MT203 Applied Operations Research

Prerequisites: CS101, Standard XII Mathematics or equivalent.

Course Contents:

Decision making in Operations Research **(5%)**

Linear Programming (LP): LP formulations, LP model and resource allocation **(10%)**

LP: Algebraic solutions, standard LP model, simplex method, special cases in simplex method **(10%)**

LP: duality and sensitivity analysis: Definition of dual, primal-dual relationships, economic interpretation of duality, dual simplex method, sensitivity analysis **(10%)**

Transportation Model: solution of the transportation model, assignment model **(10%)**

Networks: network minimization, shortest route problem, maximal flow problem, LP representation of networks **(10%)**

Revised simplex method for LPP, bounded variables, decomposition algorithm **(10%)**

Integer programming: cutting plane algorithm, branch and bound method. **(10%)**

Dynamic programming: Problem of dimensionality, solution of linear programs by dynamic programming **(10%)**

Project scheduling by PERT-CPM: critical path calculations, construction of time chart and resource leveling, probability and cost considerations, project control **(10%)**

Non-Linear programming algorithms **(5%)**

Main Reading

1. Hamdy A.Taha, Operations Research:An Introduction, Pearson Education
2. Pradeep Prabhakar Pai, Operations Research:Principles and practice, OXFORD University Press
3. Frederick S.Hillier and Mark S.Hillier, Introduction to management science: A modeling and case studies approach with spreadsheets,Tata McGraw-Hill.
4. Frederick S Hillier, and Gerald J. Lieberman, Introduction to Operations Research, McGraw Hill.

MT204 Linear Algebra and Applications

Prerequisites: Standard XII mathematics or equivalent.

Course Contents:

Linear Equations in Linear Algebra: Systems of linear equations, row reduction and echelon forms, Vector equations, matrix equation, solution sets of linear systems, linear independence, Matrix of linear transformation. **(15%)**

Matrix Algebra: characteristics of invertible matrices, Partitioned matrices, matrix factorizations, application to computer graphics, dimension and rank. **(15%)**

Determinants: Properties, Cramer's rule, volume and linear transformations. **(10%)**