

MMA-E313
MATHEMATICAL METHODS

MM : 100
Time : 3 hrs
L T P
5 2 0

Sessional : 30
ESE : 70
Pass Marks : 40

NOTE: The question paper shall consist of two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer type questions of six marks each and student shall be required to attempt any five questions. Sec.-B shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Definition and classification of linear integral equations, Conversion of ordinary differential equations into integral equations, Linear integral equations of the first and second kind of Fredholm and Voltra types, Solution by successive substitutions and successive approximations.

Solution of equations with separable kernels. The Fredholm alternative, Hilbert-Schmidt theory for symmetric kernels.

Classical Fredholm Theory: Fredholm method of solution and Fredholm Theorems.

Solution of Integral Equations by Transform Methods: Laplace Transform, Some special types of integral equations, Applications of Laplace Transform to determine the solution of integral equation with convolution-type kernels, Fourier Transform, Applications of Fourier Transform to determine the solution of integral equation.

Functional, Some simple variational problems, The variation of a functional, Euler's equation, Special cases of Euler's equation, Case of several variables, Simple variable end point problem, Variational derivative, Invariance of Euler's equation, Fixed end point problem for n unknown functions, Variational problems in parametric form, Functional depending on higher order derivatives, Variational problems with subsidiary conditions.

Text /Reference Books

1. F.B. Hildebrand, Methods of Applied Mathematics, Prentice Hall.
2. L.B. Chambers, Integral Equations, International Text Book Co.
3. I.M Gelfand, & S.V. Fomin, Calculus of Variations, Prentice Hall (Unit-III)
4. N. Seddon, Integral Transforms, Schaum's Outline Series
5. M.D.Raisinghania, Integral Equations, S. Chand
- 6.B.S.Grewal, Engineering Mathematics, Khanna Publishers