ELECTIVE – V (ANY ONE)
FMCE –907 NUMERICAL OPTIMIZATION (3-1-0)

Module-I (14 Hours)

Numerical Optimization: Introduction to Numerical Optimization , Single variable optimization , Convex and Concave functions, Maxima and Minima Multivariate optimization without constraints, Multivariate optimization with equality constraints and in-equality constraints , Lagrange multiplier, Kuhn-Tucker condition and Quadratic programming with application by Hessian matrix , Numerical application of Dynamic Programming. Applications of Fibonacci and Golden Section Search method.

.**Module -II (14 Hours)**

Unconstraint optimization Techniques; Interpolation, Quadratic Interpolation method Classification of Unconstraint minimization method ,Random Search method Grid Search method, Univarate method, Pattern Search method, Powell's Conjugate Direction Method , Hook Jeeves Method , Rosen Brock's method, Cauchy method , Fletcher-Reaves Method , Marquardt Method, Quasi - Newton Method , Davidon Fletcher method , Broyden –Fletcher method , Gold-- Farb Shanno Method

Module -III (12 Hours)

Constrained optimization Technique ;Heuristic Search method , Objective and constraint approximation methods, Sequential Linear programming Method , Sequential Quadratic programming Method ,Methods of feasible directions , Zoutendijk's method ,Rosen gradient projection Method , Generalized reduced gradient Method, Transformation of variable Techniques , Sequential unconstrained minimization Techniques , Penalty function method ,Interior Penalty function method, Exterior Penalty function method, Augmented Lagrange multiplier method

Text books

1. A. Ravindran, D. T. Philips, J. Solberg, *" Operations Research- Principle and Practice"*, Second edition, Wiley India Pvt Ltd

2. Kalyanmoy Deb, "Optimization *for Engineering Design*", PHI Learning Pvt Ltd

Reference books:

1. Stephen G. Nash, A. Safer, *"Linear and Non-linear Programming"*, McGraw Hill

2. A.Ravindran, K.M.Ragsdell, G.V.Reklaitis," *Engineering Optimization*", Second edition, Wiley India Pvt. Ltd

3. H.A.Taha, A.M.Natarajan, P.Balasubramanie, A.Tamilarasi, "*Operations Research*", Eighth Edition, Pearson Education

4. F.S.Hiller, G.J.Lieberman, *"Operations Research"*, Eighth Edition, Tata MacDraw Hill

5. P.K.Gupta, D.S.Hira, "*Operations Research*", S.Chand and Company Ltd.

6. Kanti Swarup, P. K. Gupta, Man Mohan, "*Operations Research*", Sultan Chand and Sons.