Subject Code	23BS1004	Total Contact Hour	40 hrs
Semester	SECOND	Total Credit	3
Subject Name	**MATHEMATICS-II**		
Pre-requisites			

Course Objective	The objective of this course is to familiarize the prospective engineers with techniques in ODE, PDE and Fourier analysis. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.	
Syllabus		**Contact Hour**
Module-I	**First order ODE :** Exact ODEs. Integrating factors. Linear first order ODEs. Nonlinear first order ODE and Bernoulli's equations, Applications to Population growth, Newton's law of cooling, RL circuit.	**8 hrs**
Module-II	**Second order ODE :** Second order linear differential equations with constant coefficients, Euler-Cauchy equations, method of undetermined coefficients, solution by variation of parameters. Power series solutions of ODE. Legendre's equations (explicit solution only).	**8hrs**
Module- III	**Vector Calculus :** Vector and Scalar Functions and Fields, Derivatives, Gradient of a Scalar Field, Directional Derivative, Divergence of a Vector Field, Curl of a Vector Field, Line Integrals, Path Independence of Line Integrals, Double Integrals, Green's Theorem in the Plane (Statement and applications)	**8 hrs**
Module- IV	**Complex Analysis :** Limit, Continuity, Derivative, Analytic Function, Cauchy-Riemann Equations, Laplace's Equation, Exponential Function, Trigonometric and logarithm functions.	**8 hrs**
Module- V	**Complex Analysis :** Line Integral in the Complex Plane, Cauchy's Integral Theorem, Cauchy's Integral Formula, Derivatives of Analytic Functions, Laurent series, Residue theorem with simple problems.	**8 hrs**

Essential Reading:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2006.

Supplementary Reading:

1. E.M. Stein, Fourier Analysis: An Introduction (Princeton Lectures in Analysis)

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

3. S. L. Ross, Differential Equations, 3rd Edition, Wiley India, 1984.

4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

Course Outcomes:

CO1: The effective mathematical tools for the solutions of differential equations that model physical processes.

CO2: Apply differential equation in real life engineering problems.

CO3: Application of modeling in differential equation.

CO4: To know about complex functions.

CO5: To familiar with application of complex integration.