

### THIRD SEMESTER

#### Details of Course

Course Title	Course Structure			Pre-Requisite
MC 201 : Real Analysis	L	T	P	Nil
	3	1	0	

Course Objective: To impart knowledge of real numbers system, sequences, metric spaces, and Riemann integral.

#### Course Outcome (CO):

CO1	Describe the basic concepts of Real numbers system, sets and bounds.
CO2	Explain the convergence of real sequences.
CO3	Demonstrate the understanding of Metric spaces and its topology.
CO4	Explain continuity and uniform continuity in Metric spaces.
CO5	Identify the Riemann integrability of a given function.

S. No.	Contents	Contact hours
1.	Real number system $\mathbb{R}$ , Peano's Postulate/Axiom, countable and uncountable sets, concepts of bounds, least upper bound & greatest lower bound, order and completeness properties of $\mathbb{R}$ , Archimedean property of real numbers.	8
2.	Definition of real sequence, sub-sequence, bounded sequence, convergence of a sequence (Limit of a sequence), monotone sequences and their convergence, operations on convergent and divergent sequences, Bolzano-Weierstrass theorem for sequences, Cauchy sequence, Cauchy's general principle for convergence, Nested intervals.	9
3.	Definition and examples of Metric Spaces, limits of functions in a metric space, Pseudo metric space, Euclidean space, continuity of functions, open and closed spheres, open sets, closed sets, closure, inverse image of an open or a closed set, convergent sequences in metric space.	9
4.	Cluster points, Convergent sequences in metric space, Cauchy sequence in a metric space, Neighbourhood.	8
5.	Concept of set of measure zero, Riemann sums, Riemann integral, criterion for integrability, properties of Riemann integral, fundamental theorem of calculus.	8
Total		42