

## **FMCC 401 ANALYSIS II (3-1-0)**

### **MODULE I(14 HOUR)**

Derivative of a function, Relation between continuity and differentiability, Increasing and decreasing functions, Darboux theorem, Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's theorem with Cauchy's and Lagrange's form of remainders.

### **MODULE 2(12 HOUR)**

Definition, existence and properties of Riemann integral of a bounded function, Darboux theorem, Condition of integrability, Riemann integrability for continuous functions, bounded functions, monotonic function and functions with finite or infinite number of discontinuities (without proof). The integral as the limit of the sums, Properties of Riemann integral, Fundamental theorem of calculus, First Mean value theorems, Change of variables, Second mean value theorem, Generalized mean value Theorems.

### **MODULE 2(14 HOUR)**

Definition of improper integrals, Convergence of improper integrals, Test for convergence of improper integrals Comparison test, Cauchy's test for convergence, Absolute convergence, Abel's Test, Dirichlet's Test, Beta and Gamma functions and their properties and relations. Definition of pointwise and uniform convergence of sequences and series of functions, Cauchy's criterion for uniform convergence, Weierstrass M-test, Uniform convergence and continuity, Uniform convergence and differentiation, Uniform convergence and integration..

#### **Text Books:**

1• G Das and S Pattanaik: Fundamentals of Mathematical Analysis TataMcgraw-Hill Publishing Company Limited.

#### **Reference Books:**

1. S.C. Malik and Savita Arora: Mathematical Analysis, New Age International (P) Ltd. Publishers, 1996.
2. R. G. Bartle and D.R. Sherbert, Introduction to Real Analysis ( 4<sup>th</sup> Edition), Wiley
3. K. A. Ross, Elementary Analysis: The Theory of Calculus, Under graduate Texts in Mathematics, Springer ( SIE), Indian reprint, 2004.
4. Sudhir R Ghorpade and Balmohan V. Limaye, a course in Calculus and Real Analysis, Undergraduate Text in Math., Springer (SIE). Indian reprint, 2004.