Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Computer Engineering) (Full Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
ACR3C1 APPLIED MATHEMATICS – III	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	**1**	**0**	**3**	**1**	**0**	**4**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- 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.
- The optimization techniques make the students aware of the various techniques, which provides an analytical and objective basis for decisions.

Prerequisites: Matrix, probability theory, elementary statistics.

UNIT-I

Numerical solutions of algebraic and transcendental equations: Bisection method, Regula-falsi method, Newton-Raphson method.

Solution of system of linear algebraic equation: Gauss-Seidel, Gauss Jacobi's and relaxation methods.

Numerical solution of first order ordinary differential equations by Euler's and Runge's methods.

UNIT-II

Interpolation: Finite difference operators, Newton's and central difference interpolation formulae, divided differences, Lagrange's interpolation.

Numerical differentiation using newton's formulae, maxima and minima.

Numerical integration- general quadrature formula, trapezoidal rule, Simpson's 1/3 and 3/8 rules, Weddle's rule.

UNIT-III

Correlation and regression analysis – linear correlation and regression, regression plane, multiple and partial correlation.

Random variables-discrete and continuous random variables, probability and density functions, cumulative distribution function, mathematical expectation, normal distribution.

UNIT-IV

Testing of hypothesis- parameter and statistics, sampling distribution of a statistic, standard error, null and alternative hypothesis, test of significance of large samples and small samples, test of goodness of fit and independence of attributes.

UNIT-V

Random (stochastic) processes and their classifications, special random process –Markov process, Markov chain, classification of Markov chains-regular, homogeneous, irreducible (ergodic) and reducible Markov chains, classification of states-period and aperiodic, persistent (recurrent) and transient, absorbing states, steady state distribution.

Learning Outcomes:

Upon completing the course, students will be able to:

- Learn that many problems were analytical methods seems to fail, like solving highly nonlinear equation, numerical methods work very well.
- Use the optimization techniques to provide a mathematical model to represent complex functional relationships.

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. T Veerarajan, Probability, statistics and random processes, 2nd edition, Tata McGraw-Hill, New Delhi, 2005.