OPTIMIZATION TECHNIQUES

V Semester: CSE / IT / EEE

Course Code	Category	Hours / Week		Credits	Maximum Marks			
AHS012	Core	L	Т	Р	С	CIA	SEE	Total
		2	1	-	3	30	70	100
Contact Classes: 30	Tutorial Classes: 15	Practical Classes: Nil				Tota	l Classes	: 45

I. COURSE OVERVIEW:

The primary objective of this course is to introduce the methods of optimization techniques, precise mathematical concept, study how to design algorithms, establish their correctness, study their effi- ciency and memory needs. The goal is to maintain a balance between theory, numerical computation, and problem setup for solution by optimization software and applications to engineering systems.

II. OBJECTIVES:

The course should enable the students to:

- I. Learn fundamentals of linear programming through optimization.
- II. Understand and apply optimization techniques to industrial applications.
- III. Apply the dynamic programming and quadratic approximation to electrical and electronic problems and applications.

III. COURSE OUTCOMES:

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

- CO 1 **Solve** Linear Programming Problems of different applications in engineering by Apply formulating LP model with optimization principles.
- CO 2 **Make use of** transportation and assignment problems to obtain feasible and optimal Apply values in allocating and assigning resources for real-time applications.
- CO 3 **Select** appropriate game theory and sequencing technique to reduce conflicting Apply solutions and in completion of jobs with minimum possible time.
- CO 4 Choose appropriate dynamic programming methods to transform complex Apply optimization problem into sequence of simplerin solving various types of problems.
- CO 5 **Identify** dappropriate quadratic approximation techniques to solve constrained Apply optimization problems.
- CO 6 **Develop** an ability to identify, formulate and solve simple and complex engineering Apply problems Iby using appropriate optimizationtechnique.

IV. SYLLABUS:

UNIT-I	LINEAR PROGRAMMING	Classes: 09			
Definition, characteristics and phases, types of models, operations research models, applications, linear programming problem formulation, graphical solution, simplex method; Artificial variables techniques: Two-phase method, Big-M method.					
UNIT-II	TRANSPORTATION AND ASSIGNMENT PROBLEMS	Classes: 09			
Transportation problem, formulation, optimal solution, unbalanced transportation problem, degeneracy, assignment problem, formulation, optimal solution, variants of assignment problem, traveling salesman problem.					
UNIT-III	SEQUENCING AND THEORY OF GAMES	Classes: 09			
Sequencing: Introduction, flow-shop sequencing, n jobs through two machines, n jobs through three machines, job					
shop sequencing, two jobs through m machines.					
Theory of games: Introduction, terminology, solution of games with saddle points and without saddle points, 2 x 2 games, dominance principle, m x 2 and 2 x n games, graphical method.					

UNIT-IV	DYNAMIC PROGRAMMING	Classes: 09				
Introduction: Terminology, Bellman's principle of optimality, applications of dynamic programming shortest path problem, linear programming problem.						
UNIT-V	QUADRATIC APPROXIMATION	Classes: 09				
Quadratic approximation methods for constrained problems: Direct quadratic approximation, quadratic approximation of the Legrangian function, variable metric methods for constrained optimization.						
Text Books:						
 A Ravindran, "Engineering Optimization", John Wiley & Sons Publications, 4th Edition, 2009. Hillier, Liberman, "Introduction to Operation Research", Tata McGraw-Hill, 2nd Edition, 2000. 						
Reference Books:						
 Dr. J K Sharma, "Operation Research", Mac Milan Publications, 5th Edition, 2013. Ronald L. Rardin, "Optimization in Operation Research", Pearson Education Pvt. Limited, 2005. N V S Raju, "Operation Research", S M S Education, 3rd Revised Edition, . 						
Web References:						
 http://www2.informs.org/Resources/ http://www.mit.edu/~orc/ http://www.ieor.columbia.edu/ http://www.universalteacherpublications.com/univ/ebooks/or/Ch1/origin.htm http://www.wolfram.com/solutions/OperationsResearch/ 						
E-Text Books:						
 http://engineeringstudymaterial.net/ebook/new-optimization-techniques-in-engineering-godfrey/ http://www.freetechbooks.com/urban-operations-research-logistical-and-transportation-planning-methods- t486.html 						
Course Home Page:						