Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Electronics and Instrumentation Engg.) (Full Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
AER3C1	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
APPLIED MATHEMATICS-III	**3**	**1**	**0**	**3**	**1**	**0**	**4**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

1. To develop an understanding of the underlying mathematics as a preparation for a specialist study of applications areas like electromagnetic and electrostatic field theory, control theory, communication and signal processing, power transmission, design of discrete-(time) systems, circuit analysis etc.
2. Numerical approach enables solution of a complex problem with a great number of very simple operations. It is useful to find the solution with use of computers making calculation easy and fast.

Prerequisites:

Basic knowledge of algebra of complex numbers, determinants, matrices, differentiation and integration of functions and probability theory.

COURSE CONTENTS

Unit-I

Function of Complex variables: Analytic functions, Cauchy's integral theorem and integral formulae, Taylor's and Laurent' series, Residue theorem, Solution of integrals.

Unit-II

Random variables, density function, stochastic process, autocorrelation, Markov chain, Multi-step in Markov chain. Basic concepts of reliability, failure laws, components in series and in parallel, Redundancy.

Unit-III

Interpolation: Finite difference operators, Newton's and Stirling's interpolation, Numerical differentiation, Numerical integration using Trapezoidal, Simpson's 1/3rd, Simpson's 3/8th and Weddle's rule.

Unit-IV

Numerical solutions of algebraic and transcendental equations-Bisection method, Regula-Falsi method, Newton-Raphson method. Solution of system of linear algebraic equation-Iterative methods: Gauss-Seidel and Gauss-Jacobi's iterative methods.

Numerical Solutions of differential equations - single and multi-step methods.

Unit-V

Fourier series, sine and cosine series, change of intervals, continuous-time and discrete-time Fourier series, Fourier Integral.

Learning Outcomes:
Upon completing the course, students will be able to:

1. Apply the concept of complex analysis, Fourier analysis and stochastic process in various subjects of engineering like electromagnetic and electrostatic field theory, control theory, signal processing, power transmission and so on.
2. Learn that many problems were analytical methods seems to fail, like solving highly nonlinear equation, numerical methods works very well.

BOOKS RECOMMENDED:

[1]. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 42/e, 2015.
[2]. Erwin. Kreyszig, Advanced Engineering Mathematics, 8th edition, John Willy and sons Publications, 1999.
[3]. Gupta P.P. & Malik G.S., Calculus of Finite Differences and Numerical Analysis, Krishna Prakashan Mandir, Meerut, 21/e, 2006.
[4]. Kasana H.S., Complex Variables: Theory and Applications, Prentice-Hall of India Pvt. Ltd, 2nd edition, 2005.
[5]. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw - Hill Education, 2002.
[6]. K. S. Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications, John Wiley & Sons, 2006.
[7]. G. Paria, Statistics and Stochastic Processes Part II, Scholar's Publication, Indore.
[8]. A.R. Vasishtha and R.K. Gupta, Integral Transforms, Krishna Prakashan Media Ltd, Meerut, India, 2000.
[9]. Murray R. Spiegel, Schaum's Outline of Fourier Analysis, McGraw-Hill, New York, 2004.
