RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

New Scheme of Examination as per AICTE Flexible Curricula

Mechanical Engineering, VI-Semester

Open Elective ME- 604 (B) Optimization Techniques

Unit 1 Introduction to Optimization:

Engineering application of Optimization – Statement of an Optimization problem - Optimal Problem formulation - Classification of Optimization problem. Optimum design concepts, Definition of Global and Local optima – Optimality criteria - Review of basic calculus concepts – Global optimality

Unit 2 Linear programming methods for optimum design:

Review of Linear programming methods for optimum design – Post optimality analysis - Application of LPP models in design and manufacturing.

Unit 3 Optimization algorithms for solving unconstrained optimization problems:

Gradient based method: Cauchy's steepest descent method, Newton's method, Conjugate gradient method.

Unit-4 Optimization algorithms for solving constrained optimization problems:

Direct methods – penalty function methods – steepest descent method - Engineering applications of constrained and unconstrained algorithms.

Unit 5 Modern methods of Optimization:

Genetic Algorithms - Simulated Annealing - Ant colony optimization - Tabu search – Neural-Network based Optimization – Fuzzy optimization techniques – Applications. Use of Matlab to solve optimization problems.

References:

1. Rao S. S. - 'Engineering Optimization, Theory and Practice' - New Age International Publishers - 2012 - 4th Edition.
2. Deb K. - 'Optimization for Engineering Design Algorithms and Examples' – PHI - 2000
3. Arora J. - 'Introduction to Optimization Design' - Elsevier Academic Press, New Delhi - 2004
4. . Saravanan R. - 'Manufacturing Optimization through Intelligent Techniques' - Taylor & Francis (CRC Press) - 2006
5. Hardley G. -'Linear Programming' - Narosa Book Distributors Private Ltd. - 2002