Subject Code		Total Contact Hour	40 hrs
Semester	FIRST	Total Credit	3
Subject Name	**MATHEMATICS-I**		
Pre-requisites			

Course Objective	The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering and also other disciplines.	
Syllabus		**Contact Hour**
Module - I	**Basic Calculus:** Applications of definite integrals to evaluate length of curves, areas of surfaces and volumes of surfaces of revolution, Improper integral (Definition and Elementary Examples),Beta and Gamma functions and their properties.	**8 hrs**
Module - II	**Single-variable Calculus (Differentiation):** Rolle's Theorem, Mean value theorem (Statement and applications), First derivative test for local extreme values of functions. Power series, Taylor and Maclaurin series.	**8hrs**
Module - III	**Multivariable Calculus (Differentiation):** Partial derivatives. Jacobians, Hessian Matrix. Maxima, Minima and saddle points. Method of Lagrange multipliers.	**8 hrs**
Module - IV	**Linear Algebra:** Vector Space, Basis and dimension, Linear Systems of Equations, Gauss elimination, Linear Dependence and Independence, Rank of a Matrix.	**8 hrs**
Module - V	**Linear Algebra:** Inverse of a matrix (Gauss-Jordan). Symmetric, skew-symmetric and orthogonal matrices. Eigen values and eigenvectors. Caley-Hamilton Theorem (Statement only)	**8 hrs**

Essential Reading:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, 2002.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Supplementary Reading:

1. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

2. Gilbert Strang, Introduction to Linear Algebra, 5th Edition, 2016.

3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

Course Outcomes:

CO1: To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.

CO2: The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.

CO3: The tool of power series for learning advanced Engineering Mathematics.

CO4: To deal with functions of several variables that are essential in most branches of engineering.

CO5: Learn how to convert a real life problem into a matrix system and solve it