

Liverpool John Moores University

Title: ENGINEERING PROBLEM SOLUTION
Status: Definitive
Code: **5504ENGSBC** (113904)
Version Start Date: 01-08-2018

Owning School/Faculty: Maritime and Mechanical Engineering
Teaching School/Faculty: The Sino-British College

Team	Leader
Russell English	Y

Academic Level: FHEQ5
Credit Value: 12
Total Delivered Hours: 35
Total Learning Hours: 120
Private Study: 85

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	20
Practical	5
Tutorial	10

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	Modelling and experimental validation assignment	100	

Aims

To introduce the student to 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 implement and interpret a valid problem solving process
- 3 analyse a given problem and formulate appropriate algorithms for its solution
- 4 implement the solution algorithm in the form of a MathCAD worksheet or a spreadsheet and undertake an analysis of the selected problem
- 5 conceptualise, design and manufacture a prototype
- 6 undertake checks on the validity of their modelling 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	6
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Outline Syllabus

An introduction to engineering problem solving

The problem solving process defined

Critical and creative thinking

Computer based approaches to problem solving

Algorithm development and the use of flowcharts

Making predictions and refining the model

Validation of results and the mathematical model

Application of computer based computational techniques to the solution of engineering problems

Learning Activities

The learning activities for this module involve using mathematical models for the solution of an engineering problem. The course material will be delivered by lecture and tutorial in case study format.

An engineering case study will be investigated during the course of the module and will require students to mathematically model a solution. They will be required to implement the model in MathCAD (or a spreadsheet) and use it to make predictions. The predictions made will then be compared with test data. The problem selected for inclusion in this module will draw on concepts from the fields of mathematics, dynamics, mechanics and fluid dynamics.

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 problem considered will require development of suitable mathematical models and algorithms, and their implementation within the MathCAD

environment. The problem tackled in the module will be of a practical nature and the predictions made will be tested by "hands on" experimental sessions.