

References

1. Richard H. Crowell and Ralph H. Fox, Introduction to Knot Theory, Dover, 2008.
2. W.B. Raymond Lickorish, Introduction to Knot Theory, Springer, 1997.
3. M.A. Armstrong, Basic Topology, Springer New York, 2010.
4. William S. Massey, A Basic Course in Algebraic Topology, Springer Science & Business Media, 1991.

Mathematical Methods

Code:MSM5023

INTEGRAL TRANSFORMS: Laplace transforms: Definitions - properties - Laplace transforms of some elementary functions - Convolution Theorem - Inverse Laplace transformation - Applications. Fourier transforms - Definitions - Properties - Fourier transforms of some elementary functions - Convolution theorems - Fourier transform as a limit of Fourier Series - Applications to PDE.

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3

INTEGRAL EQUATIONS: Volterra Integral Equations: Basic concepts - Relationship between Linear differential equations and Volterra integral equations - Resolvent Kernel of Volterra Integral equation - Solution of Integral equations by Resolvent Kernel - The Method of successive approximations - Convolution type equations, solution of integral differential equations with the aid of Laplace transformation. Fredholm Integral equations: Fredholm equations of the second kind, Fundamentals - Iterated Kernels, Constructing the resolvent Kernel with the aid of iterated Kernels - Integral equations with degenerate Kernels - Characteristic numbers and eigen functions, solution of homogeneous integral equations with degenerate Kernel - non homogeneous symmetric equations - Fredholm alternative.

CALCULUS OF VARIATIONS: Extrema of Functionals: The variation of a functional and its properties - Euler's equation - Field of extremals - sufficient conditions for the Extremum of a Functional conditional Extremum Moving boundary problems - Discontinuous problems - one sided variations - Ritz method.

References

1. I.N. Sneddon, The Use of Integral Transforms, Tata McGraw Hill, 1972.
2. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Dover, 2000.
3. M. L. Krasnov, G. K. Makarenko and A. I. Kiselev , Problems and Exercises in Calculus of Variations, Imported Publishers, 1985.
4. Ram P Kanwal, Linear Integral Equations, Academic Press, 1971.
5. A. M. Wazwaz; A First Course in Integral Equations; World Scientific, 1997.
6. F. B. Hildebrand, Methods of Applied Mathematics, Prentice Hall, 1965.

Nonlinear Analysis

Code:MSM5024

Fixed Point Theorems with Applications: Banach contraction mapping theorem, Brouwer fixed point theorem, Leray-Schauder fixed point theorem. Calculus in Banach spaces: Gateaux as well as Frechet derivatives, chain rule, Taylor's expansions, Implicit function theorem with applications, subdifferential. Monotone Operators: maximal monotone operators with properties, surjectivity theorem with applications. Degree theory and condensing operators with applications.

Lectures : 2
Tutorials : 2
Practical : 0
Credits : 3