11

References

1. L. C. Evans, Partial Differential Equations (Part I only), Graduate Studies in mathematics, Vol. 19, AMS, 1996.
2. F.John, Partial Differential Equations, , Springer Science and Business, 1982. 3. T.Amarnath, An Elementary Introduction to Partial Differential Equations, Alpha Science International, 2003.
4. P. Prasad and R. Ravindran, Partial Differential Equations, New Age International, 1985.
5. I.N.Sneddon,Elements of Partial Differential

Equations, Dover Publications, 2006. Advanced

Topology

Code:MSM5004

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

1. Fundamental groups and homotopy theory: homotopic mappings, contractible spaces, essential and inessential maps, homotopically equivalent spaces. Fundamental group of space, examples,homotopy groups pn(X) n 1. Munkres, Topology, Chapter-8; Hocking & Young: Topology, Chapter-4.

2. Simplicial Theory: Simplicial complexes, bary centric subdivision, simplicial maps, approximation theorem, fundamental group of a simplicial complex. Hocking & Young: Topology, Chapter-5.

3. Covering Space Theory: Covering Spaces, examples, properties of covering spaces, relation between fundamental group of covering space and its base and tower correspon dence, universal covering space construction: treatment as in - W. Massey: Introduction to Algebraic Topology.

4. Simplicial and Singular homology theory (a) Oriented complexes, chains, cycles and boundary operator Homology groups and bettinumbers and torsion coefficients zero di mensional homology, Euler Poincare formula, simplicial maps and induced homeomor phisms, chain complexes and chain maps and induced homeomorphisms. Cone complexes Hocking & Young: Topology, Chapter-6 (b) Singular homology theory, exact sequences, excision, Mayer-Vietoris sequence etc. treatment as in Greenberg: Lectures on Algebraic Topology (Benjamin) Hocking & Young: Topology, Chapter-7 (c) Cech Homology The ory Axiomatic homology theory of Eilenberg, Steenrod and its properties; Cech homology and properties Hocking & Young: Topology, Chapter-8.

Code:MSM5005

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

Representation of solutions by other methods: separation of variables; similarity of solu tions; transform methods (Fourier, Laplace); converting nonlinear PDE into ODE (Hopf Cole transform, potential functions, Legendre and Hodograph transforms); Asymptotics (singular perturbations, Laplaces method, geometric optics, stationary phase, homog enization); Power series (non characteristic surfaces, real analytic functions,Cauchy - Kovalevskaya theorem).

References

1. Maunders C.F., Algebraic Topology, Dover Publications, 1996.

Algebraic Geometry

Varieties: Affine and projective varieties, coordinate rings, morphisms and rational maps, local ring of a point, function fields, dimension of a variety. Curves:

Singular points and tangent lines, multiplicities and local rings, intersection multiplicities, Bezout's theorem for plane curves, Max Noether's theorem and some of its applications, group law on a nonsingular cubic, rational parametrization, branches and valuations.	12

Code:MSM5006

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

Code:MSM5007

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

1. S.S. Abhyankar, Algebraic Geometry for Scientists and Engineers, American Mathe-matical Society, 1990.
2. W. Fulton, Algebraic Curves, Benjamin, 1969.
3. J. Harris, Algebraic Geometry: A First Course, Springer-Verlag, 1992. 4. M. Reid, Undergraduate Algebraic Geometry, Cambridge University Press, Cam bridge, 1990.
5. I.R. Shafarevich, Basic Algebraic Geometry, Springer-Verlag, Berlin, 1974. 6. R.J. Walker, Algebraic Curves, Springer- Verlag, Berlin, 1950.

Analytic Number Theory

Arithmetic functions - Combinatorial study of phi(n),