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*Objective: The paper is the sub-field of Optimization dealing with problems that occur frequently in mathematics/economics and finance. The paper also gives to the students an overview of the class of problems with multiple goals.*

Non-Linear Programming: Convex function and its properties, basics of NLP, Method of Lagrange multiplier, Karush-Kuhn-Tucker optimality conditions, Quadratic Programming: Basic Concepts, Wolfe's method, Beale's method

Dynamic Programming: Multistage decision processes, Recursive nature of computations, Forward and Backward recursion, Bellman's principle of optimality, Selective dynamic programming applications involving additive and multiplicative separable returns for objective as well as constraint functions, Problem of dimensionality.

Goal Programming: Basics of Goal programming, Weighted and pre-emptive goal programming, Formulation of Goal programming problem and graphical solution.

### Text Book Readings:

1. **Hamdy A. Taha:** Operations Research-An Introduction, Prentice Hall, 8th Edition, 2008
2. **S. Chandra, Jayadeva, Aparna Mehra:** Numerical Optimization with Application, Narosa Publishing House, 2009
3. **Ravindran, D. T. Phillips and James J. Solberg:** Operations Research- Principles and Practice, Wiley India Edition, 2009
4. **S.M. Sinha :** Mathematical Programming-Theory and Methods, Elsevier Science, 1st Edition, 2006
5. **F.S. Hillier and G.J. Lieberman :** Introduction to Operations Research- Concepts and Cases, 9th Edition, Tata Mc Graw Hill, 2010