Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Electronics and Telecommunication Engg.)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
ATR3C1	**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:

- 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 times ystems, circuit analysis etc.
- 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 $1/3^{rd}$, Simpson's $3/8^{th}$ 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:

- 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, and power transmission.
- Learn that many problems were analytical methods seems to fail like solving highly nonlinear equation.

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.
