III B.Tech – II Semester
(20EE6644) APPLICATION OF OPTIMIZATION IN POWER SYSTEM

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	4	-	-	4

Pre-Requisites: Power System Analysis, Power System Operation and Control

Course Objectives

- To familiarize the students with optimization techniques
- To familiarize the students with Linear Programing and its duality
- To understand the evolutionary and swarm based techniques
- To implement optimization techniques in solving power system problem

UNIT–I: Fundamentals of Optimization Techniques

Definition - classification of optimization problems-Unconstrained and constrained optimization - Optimality conditions - classical optimization techniques (Lamda Iteration method, Linear programming)

UNIT–II: Lamda Iteration Method

Brief introduction to lamda iteration method, formulation of Lagrange function,Lamda iteration method to solve optimal dispatch problem

UNIT–III: Linear Programming

Fundamentals of linear programming, simplex method I, weak and strong duality theorems, integer programming, network flow, develop a linear programmingmodel from problem description

UNIT–IV: Optimization Solvers

Introduction to Evolutionary computation, advantages and limitations of evolutionary computation, fundamentals of genetic algorithm, working principle, principles of genetic algorithm - genetic operators, selection, crossover and mutation fitness function, GA operators, similarities and differences between GA and traditional methods, unconstrained and constrained optimization using Genetic Algorithm Principle, velocity updating, advanced operators- parameter selection, hybrid approaches - binary, discrete and combinatorial

UNIT–V: Applications to Power Systems

Applications to Power System Scheduling - algorithms and flow chart of various optimization techniques for solving economic load dispatch; Model Identification - Dynamic Load Modelling, Short-Term Load Forecasting; Distribution system applications - Network reconfiguration for loss reduction, Applications to system planning; Solving optimal power flow problems; etc.

Course Outcomes:

After successful completion of the course, the students will be able to:

S.No	Course Outcome	BTL
1.	The students will be able to make use of classical and advance techniques in optimization	L3
2.	The students will be able to apply the knowledge of optimization techniques in electrical power systems	L3

Correlation of COs with POs& PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1		2		1				1				1	2
CO2	1	1	1	2	1				1				1	2

Text Books:

1. S. S. Rao, Engineering Optimization Theory and Practice, John Wiley & Sons
2. S.N. Sivanandam, S. N. Deepa, Principles of Soft Computing, Wiley India Pvt. Ltd.

Reference Books:

1. K. Y. Lee and M.A. El-Sharkawi (eds.), Modern Heuristic Optimization Techniques with Applications to Power Systems, IEEE Press
2. D. E. Goldberg, Genetic Algorithm in Search, Optimization and Machine Learning, Wesley Longman Publishing Co., Inc. Boston, MA, USA