

## **M.Tech. CSE & IT**

### **PGCSE101: Advanced Engineering Mathematics**

#### **Compulsory:**

#### **Module I: Numerical Analysis:**

Use of Interpolation formulae of Stirling, Bessel's, Spline.

Solutions of system of linear simultaneous equations using SOR algorithm, Newton's method [upto two variables] (8L)

[Outcome: Ability to analyze and solve both linear & non-linear engineering problems whose solutions are not found in the closed form]

#### **Module II: Stochastic process:**

[Prerequisite: Basic Under graduate course in probability]

Random processes, Random walk, Markov process with special emphasis on Markov chain (8 L)

[Outcome: Ability to analyze and solve stochastic engineering & industrial problems]

#### **Module III: Linear algebra:**

[Pre-requisite: Basic Under graduate course in abstract algebra]

Vector spaces, Linear transformations, Eigenvalues, Eigenvectors, some applications of Eigen value & Eigen vector problems. (8L)

[Outcome: Ability to analyze the solution & examine its stability in operator theory]

#### **Module IV: Optimization Technique:**

Calculus of several variables, Implicit function theorem, Nature of singular points, Necessary and sufficient conditions for optimization, Constrained Optimization, Lagrange multipliers, Gradient method – steepest descent method. (8L)

[Outcome: Ability to optimize & solve real life problems]

#### **Module – V: Fourier series and Transform:**

Fourier series, integrals and transforms and their properties. One dimensional Fourier transform, Convolution theorem, Parseval's formula, Introduction to 2-dimensional Fourier transform. (8L)

[Outcome: Ability to solve image processing & signal processing problems]

References books:

Text:

1. Kreyzig, 'Advanced Engineering Mathematics'

References:

1. Sen, M. K. and Malik, D. F.-Fundamental of Abstract Algebra, Mc. Graw Hill
2. Khanna, V. K. and Bhambri, S. K.- Course of Abstract Algebra, Vikash Pub.
3. Scarborough, J. B.-Numerical Mathematical Analysis, Oxford University Press
4. Rao, S. S.-Optimization Theory and Application, Wiley Eastern Ltd., New Delhi
5. I. N. Herstein, "Topics in Algebra", Vani Educational Books, India 1986
6. S. S. Shastri, Numerical Methods
7. I.N. Sneddon, Fourier Transform
8. J. Medhi, Stochastic Processes