

## **M. Tech – ECE**

### **(Communication Related Group & VLSI, Microelectronics & Embedded Systems Group)**

**Advanced Engineering Mathematics; Code: MCE 101 & MVLSI101; Contacts: 3-1-0; Cr: 4**

#### **Module – I: Probability and Statistics:**

[Pre-requisite: Review of Basic Probability Theory]

Sampling distributions, Estimation of parameters (point estimation – unbiasedness & minimum variance, basics of interval estimation – confidence interval for mean), Testing of hypotheses (one and two sample tests for mean), Linear regression, Introduction to non-linear regression. [8L]

[Outcome: Ability to analyze and solve problems related to digital communication.]

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

[Prerequisite: Basic Under graduate course in probability]

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

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

#### **Module – III: Numerical Analysis:**

Introduction to Interpolation formulae [Bessel's & Sterling's], Roots of transcendental equations

[Bisection, Regula-Falsi & Newton-Raphson] Solutions of simultaneous non-linear equations

[Newton's method], Numerical solution of Ordinary Differential equation [Modified Euler's method, fourth order Runge-Kutta method], Matrix Eigen value and Eigen vector problems. [12L]

#### **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: Wavelet Transform:**

[Pre-requisite: Undergraduate Transformation theory]

Resolution problems, Multi-resolution analysis, Continuous & discrete wavelet transform [4L]

[Outcome: Ability to apply in simple real life problems]

References books:

Text:

1. Kreyzig, 'Advanced Engineering Mathematics'

References:

1. Scarborough, J. B.- Numerical Mathematical Analysis, Oxford University Press
2. Cone, S. D.- Elementary Numerical Analysis, Mc. GrawHill.
3. Mukhopadhyay, P.-Mathematical Statistics ,New Central Book Agency
4. Kapoor, V. K and Gupta, S.C.-Fundamental of Mathematical Statistics, Sultan Chand and Sons.
5. Rao, S. S.-Optimization Theory and Application, Wiley Eastern Ltd., New Delhi
6. S. S. Shastri, Numerical Methods
7. J. Medhi, Stochastic Processes
8. Jain & Iyenger, Numerical Analysis
9. Bopardikar & Rao, Wavelet Transform, Wiley