LIVERPOOL JOHN MOORES UNIVERSITY

Engineering Mathematics 2

Module Information

2022.01, Approved

Summary Information

Module Code	5502USST
Formal Module Title	Engineering Mathematics 2
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
University of Shanghai For Science and Technology

Learning Methods

Learning Method Type	Hours
Lecture	22
Tutorial	22

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	To develop further understanding in engineering mathematics for application to the solution of engineering problems

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Solve linear, first order, constant coefficient ordinary differential equations by the method of integrating factor and apply to the modelling of engineering problems
MLO2	2	Solve linear, second order, constant coefficient ordinary differential equations and apply to the modelling of engineering problems
MLO3	3	Identify first and second order partial derivatives for functions of several variables and apply to engineering problems using optimisation and errors
MLO4	4	Apply eigenvectors and eigenvalues in the solution of engineering problems
MLO5	5	Solve simultaneous homogeneous ordinary differential equations with constant coefficients and apply to the solution of a two degree of freedom system
MLO6	6	Apply Laplace transforms in the solution of engineering problems involving ordinary differential equations
MLO7	7	Apply Fourier series in the solution of engineering problems
MLO8	8	Formulate numerical solutions of ordinary differential equations

Module Content

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.Eigenvalues and eigenvectors. By manual calculation for low order matrices. Use of software for matrices of larger order.Solution of two first and second order, homogeneous simultaneous ODE's with constant coefficients. Application to normal modes for a two degree of freedom system.Laplace transforms. Concepts. Use of tables. The inverse transform. Application to the solution of ODE's. Transfer functions and stability.Periodic functions. Fourier series for functions of any period. Harmonics.Numerical solution of ODE's. Euler's method.
Module Overview	
Additional Information	This module provides a basis in advanced engineering mathematics for level five students in mechanical and electrical engineering.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Examination	100	2	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6, MLO7, MLO8

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Robert Wilkinson	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings