Lecture Plan

Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa

Name of Faculty: Deepak G Bandiwadikar	**Subject:** Mathematics	
Paper code: MAT-200	**Program: S.Y.B.**Sc.	**Division: -**
Academic year: 2024-25	**Semester:** III	**Total Lectures: 60**

Course Objectives:
To develop the habit of critical thinking and solving problems involving the fundamental concepts on the Least Upper Bound (LUB) property, continuity and differentiability of functions of a single variable.

Expected Course Outcome:

The student will be able to,

1. Explain the algebra and properties of the set of real numbers.
2. Analyze various real sequences, their properties, and examine their convergence.
3. Prove and apply results in limits and continuity and disprove false
4. Prove and apply results in differentiability and disprove false statements

Student Learning Outcome:
The student will be able to,

1. **Learn the properties of real numbers.**
2. **Learn about the convergence of real sequence and properties.**
3. **Understand the concept of limit at a point.**
4. **Understand the concept of limit with continuity and differentiability of real functions.**

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
July	01/07/2024	06/07/2024	4	Real Number System: introduction Algebra of real number system;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	08/07/2024	13/07/2024	4	Upper and Lower bounds of subsets of R , Least Upper Bound Property and its Applications;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	15/07/2024	20/07/2024	4	Least Upper Bound Property and its Applications; Absolute value and their properties.		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	22/07/2024	27/07/2024	4	Real Sequences: Sequences and their convergence; Cauchy sequences		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
July August	29/07/2024	03/08/2024	4	Monotonic sequences;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real

				Sandwich Lemma; important limits; Subsequences.			Analysis, CRC Press, 2014.
August	05/08/2024	10/08/2024	4	Continuity: Continuous functions; Sequential criteria and e-δ definition of continuity; Intermediate value theorem;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	12/08/2024	17/08/2024	3	Extreme value theorem; Monotone function , Limits;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	19/08/2024	24/08/2024	4	Uniform continuity and results in uniform continuity.		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	26/08/2024	31/08/2024	4	Derivatives and its Applications: Derivative of a function at a point; Geometric interpretation of a derivative		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
September	02/09/2024	07/09/2024	3	Algebra of derivatives; Chain rule; Properties of the derivative;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	09/09/2024	14/09/2024	3	Rolle's theorem, Lagrange's Mean Value Theorem, Cauchy's Mean		Chalk Board	A. Kumar, and S. Kumaresan: A Basic

				Value theorem, and their geometric significance;			Course in Real Analysis, CRC Press, 2014.
	16/09/2024	21/09/2024	4	Darboux theorem for differentiable functions; Higher order derivatives Taylor's theorem;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	23/09/2024	28/09/2024	4	Maclaurin's theorem; Leibnitz rule for higher order derivative of product of functions;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
Septemb er October	30/09/2024	05/10/2024	4	Stationary points and their classification; Local maxima and Local minima;		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
October	07/10/2024	12/10/2024	4	Condition for a stationary point to be local maxima and minima		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	14/10/2024	19/10/2024	4	Indeterminate forms of the type on 0/0,0^0, $\infty - \infty$, ∞/∞, atc (Only statements and examples on the topics underlined and in italics).		Chalk Board	A. Kumar, and S. Kumaresan: A Basic Course in Real Analysis, CRC Press, 2014.
	21/10/2024	23/10/2024	4	Revision		Chalk Boatd	A. Kumar, and S. Kumaresan: A Basic Course in Real

							Analysis, CRC Press, 2014.

*** Assessment Rubrics**

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