

III SEMESTER

ENGINEERING MATHEMATICS III (Common to CSE & ISE)

Subject Code: 10MAT31

Hours/Week : 04

Total Hours : 52

I.A. Marks : 25

Exam Hours: 03

Exam Marks: 100

PART – A

UNIT – 1

7 Hours

Fourier Series: Periodic functions, Fourier expansions, Half range expansions, Complex form of Fourier series, Practical harmonic analysis.

UNIT - 2

6 Hours

Fourier Transforms: Finite and Infinite Fourier transforms, Fourier sine and cosine transforms, properties. Inverse transforms.

UNIT – 3

6 Hours

Partial Differential Equations (P.D.E): Formation of P.D.E Solution of non homogeneous P.D.E by direct integration, Solution of homogeneous P.D.E involving derivative with respect to one independent variable only (Both types with given set of conditions) Method of separation of variables. (First and second order equations) Solution of Lagrange's linear P.D.E. of the type $Pp + Qq = R$.

UNIT - 4

7 Hours

Applications of P.D.E: Derivation of one dimensional wave and heat equations. Various possible solutions of these by the method of separation of variables. D'Alembert's solution of wave equation. Two dimensional Laplace's equation – various possible solutions. Solution of all these equations with specified boundary conditions (Boundary value problems)

PART – B

UNIT – 5

6 Hours

Numerical Methods: Introduction, Numerical solutions of algebraic and transcendental equations:- Newton-Raphson and Regula-Falsi methods. Solution of linear simultaneous equations : - Gauss elimination and Gauss Jordan methods. Gauss - Seidel iterative method. Definition of eigen values and eigen vectors of a square matrix. Computation of largest eigen value and the corresponding eigen vector by Rayleigh's power method.

UNIT - 6

7 Hours

Numerical Methods contd.: Finite differences (Forward and Backward differences) Interpolation, Newton's forward and backward interpolation formulae. Divided differences – Newton's divided difference formula. Lagrange's interpolation and inverse interpolation formulae. Numerical differentiation using Newton's forward and backward interpolation formulae. Numerical Integration – Simpson's one third and three eighth's value, Weddle's rule (All formulae / rules without proof)

UNIT - 7

6 Hours

Calculus of Variations: Variation of a function and a functional Extremal of a functional, Variational problems, Euler's equation, Standard variational problems including geodesics, minimal surface of revolution, hanging chain and Brachistochrone problems.

UNIT - 8

7 Hours


Difference Equations and Z-transforms: Difference equations – Basic definitions. Z-transforms – Definition, Standard Z-transforms, Linearity property, Damping rule, Shifting rule, Initial value theorem, Final value theorem, Inverse Z-transforms. Application of Z-transforms to solve difference equations

Text Book:

1. B.S. Grewal: Higher Engineering Mathematics, 40th Edition, Khanna Publishers, 2007.
(Chapters: 10, 22.1 to 22.5, 17.1 to 17.5, 18.1 to 18.2, 18.4 to 18.5, 18.7, 28.1 to 28.2, 28.4 to 28.9, 29.1, 29.5, 29.8 to 29.12, 34.1 to 34.5, 30.1 to 30.2, 23.1 to 23.5, 23.7, 23.9 to 23.11, 23.16)

Reference Books:

1. B.V. Ramana: Higher Engineering Mathematics, Tata Mcgraw Hill, 2006.
2. Glyn James: Advanced Modern Engineering Mathematics, 3rd Edition, Pearson Education, 2003.


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