8CE176 System Engineering

L-T-P-Cr: 3-0-3

Objective: At the end of the module the reader will be able to 1. Understand the need and origin of the optimization methods.

2. Get a broader picture of the various applications of optimization methods used in engineering.

3. Define and optimization problem and its various components.

4. Formulate optimization problems as mathematical problems.

5. Classify optimization problems to suitably choose the method needed to solve the particular type of problem. 6. Briefly learn about classical and advanced techniques in optimizations.

Theory: 1. Introduction to the course and its importance towards Civil Engineering Optimization

methods: - Introduction, mathematical principles in optimization. Modelling with linear programming, Problem formulation, Transportation and assignment problem, manpower planning problems, etc. 10 Lectures

2. Solution techniques for LPP: graphical approach to problem solving, transition from graphical to algebraic solution, simplex and dual simplex method, primal dual, generalized simplex method, Introduction to civil engineering case studies. 12 Lectures

3. Classical optimization Techniques: Introduction single variable optimization, multi, variable optimization with no constraints, multivariable optimization with equality and inequality constraints. Direct method of constrained optimization. 12 Lectures

4. Introduction to nonlinear programming algorithms, Lagrange Multipliers, Kuhn Tucker Conditions. 8 Lectures

Text Books: 1. S.S .Rao , Optimization Theory And Application 2. H. A. Taha , Operations Research An Introduction