

SEMESTER – VI

MJC-11: Metric Space

Course Outcomes

After the completion of the course, the student will be able to:

- CO1: Understand the basic concepts of metric spaces;
CO2: Correlate these concepts to their counter parts in real analysis;
CO3: Understand the abstractness of the concepts such as open balls, closed balls, compactness, connectedness etc. beyond their geometrical imaginations.

MJC-11: Metric Space (5 credits) Full Marks-100		
Unit	Topics to be covered	No. of Lectures
1	Definition and examples of metric spaces, notion of Open and closed ball, Neighborhood of a point, Open set, Interior point, Interior of a set, Limit point of a set, Derived set, Closed set, Closure of a set, Diameter of a set, Dense set, Subspaces.	12
2	Sequences in metric spaces, Cauchy sequences, Complete metric space, Cantor's intersection theorem, Baire's category theorem, Contraction mapping, Banach fixed point theorem.	12
3	Continuous mappings, Sequential criterion and other characterizations of continuity, Uniform continuity, Homeomorphism.	10
4	Connectedness, Connected subsets of \mathbb{R} , Connectedness and continuous mappings.	08
5	Compactness, boundedness, Continuous functions on compact spaces.	08
	TOTAL	50

Book References:

1. Kumaresan, S. (2014). Topology of Metric Spaces (2nd ed.). Narosa Publishing House. New Delhi.
2. Simmons, G. F. (2004). Introduction to Topology and Modern Analysis. Tata McGraw Hill. New Delhi.
3. E.T. Copson, (1968) Metric Spaces, Cambridge University Press
4. S. Shirali and H.L. Vasudeva, Metric Spaces, Springer.
5. P. K. Jain and K. Ahmad, Metric Spaces, Narosa Publishing House.