FACULTY OF ENGINEERING & TECHNOLOGY

First Year Master of Technology

Semester I

Course Code: 102450108

Course Title: OPTIMIZATION TECHNIQUES

Type of Course: Program Elective II

Course Objectives: To learn optimization techniques for different experiment condtitions.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Internal		External		Total
Lecture	Tutorial	Practical		Theory	J/V/P*	Theory	J/V/P*	
3	2	0	4	30/15	20/10	70/35	30/15	150/75

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	LINEAR PROGRAMMING: Statement of optimization problems, principles of single and multi-objective optimization, graphical method, simplex method, revised simplex method, two phase simplex method, duality in linear programming, sensitivity analysis.	10
2	NON-LINEAR PROGRAMMING (UNCONSTRAINED OPTIMIZATION): Direct search methods - univariate method, pattern search method, simplex method, descent methods - steepest descent method, conjugate gradient method, Quasi Newton method.	9
3	NON-LINEAR PROGRAMMING (CONSTRAINED OPTIMIZATION): Direct methods - The complex method, Zoutendijk's method of feasible directions, Rosen's gradient projection method, indirect method - transformation techniques, basic approach of the penalty function method, interior penalty function method, exterior penalty function method.	10
4	DYNAMIC PROGRAMMING: Multistage decision process, Suboptimization and principle of optimality, computational procedure, final value problem to initial value problem, linear programming as a case of dynamic programming, continuous dynamic programming.	10

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Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						**R**: Remembering; **U**: Understanding; **A**: Application, **N**: Analyze; **E**: Evaluate; **C**: Create
R	**U**	**A**	**N**	**E**	**C**	
20	15	15	15	15	20	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1	Operations Research: An Introduction,Hamdy A Taha, Pearson Education, New Delhi.
2	Engineering Optimization: Theory and Practice,Singaresu S Rao, New Age International, New Delhi.
3	Linear and Nonlinear Programming,Nash S G and Ariela Sofer, McGraw Hill, New York.
4	Optimization Techniques in Operations Research, Gupta C B, I K International, New Delhi.
5	Operations Research: Theory and Applications, Sharma J K, Macmillan Company, New Delhi.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Students able to know the linear programming.	**40 %**
CO-2	Understand the non-linear programming.	**30 %**
CO-3	Understand the dynamic programming.	**30 %**

List of Practicals / Tutorials:

1	To study basic concept and application of optimization problem.
2	To study linear programming and problem formulation in optimization problem.
3	To study and solve examples for the simplex method.
4	To study about duality and sensitivity in linear programming.
5	To study in detail about direct and pattern search methods.
6	To study and understand descent, conjugate gradient and Quasi Newton method.
7	To study about direct methods of linear programming.
8	To study and apply transformation techniques and different penalty function method.
9	To study about dynamic programming and its computational procedure.
10	To understand and selecting modern optimization methods with case studies.

Supplementary learning Material:

Curriculum Revision:	
Version:	**1**
Drafted on (Month-Year):	Apr-20
Last Reviewed on (Month-Year):	Jul-20
Next Review on (Month-Year):	Apr-22

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