

Summary Information

Module Code	4316CIT
Formal Module Title	Engineering Mathematics 1b
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Changshu Institute of Technology

Learning Methods

Learning Method Type	Hours
Lecture	48

Module Offering(s)

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

Aims and Outcomes

Aims	To provide a foundation in engineering mathematics for its application to the solution of engineering problems
------	--

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Understand matrices in the solution of engineering problems and matrices.
MLO2	2	Perform techniques in differentiation to the solution of engineering problems.
MLO3	3	Perform techniques in integration to the solution of engineering problems.
MLO4	4	Perform the techniques of numerical integration to obtain approximations to integration of engineering problems.
MLO5	5	Perform Newton's method to obtain approximations to equations of engineering problems.

Module Content

Outline Syllabus	Introduction of the use of a computer algebra system e.g. MATLAB. Use of the software applied to the syllabus items below Basic matrix manipulation including the inverse matrix. Solution of systems of linear equations. Differential calculus of one variable: Gradient of curve, derivatives of standard functions, linearity, derivatives of composite functions, products and quotients. Applications. Stationary points. Rates of change. Integral calculus as inverse of differentiation and as a limit of a sum. Standard integrals, linearity, integration of composite functions. Other methods of integration. Numerical integration. Ordinary differential equations. First order linear, constant coefficient equations. Separation of variables. Application to modelling. Basic convex optimisation theorem including how to prove convex function with or without some constraints. Introduction to use of fmincon in Matlab to obtain the optimal solution to engineering problems.
Module Overview	
Additional Information	The module introduces students Engineering Mathematics of Mathematical Physics, and demonstrate the utility and limitations of a variety of powerful calculational techniques and to provide a deeper understanding of the mathematics underpinning theoretical physics. Examinations are 2 hour duration.

Assessments

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

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Clifford Mayhew	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
--------------	--------------------------	-----------