

Lecture Plan		
Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa		
Name of Faculty: Rohit R. Redkar	Subject: Mathematics	
Paper code: MAT-302 Metric Spaces	Program: B.Sc.	Division: -
Academic year: 2025-26	Semester: V	Total Lectures: 60
Course Objectives: 1. To understand the introductory concepts of metric spaces. 2. To apply sequences and their properties in concepts like completeness, continuity and connectedness. 3. To analyse continuous functions and their properties. 4. To understand the abstractness of the topic ‘connectedness’ beyond their geometrical imaginations. 5. To acquire knowledge for advanced courses in real analysis, functional analysis, and topology.		
Expected Course Outcome: 1) Display familiarity and knowledge of the concepts in metric spaces. 2) Demonstrate proofs to establish truths related to the concepts in metric spaces. 3) Choose the appropriate procedures and modify them, if needed, to solve method-based problems on the concepts in metric spaces. 4) Analyze and solve unseen problems in Metric Spaces and invent mathematically precise arguments to justify their solutions.		
Student Learning Outcome: Student will be able to 1) Display familiarity and knowledge of the concepts in metric spaces. 2) Demonstrate proofs to establish truths related to the concepts in metric spaces. 3) Choose the appropriate procedures and modify them, if needed, to solve method-based problems on the concepts in metric spaces. 4) Analyze and solve unseen problems in Metric Spaces and invent mathematically precise arguments to justify their solutions.		

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	25/06/2025	28/06/2025	2	Inequalities (only statements), Definition and examples of metric Spaces		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
July	30/06/2025	05/07/2025	4	Examples of metric Spaces, Open and Closed Balls(spheres)		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	07/07/2025	12/07/2025	4	Hausdorff Property, Open Sets, Closed Sets		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	14/07/2025	19/07/2025	4	Closed Sets, Interior Points and Interior of a Set	Tutorial	Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	21/07/2025	26/07/2025	4	Limit Points and Isolated Points, Derived Set, Closure of a Set and its properties		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
July August	28/07/2025	02/08/2025	4	Boundary Points, Distance between Sets, Diameter of a Set		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad

August	04/08/2025	09/08/2025	4	Bounded and unbounded metric spaces, Subspace of Metric Space, Properties of Subspaces		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	11/08/2025	16/08/2025	4 IndependenceDay	Convergence of a Sequence in a Metric Space, Cauchy Sequence in a Metric Space		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	18/08/2025	23/08/2025	4	Complete Metric Spaces, Cantor's Intersection Theorem, Prerequisites on Function Images and Preimages		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	25/08/2025	30/08/2025	0 Chaturthi Break 26/08/25 To 01/09/25				
September	02/09/2025	06/09/2025	3	Definition and examples of Continuous Functions, Sequential Continuity, Continuity of Functions using Open Sets and Closed Sets		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	08/09/2025	13/09/2025	4	Continuity of Functions using Closure of a Set, Problems on Continuity using Characterizations	ISA, Tutorial	Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	15/09/2025	20/09/2025	4	Fixed point, Contraction mapping, Banach's fixed point theorem	Tutorial	Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad

	22/09/2025	27/09/2025	4	Separated Sets, Disconnected Sets		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
September October	29/09/2025	04/10/2025	4 Gandhi Jayanti / Dussehra	Connected Sets in a Metric Spaces and Properties	ISA	Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
October	06/10/2025	11/10/2025	4	Connected Subsets of R, Continuous Functions and connected sets		Hando uts in LaTe X	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	13/10/2025	18/10/2025	4	Revision		Hando uts in LaTe X	

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
Practical	Nil
Project	Nil
Semester End Exam	80