

Devi Ahilya University, Indore, India Institute of Engineering & Technology			MSc – I Year (Applied Mathematics) with Specialization in Computing & Informatics Semester- III				
Subject Code & Name	Instructions Hours per Week			Credits			
AM3PC1: Topology	L	T	P	L	T	P	Total
	3	1	-	3	1	-	4
Duration of Theory Paper: 3 Hours							

Objectives: To Study the properties of space, dimension, and transformation that are preserved under continuous deformations including stretching and bending, but not tearing or gluing. This includes properties such as connectedness, continuity, compactness and boundary.

Prerequisite(s): Basics of sets and functions.

COURSE OF CONTENTS

UNIT I

Countable and uncountable sets, Axiom of choice, Cardinal numbers, Schroeder-Bernstein theorem, Cantor's theorem, continuum hypothesis, Zorn's lemma, Well-ordering theorem. Definition and examples of Topological spaces, Bases and subbases, relative topology, Kuratowski closure operator, neighbourhood systems. Closed sets and limit points, Closure of a set, Dense subsets, Interior, exterior and boundary of a subset, derived sets, continuous functions and homomorphism.

UNIT II

Connected spaces, Connectedness on the real line, Components, Locally connected spaces, Connectedness and product spaces.

UNIT III

Compactness, Continuous functions and compact sets, Basic properties of compactness, Compactness and finite intersection property, Sequentially and Countably compact sets, Local compactness, Countable compactness and Sequential compactness in metric spaces.

UNIT IV

First and second countable spaces, Lindelof's theorem, separable spaces, second countability and separability, Separation axioms. T_0 , T_1 , T_2 , T_3 , T_4 , their characterization and basic properties, Urysohn's lemma, Tietze extension theorem.

UNIT V

Nets and Filters: Definition of Net, topology and convergence of Nets, Filters and their convergence, Ultra filters and compactness.

BOOKS RECOMMENDED:

- [1] George F. Simmons, Introduction to topology and modern analysis, McGraw Hill Book Company Inc., 2004.
- [2] K. D. Joshi, Introduction to topology, Wiley Eastern, 1983.
- [3] James R. Munkres, Topology, Prentice-Hall of India, 2nd Ed., 2000.