Liverpool John Moores University

Title:	ENGINEERING MODELLING AND PROBLEM SOLVING
Status:	Definitive
Code:	**4021ENG** (105265)
Version Start Date:	01-08-2016

Owning School/Faculty: Electronics and Electrical Engineering
Teaching School/Faculty: Electronics and Electrical Engineering

Team	Leader
Jamie Finlay	Y

Academic Level:	FHEQ4	**Credit Value:**	12	**Total Delivered Hours:**	72
Total Learning Hours:	120	**Private Study:**	48		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	48

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	Modeling and experimental validation assignment	25	
Essay	AS2	Modeling and experimental validation assignment	25	
Essay	AS3	Modeling and experimental validation assignment	25	
Essay	AS4	Modeling and experimental validation assignment	25	

Aims

The module aims to introduce the student to the engineering computation and problem solving.

Learning Outcomes

After completing the module the student should be able to:

1 Interpret a practical engineering problem and formulate an appropriate approach to its analysis and subsequent solution
2 Analyse a given problem and formulate appropriate algorithms for its solution
3 Describe computational algorithms in the form of a flow chart
4 Implement the solution algorithm in the form of a MathCAD (or equivalent) worksheet and undertake an analysis of the selected problems
5 Undertake tests to check on the validity of their modeling process and recognise the professional need for model validation.

Learning Outcomes of Assessments

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

CW	1	2	3	4	5
CW	1	2	3	4	5
CW	1	2	3	4	5
CW	1	2	3	4	5

Outline Syllabus

An introduction to engineering problem solving
Computer based approaches to problem solving, numerical and symbolic computation systems
Algorithm development and the use of flowcharts
Validation of calculation results and model predictions
The use of programming constructs
Application of computer based computational techniques to the solution of engineering problems

Learning Activities

The learning activities for this module are centered on the use of MathCAD software (or equivalent) for the solution of classical engineering problems. The course material will be delivered by lecture, tutorial and problem based approaches.

It is anticipated that four problems will be considered during the course of the module. Each problem will require the modeling of a practical engineering problem. Students will be required to implement the model in MathCAD (or equivalent) and use it to make predictions. The predictions made will then be tested by comparison with the results of hands on experiments. All students will conduct experiments in order to test their predictions. The problems selected for inclusion in this module will

draw on concepts developed during L1 mathematics, engineering principles and mechanical principles.

Notes

This module aims to explore the engineering problem solving process. The module concentrates on engineering computation and algorithm development. The course uses MathCAD software. The module will make extensive use of problem-based assignments. The problems considered will require development of suitable mathematical models and algorithms, and their implementation within the MathCAD environment. The problems tackled in the module will all be of a practical nature and the predictions made will be tested by "hands on" experimental sessions.