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(Civil Engineering)

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EFFECTIVE FROM ACADEMIC YEAR JUNE 2016

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Engineering Mathematics - III

Second Year Engineering (Semester – III)

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SYLLABUS

Unit - I : Linear Differential Equations (LDE) and Applications (09 Hrs.)

LDE of nth order with constant coefficients, Method of variation of parameters, Cauchy's & Legendre's Differential Equations, Simultaneous & Symmetric simultaneous Differential Equations. Modeling of problems on bending of beams, whirling of shafts and mass spring systems.

Unit - II : Numerical Methods (09 Hrs.)

Numerical solutions of (i) System of linear equations by Gauss elimination method, Cholesky and Gauss-Seidel methods (ii) Ordinary differential equations by Euler's, Modified Euler's, Runge-Kutta 4th order and Predictor-Corrector methods.

Unit – III : Statistics and Probability (09 Hrs.)

Measures of central tendency, Standard deviation, Coefficient of variation, Moments, Skewness and Kurtosis, Correlation and Regression, Reliability of Regression estimates. Probability, Probability density function, Probability distributions: Binomial, Poisson, Normal and Hypergometric, Test of hypothesis: Chi-square test.

Unit – IV : Vector Differential Calculus (09 Hrs.)

Physical interpretation of Vector differentiation, Vector differential operator, Gradient, Divergence and Curl. Directional derivative, Solenoidal, Irrotational and Conservative fields, Scalar potential, Vector identities.

Unit - V : Vector Integral Calculus and Applications (09 Hrs.)

Line, Surface and Volume integrals, Work-done, Green's Lemma, Gauss's Divergence theorem, Stoke's theorem. Applications to problems in Fluid Mechanics, Continuity equations, Streamlines, Equations of motion, Bernoulli's equation.

Unit - VI : Applications of Partial Differential Equations (PDE) (09 Hrs.)

Basic concepts, modeling of Vibrating String, Wave equation, one and two dimensional Heat flow equations, method of separation of variables, use of Fourier series. Applications of PDE to problems of Civil and allied Engineering.

Recommended by SPPU Text Books and Reference Books

Text Books :

1. Advanced Engineering Mathematics, Ninth edition, by Erwin Kreyszig (Wiley India).
2. Advanced Engineering Mathematics, seventh edition, by Peter V. O'Neil (Cengage Learning).