Chapter- 1 Mathematical Modeling [2Hrs]

- Introduction
- Classification of Mathematical Models
- Errors, Accuracy and Precision

Chapter - 2 Roots of Equations [4Hrs]

- Introduction
- Root finding methods: A Brief Summary
    - Bisection Method
    - False Position Method
    - Fixed Point Iteration Method
    - Newton – Raphson Method
    - Secant Method

Chapter - 3 Linear Algebraic Equations [4Hrs]

- Introduction
- Gaussian Elimination
- LU decomposition
- Gauss – Seidel

Chapter - 4 Non - Linear Systems of Equations [4Hrs]

- Iterative Methods: Gauss – Seidel/Jacobi Method, Newton – Raphson Method

Chapter - 5 Curve Fitting [10Hrs]

- Introduction
- Least – Squares Regression

Chapter - 6 Numerical Differentiation and Integration [8Hrs]

- Interpolation
- Introduction
- Lower Order Differentiation Methods
- High – Accuracy Differentiation Methods
- Newton – Cotes Integration Formulas

Chapter - 7 Numerical Solution of ODEs [4Hrs]

- Introduction
- Euler Method
- Runge – Kutta Methods

<u>Evaluation**</u>

Test – 1: 20 %

Test – 2: 20%

Assignments: 10%

Final Exam: 50%

** Instructors reserve the collective right to change the quota of evaluations in the total grade as they see fit.

<u>References</u>

*** Chapra C.S. an Canale P.R. Numerical Methods for Engineers with Programming and Software Application, 7th ed.,

- ✓ J.D. Hoffman, Numerical Methods for Engineers and Scientists
- ✓ Jaan Kiusalaas, Numerical Methods in Engineering with MATLAB