



MAT 673 – Algebraic Topology

Course Code & Number	Course Name	Credit Hours	Lec.	Lab.	Tut.	Prerequisites
MAT 673	Algebraic Topology	4	3	0	1	MAT 671

Syllabus:

The Fundamental Group: Paths and Homotopy, Simply connected Spaces, The Fundamental Group $\pi_1(X)$ Quotient topology, Covering Spaces and Universal covering spaces, The Fundamental Group of the Circle, Retractions and Fixed Points, The Fundamental Theorem of Algebra, Borsuk-Ulam Theorem, Deformation retracts and Homotopy type, The induced homomorphism, The Fundamental Group of S^n , Fundamental groups of torus, double torus and Projective Plane. Higher Homotopy Groups $\pi_n(X)$, Homotopy Groups $\pi_n(X)$ of S^n .

Homology Groups: Geometric Complexes and Polyhedra; Orientation of Geometric Complexes; Chains, Cycles and boundaries; Simplicial Homology Groups $H_n(X)$; The Euler-Poincare Theorem; Homology Groups of S^n , Simplicial Approximation; induced homomorphisms, The Relation Between the group $H_n(X)$ and the group $\pi_n(X)$. Chain Derivation Lefschetz Fixed Point Theorem and general Brouwer Fixed Point Theorem; Relative Homology Groups; Singular Homology Theory; Axioms for Homology Theory.

References

1. F. Croom; *Basic Concepts of Algebraic Topology*; Springer Verlag, 1978. (Main Reference)
2. J. Munkres; *Topology*; 2nd Edition, Pearson, 2000.
3. A. Hatcher; *Algebraic Topology*; Cambridge University Press 2002.

