

Liverpool John Moores University

Title: MACHINE DESIGN II
Status: Definitive
Code: **5501ICBTME** (127054)
Version Start Date: 01-08-2021

Owning School/Faculty: Engineering
Teaching School/Faculty: ICBT, Colombo

Team	Leader
Alison Cotgrave	Y

Academic Level: FHEQ5 **Credit Value:** 15 **Total Delivered Hours:** 61
Total Learning Hours: 150 **Private Study:** 89

Delivery Options

Course typically offered: Semester 1 and Summer

Component	Contact Hours
Lecture	45
Tutorial	15

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Practice	AS1	Practical Assignment (2000 words)	60	
Exam	AS2	Exam (Open book)	40	1

Aims

This module aims to develop the knowledge and understanding of advanced mechanical engineering systems and practically integrated complex engineering systems. The students are to be given in-depth knowledge and practical exposure on industry level engineering simple to moderately complex real applications.

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse designs of simple to moderately complex mechanical engineering systems and demonstrate an understanding of how different areas of engineering are integrated in these engineering systems.
- 2 Apply and solve complex problems of engineering systems using theoretical calculations and finite element modelling.
- 3 Apply modern CAD, CAE (Computer aided engineering) to carry out complex engineering analysis. (Finite Element Analysis).
- 4 Analyse designs and produce cost estimation and cost optimisations.

Learning Outcomes of Assessments

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

Practical Assignment	3	4
Exam	1	2

Outline Syllabus

Advanced vibration systems- Apply Newton-Euler methods to 3D rigid body dynamics

Advanced Stress Analysis – 3D stress analysis

Introduction to Computational Fluid Dynamics

Finite Element Analysis and Applications

Mechanical Transmissions – design of complex gear drives, couples, pulleys and keys

Introduction to Tribology

Joining of Materials – Welding, brazing and soldering

Curve and surface design using Cubics

Principles of Computer Numerically Controlled machines

Computer aided process planning

Learning Activities

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:

By a series of lectures and tutorials and through participation within laboratory practical sessions for problem solving.

Self-managed investigative study to analyse cases related to mechanical engineering systems.

A recommended resource list - indicating key reading, internet support and physical learning assistance, is provided to help enable students to undertake self-directed

study.

Notes

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