Sub Code	**:**	**06MAT31**
IA Marks	**:**	**25**
Hrs/ Week	**:**	**04**
Exam Hours	**:**	

03

Total Hrs.

:

52

Exam Marks

:

100

PART – A

Unit 1:

Fourier Series

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

7 Hours

Unit 2:

Fourier Transforms

Finite and Infinite Fourier transforms, Fourier sine and consine transforms, properties. Inverse transforms.

6 Hours

Unit 3:

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 P p + Q q = R.

6 Hours

Unit 4:

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).

7 Hours

PART – B

Unit 5:

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 Jordon 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.

6 Hours

Unit 6:

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)

7 Hours

Unit 7:

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.

6 Hours

Unit 8:

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.

7 Hours

Text Book: Higher Engineering Mathematics by Dr. B.S. Grewal (36th Edition – Khanna Publishers)

Unit No.

Chapter No.	**Article Numbers**	**Page Nos.**
10	10.1 to 10.7, 10.10 and 10.11	375 – 400
22	22.4, 22.5	

716 – 722

□□□□□□	III□□	□□□□	□

17, 18

17.1 to 17.5, 18.2

541 – 547

562 – 564

□□□□□□	IV□□	□□□□	□

18

18.4, 18.5, 18.7

564 – 578

580 – 582

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24

24.1, 24.2, 24.4 to 24.6, 24.8

820 – 826

829 – 840

843 – 845

□□□□□□	VI□□	□□□□	□

25

25.1, 25.5, 25.12 to 25.14, 25.16

846, 847

857 – 862

871 – 878

881 – 887

□□□□□□	VII	□□□	□

30

30.1 to 30.5

1018 – 1025

	VIII		

26

26.1, 26.2, 26.9 to 26.15, 26.20, 26.21

888, 889

899 – 913

Reference Books:

1. **Higher Engineering Mathematics** by B.V. Ramana (Tata-Macgraw Hill).

2. **Advanced Modern Engineering Mathematics** by Glyn James – Pearson Education.

Note:

1. One question is to be set from each unit.

2. To answer Five questions choosing atleast Two questions from each part.