Engineering Mathematics-I

IILM University Greater Noida 	**School:** School of Basic and Applied Sciences **Department:** **Course:** B.Tech. (EC, Mech., AI & Robotics)	**Year:** I **Semester:** I	**Subject Name:** Engineering Mathematics-I **Subject Code:** UBS 1006 M **L-T-P:** 3-1-0 **Prerequisite Subject Name/code:**

Course Outcome (At the end of the course, students will be able to understand)	Description
CO1	Understand the concepts of Rolle's, Lagrange's, and Leibnitz's theorems.
CO2	Identify the application of partial differentiation and apply it to evaluating maxima, minima, series, and Jacobians.
CO3	Illustrate the working methods of multiple integrals and apply them to find area, volume, the center of mass, and the center of gravity.
CO4	Illustrate the working methods of complex functions and apply them to finding analytic functions.
CO5	Remember the concept of sequence and series.

Detailed Syllabus (Theory)

Unit No.	Topics	CO No.	No. of proposed lectures
1.	**Differential Calculus-I:** Successive differentiation of standard forms, Taylor's Theorem for one variable, Rolle's and Lagrange's mean value theorems, Leibnitz's theorem.	1	8
2.	**Differential Calculus-II:** Partial derivatives, Total derivative, Euler's Theorem for homogeneous functions, Taylor and Maclaurin's theorems for a function of two variables, Maxima and Minima of functions of several variables, Lagrange Method of Multipliers, Jacobians.	2	8
3.	**Integral Calculus:** Multiple integration: Double integral, Triple integral, Change of order of integration, Change of variables, Application: Areas and volumes, Center of mass and center of gravity (Constant and variable densities)	3	8

4.	**Complex Analysis:** Limit, Continuity and differentiability, Functions of a complex variable, Analytic functions, Cauchy- Riemann equations (Cartesian and Polar form), Harmonic function, Method to find Analytic functions, Milne's Thomson method.	4	8
5	**Sequence & Series:** Definition of Sequence and series with examples, Convergence of sequence and series, Tests for convergence of series, (Ratio test, D' Alembert's test, Raabe's test and comparison test).	5	8

Text Books :

1. E. Kreyszig: Advanced Engineering Mathematics-Volume-I, John Wiley & Sons 2. B. V. Ramana
2. Higher Engineering Mathematics, Tata Mc Graw- Hill Publishing Company Ltd
3. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House.

Reference Books :

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers
2. Peter V. O'Neil, Advanced Engineering Mathematics, Thomas (Cengage) Learning
3. Thomas & Finley, Calculus, Nar osa Publishing House