Further Mathematics

Module Information

2022.01, Approved

Summary Information

Module Code	5503NCCG
Formal Module Title	Further Mathematics
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	60

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks
SEP-PAR	PAR	September	12 Weeks

SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	The module will prepare students to analyse and model engineering situations using mathematical techniques. Among the topics included in this module are: number theory, complex numbers, matrix theory, linear equations, numerical integration, numerical differentiation, and graphical representations of curves for estimation within an engineering context. Finally, students will expand their knowledge of calculus to discover how to model and solve engineering problems using first and second order differential equations. On successful completion of this module students will be able to use applications of number theory in practical engineering situations, solve systems of linear equations relevant to engineering applications using matrix methods, approximate solutions of contextualised examples with graphical and numerical methods, and review models of engineering systems using ordinary differential equations.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Use applications of number theory in practical engineering situations
MLO2	2	Solve systems of linear equations relevant to engineering applications using matrix methods
MLO3	3	Approximate solutions of contextualised examples with graphical and numerical methods.
MLO4	4	Review models of engineering systems using ordinary differential equations.

Module Content

Outline Syllabus	Number theory: types of numbers (Natural, Integer, Rational, Real, Complex), the modulus, argument and conjugate of complex numbers, polar and exponential forms of complex numbers, the use of de Moivre's Theorem in engineering, complex number applicationsMatrix methods: introduction to matrices and matrix notation, the process for addition, subtraction and multiplication of matrices, the determinant of a matrix, using the inverse of a square matrix to solve linear equations, Gaussian elimination to solve systems of linear equations.Graphical and numerical methods: standard curves of common functions, including quadratic, cubic, logarithm and exponential curves, systematic curve sketching knowing the equation of the curve, using sketches to approximate solutions of equations, numerical analysis using a variety of formal methods.Differential equations: formation and solutions of first-order differential equations, applications of first-order differential equations, formation and solutions of second-order differential equations, applications of second-order differential equations, Laplace transform solutions of linear ordinary differential equations, applications of Laplace transforms
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Test	Online Test	40	1	MLO1, MLO2
Exam	Exam	60	2	MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Christian Matthews	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings