Indraprastha College for Women
University of Delhi

Course Name:	B.Sc. (Hons.) Mathematics
Paper Title:	Metric Spaces
Unique Paper Code:	
Semester:	V
Faculty(s):	Mrs. Sarita Anand
Year:	2024

Work Plan

Period	Unit No.	Learning Objective	Topics to be Covered
1st Aug -3rd Aug	I	•The usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences. •The two important topological properties, namely connectedness, and compactness of metric spaces with their characterizations.	Definition and examples of metric spaces, Sequences in metric spaces.
5th Aug-10th Aug	I	•The usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences. •The two important topological properties, namely connectedness, and compactness of metric spaces with their characterizations.	Definition and examples of metric spaces, Sequences in metric spaces.
12th Aug-17th Aug	I	•The usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences. •The two important topological properties, namely connectedness, and compactness of metric spaces with their characterizations.	Definition and examples of metric spaces, Sequences in metric spaces.
19th Aug-24th Aug	I	•The usual idea of distance into an abstract form on any set of objects, maintaining its	Cauchy sequences, Complete metric space.

		inherent characteristics, and the resulting consequences. • The two important topological properties, namely connectedness, and compactness of metric spaces with their characterizations.	
26th Aug-31st Aug	I	• The usual idea of distance into an abstract form on any set of objects, maintaining its inherent characteristics, and the resulting consequences. • The two important topological properties, namely connectedness, and compactness of metric spaces with their characterizations.	Open and closed balls, Neighborhood, Open set, Interior of a set.
31st Aug			RETIREMENT

	TOPICS
I	**UNIT – I: Topology of Metric Spaces** Definition, examples, sequences and Cauchy sequences, Complete metric space; Open and closed balls, Neighborhood, Open set, Interior of a set, Limit point of a set, Derived set, Closed set, Closure of a set, Diameter of a set, Cantor's theorem, Subspaces.
II	**UNIT – II: Continuity and Uniform Continuity in Metric Space** Continuous mappings, Sequential criterion and other characterizations of continuity, Uniform continuity; Homeomorphism, Isometry and equivalent metrics, Contraction mapping, Banach fixed point theorem
III	**UNIT – III: Connectedness and Compactness** Connectedness, Connected subsets of $\mathbb{R}$, Connectedness and continuous mappings, Compactness and boundedness, Characterizations of compactness, Continuous functions on compact spaces

S. No.	**Name of Authors/Books/Publishers**
1.	Shirali, Satish & Vasudeva, H. L. (2009). Metric Spaces. Springer. Indian Reprint 2019
2.	Kumaresan, S. (2014). Topology of Metric Spaces (2nd ed.). Narosa Publishing House. New Delhi.
3.	Rudin, Walter. Principles of mathematical Analysis (3rd ed.).
4.	Simmons, George F. (2004). Introduction to Topology and Modern Analysis. McGraw-Hill Education. New Delhi.