

McGraw Hill.

3. Frank Harary, Graph Theory, Addison - Wesley series in mathematics, Perseus Books, 1994.

4. Norman L. Biggs, Discrete Mathematics, Oxford University Press, 2002.

Code:MSM514 Algebra - I

Basic representation theorem, The fundamental theorem of arithmetic; Combinatorial Presentations.

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
and Computational number theory: Permutations and combinations, Fermats little theorem, Wilsons theorem, Generating functions; Fundamentals of congruences - Residue systems, Riffing; Solving congruences - Linear congruences, Chinese remainder theorem, Polynomial congruences.

Plane Isometries , Direct products & finitely generated Abelian Groups, Binary Linear Codes, Factor Groups, Factor-Group Computations and Simple Groups, Series of groups. Group action on a set, Applications of G-set to counting, Isomorphism theorems: Proof of the Jordan-Holder Theorem , Sylow theorems, Applications of the Sylow theory, Free Groups , Group

References

1. George E. Andrews: Number Theory, Dover Publications, New York, 1971.
2. Tom M. Apostol, Introduction to Analytic Number Theory, Springer, 1998.
3. Joseph Gallian, Contemporary Abstract Algebra, 7th Edition, Cengage Learning, 2009.
4. M. Artin: Algebra, Prentice Hall, 1991.
5. Thomas W. Hungerford, Algebra , Springer, 2003.
6. John B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, 2002.

Code:MSM515 Ordinary Differential Equations Ordinary Differential Equations: Linear Equations with constant

coefficients - Second

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
order Homogeneous equations - Initial value problems - Linear dependence and independence Wronskian and a formula for Wronskian - Non Homogeneous equation of order two.

Homogeneous and Non - Homogeneous Equations of order 'n' - Initial value problems - annihilator Method to solve a non - homogeneous equation - Algebra of constant coefficients operators.

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Linear Equations with variable coefficients - Initial value problems - Existence and Uniqueness Theorems - Solutions to a non - homogeneous equation - Wronskian and Linear dependence - reduction of the order of a homogeneous equation - Homogeneous equation with analytic coefficients - The Legendre equation.

Linear Equation with regular singular points - Euler Equation - Second order equations with regular singular points - Exceptional cases - Bessel equation.

Existence and Uniqueness of solutions to first order equations - Equation with variables separated - Exact Equations - Method of successive approximations - The Lipschitz condition - convergence of the successive approximations and the existence theorem.

First order systems in two variables and linearization: The general phase plane-some population models - Linear approximation at equilibrium points - Linear systems in matrix form.

Averaging Methods: An energy balance method for limit cycles - Amplitude and frequency estimates - slowly varying amplitudes - nearly periodic solutions - periodic solutions: harmony balance - Equivalent linear equation by harmonic balance - Accuracy of a period

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, Gauss

Lectures : 3 Tutorials : 2 Practical : 0 Credits : 4
Lemma. The Eisenstein criterion, examples and applications. Gaussian primes. Algebraic integers. Integers in quadratic fields. Rings of polynomials, Factorization of polynomials 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, families of circles, integrals

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

Complex integration, rectifiable curves, Cauchy's theorem for rectangle and disc, Cauchy's integral formula, higher derivatives

Local properties of analytic functions, removable singularities, Taylor's 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

Harmonic functions, mean value property, Poisson's formula, Schwarz theorem, reflection principle, Weierstrass theorem.

References

1. L.V. Ahlfors- Complex Analysis, Third Edition McGraw 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.