EN010501 B Engineering Mathematics IV

(CS, IT)

Teaching scheme **Credits 4**

2 hours lecture and 2 hour tutorial per week

Objectives: *To use basic numerical techniques for solving problems and to know the importance learning theories in mathmatics and in queueing system*

MODULE 1 Finite differences (12 hours)

Finite difference operators Δ, ∇, E, μ δ - interpolation using Newtons forward and backward formula – Newton's divided difference formula - Numerical differentiation using Newtons forward and backward formula – Numerical integration – Trapezoidal rule – Simpsons $1/3^{rd}$ and $3/8^{th}$ rule

MODULE 2 Z transforms (12 hours)

Definition of Z transforms – transform of polynomial function and trignometric functions – shifting property , convolution property - inverse transformation – solution of 1^{st} and 2^{nd} order difference equations with constant coifficients using Z transforms.

MODULE 3 Discrete numeric functions (12 hours)

Discrete numeric functions – Manipulations of numeric functions- generating functions – Recurrence relations – Linear recurrence relations with constant coefficients – Homogeneous solutions – Particular solutions – Total solution – solution by the method of generating functions.

MODULE 4 Complex integration (12 hours)

Functions of complex variable – analytic function - Line integral – Cauchy's integral theorem – Cauchy's integral formula – Taylor's series- Laurent's series – Zeros and singularities – types of singularities – Residues – Residue theorem – evaluation of real integrals in unit circle – contour integral in semi circle when poles lie on imaginary axis.

MODULE 5 Queueing Theory (12 hours)

General concepts – Arrival pattern – service pattern – Queue disciplines – The Markovian model M/M/1/∞ , M/M/1/N – steady state solutions – Little's formula.

References

1. C.L.Liu and D.P. Mohapatra – Elements of Discrete Mathematics - Mc Graw Hill
2. S.Lipschutz, M.L.Lipson – Discrete mathematics –Schaum's outlines – Mc Graw Hill
3. B.V. Ramana - Higher Engg. Mathematics – McGraw Hill
4. Babu Ram – Engg. Mathematics -Pearson.
5. K Venkataraman- Numerical methods in science and Engg -National publishing co

6. V. Sundarapandian - probability ,Statistics and Queueing theory - PHI
7. S.Bathul – text book of Engg.Mathematics – Special functions and complex variables –PHI
8. H. Weif HSU – probability, random variables & Random processes – Schaum's out lines - Mc Graw Hill
9. T.Veerarajan - probability ,Statistics & Random processes - Mc Graw Hill
10. H.C.Taneja – Advanced Engg. Mathematics Vol II – I.K.International