

Subject Code: 1ET2130204	Elective 2 - Power System Optimization
Pre-requisite Subject	Advanced Power System & Numerical Techniques

Course Objective:

1. To study classical optimization techniques.
2. To study nonlinear programming techniques.
3. To study the application of constrained optimization technique to economic load dispatch.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	-	2	5	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Introduction: Fundamentals of Optimization, Feasibility and optimality, Convexity, constraints, Rates of convergence, Linear Programming: Standard form, geometry of LPP, Simplex Method for solving LPP, revised simplex method, duality, decomposition principle, and transportation problem.	8	22%	
2	Unconstrained optimization: Introduction, Optimality conditions, Newton's method for minimization, Line search methods, Steepest-Descent method, Quasi-Newton method, Golden section method.	8	22%	
3	Non-Linear Programming (NLP): Optimality conditions for constrained problems, Kuhn Tucker conditions, Penalty function method, Barrier method, The Lagrange multipliers and the Lagrangian function, Sensitivity analysis, Computing the Lagrange multipliers, Sequential quadratic programming, Interior point method- Economic dispatch solution using NLP.	12	34%	
4	Genetic Algorithm for generation scheduling optimization: Introduction to genetic Algorithm, coding of variables, fitness function, GA operators; Economic Load Dispatch problem; Genetic algorithm solution Methodology, Multi-objective optimization.	8	22 %	

Course Outcome:

After learning the course the students should be able to: acquire the knowledge regarding various classical optimization methods. They will be able to solve various real world optimization problems and they can apply those methods to solve optimization problems of Electrical power systems.

List of Text Books:

1. " Engineering Optimization - Theory and Practices" - S.S.Rao, 3 rd Ed., John Wiley & Sons,Inc.
2. "Introduction of Linear and Non-Linear Programming ", David G. Luenberger, Wesley Publishing Company.

List of Reference Books:

1. "Optimization for Engineering Design: Algorithms and Examples", Kalyanmoy deb, PHI Publication.
2. "Power System Optimization", D.P.Kothari and J.S.Dhillon, 4th Ed., PHI publication.
3. "Genetic Algorithm in Search Optimization and Machine Learning ", D.E. Goldberg, Addison-Wesley Publication, 1989.