

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: 2026-27	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	22/06/2026	27/06/2026	4	Inequalities (only statements), Definition and examples of metric Spaces		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	29/06/2026	04/07/2026	4	Examples of metric Spaces, Open and Closed Balls(spheres)		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
July	06/07/2026	11/07/2026	4	Hausdorff Property, Open Sets, Closed Sets		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	13/07/2026	18/07/2026	4	Closed Sets, Interior Points and Interior of a Set		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	20/07/2026	25/07/2026	4	Limit Points and Isolated Points, Derived Set, Closure of a Set and its properties		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
Jul/Aug	27/07/2026	01/08/2026	4	Boundary Points, Distance between Sets, Diameter of a Set	Assignment for ISA I	Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
August	03/08/2026	08/08/2026	4	Bounded and unbounded metric spaces, Subspace of Metric Space, Properties of Subspaces		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	10/08/2026	15/08/2026 Independence Day	3	Convergence of a Sequence in a Metric Space, Cauchy Sequence in a Metric Space		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad

	17/08/2026	22/08/2026	4	Complete Metric Spaces, Cantor's Intersection Theorem, Prerequisites on Function Images and Preimages		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	24/08/2026	29/08/2026	4	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
August/Sep t	31/08/2026	05/09/2026	4	Continuity of Functions using Closure of a Set, Problems on Continuity using Characterizations	ISA 2 Test	Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
Sep	07/09/2026	12/09/2026	4	Fixed point, Contraction mapping, Banach's fixed point theorem		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	14/09/2026	19/09/2026	0	Ganesh Chaturthi Break (14–19 Sep)			
	21/09/2026	26/09/2026	4	Separated Sets, Disconnected Sets		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
Sep/Oct	28/09/2026	03/10/2026	4	Connected Sets in a Metric Spaces and Properties	ISA III	Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
Oct	05/10/2026	10/10/2026	4	Connected Subsets of $\mathbb{R}$, Continuous Functions and connected sets		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad
	12/10/2026	14/10/2026	2	Revision		Handouts in LaTeX	Metric Spaces, Pawan K. Jain, Khalil Ahmad

* Assessment Rubrics

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