie Finlay	Y
Thomas Byrne	

Academic Level: FHEQ5 **Credit Value:** 20 **Total Delivered Hours:** 44
Total Learning Hours: 200 **Private Study:** 156

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	22
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Portfolio	Portfolio	In-class dynamic analysis test	100	

Aims

Provide students with knowledge and experience relating to the static stress analysis of products.

Learning Outcomes

After completing the module the student should be able to:

- 1 Undertake simple analytical hand-calculations to determine deflections and stresses in component(s).
- 2 Undertake a finite element analysis to investigate the structural integrity of product component(s).
- 3 Evaluate and rationalise calculated results to ensure accuracy

Learning Outcomes of Assessments

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

Stress analysis portfolio 1 2 3

Outline Syllabus

Simple analysis for design

Use of free-body diagrams in determining loads and reactions, simple hand calculations, statics of a particle, statics of rigid bodies, load deformation of materials, concepts of stress and strain.

Finite element analysis for design

Modelling strategy. Planning the analysis. Analysis types. Loading, point loads, stress singularities, pressure loading. Boundary conditions, use of symmetry, balanced loading and minimum constraint, avoidance of free body motion, problems associated with inappropriate boundary conditions. Choice of element, mesh controls and mesh density, convergence of results, problems with element distortion, adaptive meshing. Managing the solution, types of solver, analysis of errors and warnings. Post processing and results checking. Review of available results, stress, strain, displacement, primary and derived quantities etc. Interpretation of results, checking results, reaction forces, displaced shape, nodal and element plots, hand calculations. Design against yielding in materials and factors of safety.

Learning Activities

This module will be delivered through an integrated series of lectures, tutorials, practical sessions, guided design activities and case studies. The learning activities are to be student focused and develop the students design knowledge through experiential learning.

Notes

This module is delivered using a variety methods including lectures, seminars, tutorials and practical sessions. The module will be delivered from a engineering and product design perspective.