

Semester - IV

Advanced Topic in Topology and Modern Analysis II

Course No. MM-CP-407
Duration of Examination: 3 hrs

Maximum Marks: 100
(a) External Exam: 80
(b) Internal Exam: 20

Unit I

Homotopy theory:- Fundamental group, simple connectedness and contractibility, covering spaces and elementary examples, applications to fundamental theorem of algebra, Fundamental groups of S^1 Van Kampen's theorem (special case).

Unit II

Borsuk-Ulam theorem, Retract and Deformation retract, simple connectedness' of S^n ($n \geq 2$), $\mathbb{R}^n - \{0\}$, $n > 2$, essential and inessential maps, Brouwer's fixed point theorem in the plane and its consequences.

Unit III

Banach Algebra:- Preliminaries on Banach Algebra's Invertible elements, the spectrum, spectral radius and the spectral radius formula, Gelfand- Mazur theorem, Gelfand mapping, maximal ideal space and its characterization, continuity of multiplicative functionals on a Banach algebra,

Unit IV

B^* -Algebra and the Gelfand Naimark Theorem, Ideals in $C(X)$ and application to Stone-Čech compactification and Banach Stone theorem, structure of commutative C^* -Algebras, spectral theorem for compact normal operators and its consequences.

Test Books

1. K.d. Joshi Introduction to General Topology.
2. G. Murdeshwar, Central Topology
3. I.M. James Uniform Spaces.
4. E. Hewitt & K.A Ross, Abstract harmonic Analysis-I
5. G.B Folland, Real Analysis
6. J.M. Munkres, Topology (a first course/ Second Course)
7. F.H. Croom, Basic concept of Algebraic Topology.
8. G.F. Simmons Introduction to
9. Topology and Modern Algebra.
10. J.B. Conway, A course in Functional Analysis (GTM_96, Springer Verlag).