estimate.

References

1. Eral. A. Coddington, An Introduction to Ordinary Differential Equations, PHL Learning Pvt Ltd, 2009.
2. T.Amaranath: An Elementary Course on Partial Differential Equations. Narosa, 2nd Edition, 2003.
3. Lawrence Perko, Differential equations and dynamical systems, Springer, 3rd Edition, 2001.
4. G.F.Simmons: Differential Equations with Applications and Historical notes. Tata McGraw Hill, 2nd edition, 2003.

Code:MSM 521 Algebra - II

Rings definition, basic concepts and examples. UFDs, PIDs, Euclidean domains, Gausss

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
Lemma. The Eisenstein criterion, examples and applications. Gaussian primes. Alge braic integers. Integers in quadratic fields.Rings of polynomials, Factorization of polyno mials over a field, Non commutative examples, Homomorphism and factor rings. Prime and Maximal ideals.

Introduction to Extension Fields, Algebraic Extensions, Geometric Constructions, Finite Fields, Automorphisms of Fields, The Isomorphism Extension Theorem, Splitting Fields, Separable Extensions, Galois Theory, Illustration of Galois Theory, Insolvability of the Quintic. Modules: Definitions and Examples, Direct sums, Free Modules, Quotient Module, Homeomorphisms, Module over PIDs.

References

1. M. Artin: Algebra, Prentice Hall, 1991.
2. Thomas W. Hungerford, Algebra ,Springer, 2003.
3. John B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, 2002. 4. Joseph Gallian, Contemporary Abstract Algebra, 7th Edition, Cengage Learning, 2009.
5. D.M. Burton, A First Course in rings and Ideals, Addison Wesley 1970. 6. C.Musili, Introduction to Rings and Modules, Narosa Publishing House.

6

Code:MSM522 Complex Analysis

Conformal mapping, Linear transformations, cross ratio, symmetry, oriented circles, fam

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
ilies of circles, use of level curves, elementary mappings and Riemann surfaces

Complex integration, rectifiable curves, Cauchys theorem for rectangle and disc, Cauchys integral formula, higher derivatives
Local properties of analytic functions, removable singularities, Taylors theorem, Taylor series and Laurent series, zeroes and poles, local mapping, the maximum principle Chains

and cycles, simple connectivity, locally exact differentials, multiply connected regions, residue theorem, argument principle, evaluation of definite integrals

Harmonic functions, mean value property, Poissons formula, Schwarz theorem, reflection principle, Weierstrass theorem.

References

1. L.V. Ahlfors- Complex Analysis, Third Edition Mc-Graw Hill International, 1979. 2. John M. Howie, Complex Analysis, Springer Science & Business Media, 2003. 3. H. A. Priestley - Introduction to Complex Analysis, Oxford University Press, 2003. 4. John B. Conway, Functions of One Complex Variable I, Springer Science & Business Media, 1978.

5. J. Brown and R. Churchill, Complex Variables and Applications, McGraw-Hill Education, 2013.

Code:MSM523 Topology

Topological Spaces, Basis for a topology, Subspace topology, Closed sets and Limit points,

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
Continuous Functions, Product Topology, Quotient Topology. Connected spaces, Con

nected subspaces of the Real line, Components and Local Connectedness, Path connect edness, Compact spaces, Limit-point compactness, Local compactness.

Countability and Separation axioms, Urysohn Lemma, Urysohn Metrization Theorem, Tietze Extension Theorem, Tychonoff Theorem

References

1. J.R. Munkres, Topology, 2nd Ed., Pearson Education India, 2001. 2. K.D. Joshi, Introduction to General Topology, New Age International, New Delhi, 2000.
3. J. Dugundji, Topology, Allyn and Bacon, Inc. 1966.
4. J.L. Kelley, General Topology, Van Nostrand, 1955.
5. M.G. Murdeswar, General Topology, New Age International, 1990. 6. G.F. Simmons, Introduction to Topology and modern Analysis, International Stu dent edition, 1963.

Code:MSM524 Multivariable Calculus

Functions of several - variables, Directional derivative, Partial derivative, Total deriva

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
tive, Jacobian, Chain rule and Mean - value theorems, Interchange of the order of differ entiation, Higher derivatives, Taylor's theorem, Inverse mapping theorem, Implicit func tion theorem, Extremum problems, Extremum problems with constraints, Lagrange's multiplier method.

Multiple integrals, Properties of integrals, Existence of integrals, iterated integrals, change of variables.

Curl, Gradient, div, Laplacian cylindrical and spherical coordinate, line integrals, surface integrals, Theorem of Green, Gauss and Stokes.

References

1. Apostol T.M., Mathematical Analysis, Original Edition .
2. C.H.Edwards Jr.: Advanced Calculus of Several Variables. Academic Press, 1973. 3. Apostol T.M., Calculus-II - Part-2,Non-Linear Analysis

Code:MSM525 Partial Differential Equations Partial Differential Equations- First Order Partial Differential

Equations - Linear equa

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
tions of first order. Nonlinear Partial Differential Equations of the first order - Cauchys method of characteristics - Compatible systems of first order equations - Charpits method- Special types of First order equations - Jacobis method.
Partial Differential Equations of Second order - The origin of Second-order Equations - Linear Partial Differential Equations with constant coefficients - Equations with vari able coefficients - Characteristics curves of second - order equations- Characteristics of

equations in three variables.
The Solution of Linear Hyperbolic Equations - Separation of variables - The Method of Integral Transforms - Nonlinear Equations of the second order. Laplaces Equation - The occurrence of Laplaces Equation in Physics- Elementary solution of Laplaces Equation - Families of Equipotential surfaces Boundary value problems - Separation of variables- Problems with axial symmetry.
The wave equation - The occurrence of wave equation in Physics - Elementary solutions of the one-