Course Code:MATH321Course Title:Real AnalysisCredit Hours:(3 0 3)

Course Objectives:

The objectives of this course are:

- a) To understand and deal with the real number system.
- b) To be able to construct proofs regarding limit and continuity.
- c) To learn basic properties of functions on R.
- d) To learn the elementary theory of differentiation.

Reading list:

- 1. R. L. Brabenec, "Introduction to Real Analysis", PWS Publishing Co, USA 1997
- 2. E. D. Gaughan, "Introduction to Analysis", 5th edition, Brooks/Cole, 1997.
- 3. R. G. Bartle, D. R. Sherbert, "Introduction to Real Analysis", 4th edition, John Wiley & Sons Inc, 2011.
- 4. M. H. Protter, "Basic Elements of Real Analysis", Springer Verlag, New York, 1998
- 5. S. C Malik, S. Arora, "Mathematical Analysis", Wiley Eastern Ltd., 2009.

Lecture-wise distribution of the Contents

Lecture #	Торіс
L1	Introduction to the course
L2 – L4	Real number system and extended real number system. Axioms for a Field.
	Neighbourhoods, limit point, boundedness and related theorems
L5 – L7	The Bolzano–Weierstrass Theorem, Supremum and infimum, completeness properties of the real numbers
L8 – L9	Convergence of sequences, uniqueness of limit, Boundedness of convergent sequences
L10 - L13	Cauchy sequences, Cauchy's Convergence Criterion , Monotone sequences and related theorems
L14-L15	Limits of functions and their properties
L16 - L18	Cauchy's first theorem on limits, Cauchy's second theorem on limits
L19 – L21	Continuous functions and their properties, discontinuity, Continuous functions on Closed bounded intervals
L22	Uniform Continuity
L23	MID EXAM
L24-L25	Derivatives in one variable and related theorems
L26 – L28	The mean value theorems: Rolle's, Cauchy's and Lagrange's Mean Value
L29	The Taylor's Theorem

	Functions of asymptoticables, Limit and Continuity
L30 - L32	Functions of several variables, Limit and Continuity
L33 - L35	Differentiability and related theorems
L36-L37	Partial derivatives. Chain rule
1.38 - 1.40	Darboux upper and lower sums and integrals
1/1	Definition and existence of the Riemann integral
	Definition and existence of the ritemann integral
112-111	Theorems on Riemann integration
L42 - L44	Theorem's on Memanin integration
L45 - L46	Integration and differentiation Theorems
47 - 148	Riemann-Steilties integration
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