

**PET5H005 OPTIMIZATION IN ENGINEERING****MODULE-I**

1. Idea of Engineering optimization problems, Classification of optimization algorithms, modeling of problems and principle of modeling.
2. **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**

3. **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
4. **Assignment problems:** Hungarian method for solution of Assignment problems  
**Integer Programming:** Branch and Bound algorithm for solution of integer Programming Problems

**MODULE-III**

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

**MODULE-IV**

8. **Queuing models:** General characteristics, Markovian queuing model, M/M/1 model, Limited queue capacity, multiple server, Finite sources, Queue discipline.

**Additional Module (Terminal Examination-Internal)**

9. Introduction to Genetic Algorithm.

**Text Books**

1. Operations Research- Principle and Practice, A. Ravindran, D. T. Philips, J. Solberg, Second edition, Wiley India Pvt Ltd.
2. Operation Research, Prabhakar Pai, Oxford University Press
3. Optimization for Engineering Design, Kalyanmoy Deb, PHI Learning Pvt Ltd.
4. Operations Research, H.A.Taha, A.M.Natarajan, P.Balasubramanie, A.Tamilarasi, Pearson Education, Eighth Edition.
5. Engineering Optimization, S S Rao, New Age International(P) Ltd, 2003.

**Reference Books**

1. Linear and Non-linear Optimization, Stephen G. Nash, A. Sofer, McGraw Hill, 2<sup>nd</sup> Edition.
2. Engineering Optimization, A.Ravindran, K.M.Ragsdell, G.V.Reklaitis, Wiley India Pvt. Ltd, Second edition.
3. Operations Research, F.S.Hiller, G.J.Lieberman, Tata McGraw Hill, Eighth Edition, 2005.
4. Operations Research, P.K.Gupta, D.S.Hira, S.Chand and Company Ltd, 2014.