

dimensional wave equation - Vibrating Membranes: 8
 Applications of the calculus of variations - Three dimensional problems.
 The Diffusion Equations: Elementary solutions of the Diffusion Equation - Separation of variables- The use of Integral transforms.

References

1. I.N. Sneddon, Elements of Partial Differential Equations, Dover, 2006.
2. Robert C. McOwen, Partial Differential Equations, Pearson Education, 2 edition, 2003.
3. T.Amaranath: An Elementary Course on Partial Differential Equations. Narosa, 2nd Edition, 2003.
4. G.F.Simmons: Differential Equations with Applications and Historical notes. Tata McGraw Hill, 2nd edition, 2003.

Code:MSM531 Functional Analysis

Normed linear space; Banach spaces and basic properties; Heine - Borel theorem, Riesz of operators; Spectrum of an operator. Spectral theory of self adjoint compact operators.
 Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
 lemma and best approximation property; Inner product space and projection theorem; Orthonormal bases; Bessel inequality and Parseval's formula; Riesz - Fischer theorem. Bounded operators and basic properties; Space of bounded operators and dual space; Riesz representation theorem; Adjoint of operators on a Hilbert space; Self adjoint, Normal and Unitary Operators; Examples of unbounded operators; Convergence of sequence of operators.
 Hahn-Banach Extension theorem; Uniform boundedness principle; Closed graph theorem and open mapping theorem. Some applications. Invertibility
 References
 1. B.V. Limaye, Functional Analysis, Second Edition, New Age International, 1996. 2. B.Bollabas, Linear Analysis, Cambridge University Press, Indian edition, 1999. 3. G.F.Simmons, Introduction to Topology and Modern Analysis, McGraw - Hill, 1963.
 4. E. Kreyszig, Introduction to Functional Analysis with Applications, Wiley India Private Limited.
 5. A.E. Taylor and D.C. Lay, Introduction to Functional Analysis, 2nd edition, Wiley, New york, 1980.

Code:MSM532 Measure and Integration

Review of Riemann Integral Lebesgue Measure; Lebesgue Outer Measure; Lebesgue Mea
 Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
 surable Sets . Measure on an Arbitrary σ - Algebra; Measurable Functions; Integral of a Simple Measurable Function; Integral of Positive Measurable Functions. Lebesgue's
 Monotone Convergence Theorem; Integrability; Dominated Convergence Theorem; L^p - Spaces. Differentiation and Fundamental theorem for Lebesgue integration Product measure; Statement of Fubini's theorem.
 References
 1. G. de Barra, Measure and Integration, Wiley Eastern, 1981.
 2. W. Rudin, Real and Complex Analysis, Third edition, McGraw-Hill, International Editions, 1987.
 3. H.L. Royden, Real Analysis, Third edition, Prentice-Hall of India, 1995. 4. D.L. Cohn, Measure Theory, Birkhauser, 1997.
 5. P.K. Jain and V.P. Gupta, Lebesque Measure and Integration, New Age International, 2006.

Code:MSM533 Numerical Analysis

Solution of Equations, Linear Systems and Algebraic Eigenvalue Problems Solution of al
 Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
 gebraic and transcendental equations: Fixed - point iteration method, Newton's method; Linear system (Direct methods): Gaussian elimination - Pivoting - LU Decomposition; Vector and Matrix norms - Error
 Analysis and Condition numbers; Linear system (Iterative methods): Gauss - Jacobi and Gauss - Seidel - Convergence considerations; Eigen value problem: Power method - Jacobi for a real symmetric matrix.