20MA302E					Optimization for Engineers					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs. / Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	25	--	--	100

COURSE OBJECTIVES

- To understand the concept of optimization
- To make students acquaint with basic terminology of mathematical model as design vectors, objective functions, constraints and bounds.
- To understand formulation and various methods available for solving linear programming problem.
- To understand formulation and various methods available for solving non- linear programming problem.
- To introduce stochastic approach of optimization

UNIT 1 INTRODUCTION TO OPTIMIZATION 09 Hrs.

Origin and development of optimization methods, Mathematical models, Characteristics and limitations of mathematical model, design vectors (decision variable), objective functions, types of constraints and boundary conditions, mathematical formulation of engineering problems.

UNIT 2 LINEAR PROGRAMMING (CONSTRAINED) 12 Hrs.

Structure of Linear Programming Problem, feasible solution and optimal solution, solution of LPP by graphical method, solution of LPP by simplex method and Big M- method, types of solutions and their interpretations.

UNIT 3 NON-LINEAR PROGRAMMING 09 Hrs.

Unconstrained optimization for single and multivariable functions, (conventional and search algorithms), Constrained multivariable optimization with equality constraints – Lagrange multiplier method, Constrained multivariable optimization with inequality constraints – Kuhn Tucker necessary and sufficient conditions.

UNIT 4 STOCHASTIC PROGRAMMING 10 Hrs.

Introduction to stochastic programming, basic concepts of probability: random variable, probability mass function and density function, stochastic linear programming, stochastic non – linear programming.

40 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to
CO1 – Understand importance and physical interpretation of decision variables, objective functions, bounds and constraints.
CO2 – Apply simplex algorithm to solve a wide range of linear programming problems.
CO3 – Apply concepts of probability distribution to solve stochastic linear programming problem.
CO4 – Differentiate different approaches available to solve a non – linear Programming Problem.
CO5 – Formulate mathematical structure of linear and non – linear problems from various engineering problems.
CO6 – Produce optimal solutions for stochastic non – linear programming with appropriate interpretations.

TEXT / REFERENCE BOOKS

1. H. A. Taha, Operations research: an introduction, , 8th ed., PHI Publications, New Delhi, 2006.
2. F. S. Hiller and G. J. Liberman, Introduction to operations research, 9th ed., McGraw-Hills Publication, 2012
3. Singiresu S. Rao, Engineering Optimization: Theory and Practices, 4th ed., WILEY, 2009
4. K. V. Mittal and C. Mohan, Optimization methods in Operations Research and System Analysis, 5th ed., New Age International Publications,1996