

## Liverpool John Moores University

Title: Mathematics for Manufacturing Engineers  
Status: Definitive  
Code: **5502MTC** (125783)  
Version Start Date: 01-08-2019

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

Team	Leader
Robert Wilkinson	Y

**Academic Level:** FHEQ5      **Credit Value:** 10      **Total Delivered Hours:** 34  
**Total Learning Hours:** 100      **Private Study:** 66

### Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Online	24
Tutorial	10

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	Online coursework delivered using a virtual learning environment	100	

### Aims

*To provide an advanced engineering mathematics course for application to the solution of engineering problems*

### Learning Outcomes

After completing the module the student should be able to:

- 1 Solve ordinary differential equations and apply to the modelling of engineering problems
- 2 Find first and second order partial derivatives for functions of several variables and apply to engineering problems using optimisation and errors
- 3 Use Laplace transforms in the solution of engineering problems involving ordinary differential equations
- 4 Apply the principles of statistics to collect and analyse product and process data to evaluate and improve a manufacturing process.

## Learning Outcomes of Assessments

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

Online assessment	1	2	3	4
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## Outline Syllabus

*The solution of first order ODE's by the integrating factor method. The solution of second order ODE's by the method of undetermined coefficients. Application to single degree of freedom oscillating systems.*

*Functions of several variables. Partial differentiation with application to optimisation and error estimation.*

*Laplace transforms. Concepts. Use of tables. The inverse transform. Application to the solution of ODE's. Transfer functions and stability.*

*Numerical solution of ODE's. Euler's method and application of software.*

*The use of a symbolic mathematical package eg MATLAB in the solution of problems involving the above topics.*

*Basic statistics and measures. Summary measures(averages-mean/median/mode). Describing variation (standard deviation and standard error). Presenting results (confidence intervals). Formal Testing (T-test, significance of Test (p value)). Making comparisons (Analysis of Variance). Visualisations for presentation and explanation.*

## Learning Activities

A combination of online lectures and tutorials and campus based tutorials.

## Notes

This module provides a basis in advanced engineering mathematics.