

PRODUCTION ENGINEERING

5th semester

HSSM3302 OPTIMIZATION ENGINEERING (3-0-0)

Module-I

(10 Hours)

Idea of Engineering optimization problems, Classification of optimization algorithms, Modeling of problems and principle of modeling. Linear programming: Formulation of LPP, Graphical solution, Simplex method, Big-M method, Revised simplex method, Duality theory and its application, Dual simplex method, Sensitivity analysis in linear programming

Module-II

(10

Hours) Transportation problems: Finding an initial basic feasible solution by Northwest Corner rule, Least Cost rule, Vogel's approximation method, Degeneracy, Optimality test, MODI method, Stepping stone method Assignment problems: Hungarian method for solution of Assignment problems Integer Programming: Branch and Bound algorithm for solution of integer Programming Problems Queuing models: General characteristics, Markovian queuing model, M/M/1 model, Limited queue capacity, Multiple server, Finite sources, Queue discipline.

Module-III

(10 Hours)

Non-linear programming: Introduction to non-linear programming. Unconstrained optimization: Fibonacci and Golden Section Search method. Constrained optimization with equality constraint: Lagrange multiplier, Projected gradient method Constrained optimization with inequality constraint: Kuhn-Tucker condition, Quadratic programming Introduction to Genetic Algorithm.

Recommended 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
- Recommended Reference

Books:

1. Stephen G. Nash, A. Sofer, " 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 McDraw Hill 5. P.K. Gupta, D.S. Hira, "Operations Research", S.Chand and Company Ltd.