MA6452 STATISTICS AND NUMERICAL METHODS

DETAILED SYLLABUS

OBJECTIVES:

This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.

UNIT I TESTING OF HYPOTHESIS

Large sample test based on Normal distribution for single mean and difference of means – Tests based on t, and F distributions for testing means and variances – Contingency table (Test for Independency) – Goodness of fit.

UNIT II DESIGN OF EXPERIMENTS

One way and two-way classifications - Completely randomized design – Randomized block design – Latin square design –2^2 factorial design.

UNIT III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS

Newton Raphson method – Gauss elimination method – pivoting – Gauss Jordan methods – Iterative methods of Gauss Jacobi and Gauss Seidel – Matrix inversion by Gauss Jordan method – Eigen values of a matrix by power method.

UNIT IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivates using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS

Taylor's series method – Euler's method – Modified Euler's method – Fourth order Runge-Kutta method for solving first order equations – Milne's predictor corrector methods for solving first order equations – Finite difference methods for solving second order equations.

TEXT BOOKS:

1. Johnson. R.A., and Gupta. C.B., "Miller and Freund's Probability and Statistics for Engineers", 11th Edition, Pearson Education, Asia, 2011.

2. Grewal. B.S., and Grewal. J.S., "Numerical Methods in Engineering and Science", 9th Edition, Khanna Publishers, New Delhi, 2007.

REFERENCES:

1. Walpole. R.E., Myers. R.H., Myers. S.L., and Ye. K., "Probability and Statistics for Engineers and Scientists", 8th Edition, Pearson Education, Asia, 2007.

2. Spiegel. M.R., Schiller. J., and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics", Tata McGraw Hill Edition, 2004.

3. Chapra. S.C., and Canale. R.P, "Numerical Methods for Engineers", 5th Edition, Tata McGraw Hill, New Delhi, 2007.

4. Gerald. C.F., and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 2006.