Free Electives - II

FESM6301 NUMERICAL METHODS (3-0-0)

Unit –I (10 hors)
Approximation of numbers, Significant figures, Accuracy and precision, Error definition, Round off errors, Error propagation, Total numerical error
Roots of equation: Bisection ethos, False-position method, Fixed point iteration, Newton-Raphson method, Secant method, Convergence and error analysis, System of non-linear equations
Linear algebraic equation: LU decomposition, The matrix inversion, Error analysis and system conditions, Gauss-Siedel method

Unit-II (10 hours)
Interpolation: Newton's divided difference interpolating polynomial, Lagrange interpolating polynomial, Spline interpolation.
Numerical integration: The Trapezoidal rule, Simpson's rule, Newton-Cotes algorithm for equations, Romberg integration, Gauss quadrature

Unit-III(10 Hours)
Ordinary differential equation: Euler method, Improvement of Euler's method, Runge-Kutta methods, System of equations, Multi step methods,
General methods for boundary value problems, Eigen value problems

(Algorithm and error analysis of all methods are included)

Text Book:
1. S.C. Chapra, R.P.Canale," *Numerical methods for Engineers*", Fifth edition, THM Publication.

Reference Books
1. S. Kalavathy, " *Numerica methods*", Thomson/ Cengage India
2. K.E. Atkinson," *Numerical analysis,*" Second edition, John Wiley & Sons.