SCHEME OF COURSE WORK

Course Title	OPERATIONS RESEARCH		
Course Code	: 19ME21P1	L P C	: 2 0 2
Program:	: M.Tech.		
Specialization:	: CAD/CAM		
Semester	: II		

Course Outcomes (COs):

At the end of the course, the student will be able to

1	Formulate a linear programming problem for given problem and solve this problem by using Simplex techniques
2	Evaluate sensitivity analysis to the given input data in order to know sensitive of the output.
3	Apply the concept of non-linear programming for solving the problems involving non-linear constraints and objectives.
4	Solve deterministic and Probabilistic inventory control models for known and unknown demand of the items
5	Apply the dynamic programming to solve problems of discrete and continuous variables

Program Outcomes (POs)

At the end of the program, the students in CAD/CAM will be able to

1. acquire fundamentals in the areas of computer aided design andmanufacturing
2. apply innovative skills and analyze computer aided design and manufacturing problemscritically
3. identify, formulate and solve design and manufacturingproblems
4. carry out research related to design andmanufacturing
5. use existing and recent CAD/CAMsoftware
6. collaborate with educational institutions, industry and R&D organizations inmultidisciplinary teams
7. apply project and finance management principles in engineeringprojects
8. prepare technical reports and communicateeffectively
9. engage in independent and life-long learning and pursue professional practice in their specialized areas ofCAD/CAM
10. exhibit accountability to society while adhering to ethicalpractices
11. act independently and take corrective measures wherenecessary

Course Outcome versus **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	M	M		M						
CO-2	S	S	S	M		M	M		M			
CO-3	S	S	S	S		M	M		M			
CO-4	S	M							M			
CO-5	M		M	M		M			M			

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

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Teaching-Learning and Evaluation

WEEK	TOPIC / CONTENTS	COURSE OUTCOMES	SAMPLE QUESTIONS	TEACHING-LEARNING STRATEGY	ASSESSMENT METHOD &SCHEDULE
1	Optimization techniques	CO1	1. Explain the various types of Optimization techniques. 2. Discuss about simplex techniques. 3. Explain about inventory control models	Lectures PPT, Seminar	Seminar (week 3-7)
2	model formulation and models	CO1			
3	simplex techniques	CO1			
4	. inventory control models	CO1			
5	Formulation of a LPP - graphical solution for LPP	CO2	1. Using graphical method, the optimum solution of the LPP of maximizing z = 10x+15y subject to the 2x+y≤26, x+2y≤28, y-x≤5 and x≥0, y≥0 is obtained as x= ---------- and y = ------ 2. Write the dual of the following LPP Maximize z = 5x1+3x2 subject to the constraints: 3x1+5x2≤15, 5x1+2x2≤10, where x1≥0 and x2≥0 3. Discuss the effect of variation or changes in objective function coefficients Cj's for a given LPP.	Lectures PPT, Seminar	
6	revised simplex method	CO2			
7	duality theory, dual simplex method	CO2			
8	sensitivity analysis - parametric programming	CO2			
9	Mid-Test 1	CO-1, CO-2			

10	Nonlinear programming problem - Kuhn-Tucker conditions	CO3	1. Writ any three differences between PERT and CPM. 2. Maximize $Z = -x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2$ Subject to the constraints $x_1 + x_2 \le 2$ $2x_1 + 3x_2 \le 12$ $x_1, x_2 \ge 0$ Using Kuhn-Tucker conditions 3. Define total float, free float and independent float	Lectures PPT, Seminar	Seminar (week 11-16)
11	CPM/PERT	CO3			
12	single server and multiple server models	CO4	1. Derive Wilson harris formula for EOQ. 2. Give an average arrival rate of 20 per hour there are two options for a customer: A single channel with service rate 22 customers per hour or a two service channel with service rate of 11 customers per hour. Determine which is a better option. (with respect to waiting time) 3. Define degree of difficulty.	Lectures PPT, Seminar	
13	deterministic inventory models - probabilistic inventory control models	CO4			
14	geometric Programming	CO4			
15	Single and multi-channel problems , sequencing models,	CO5	1. Explain about bellmans principle of optimality. 2. Define total elapsed time, idle time and no passing rule. 3. Explain about principle of dominance..	Lectures PPT, Seminar	
16	dynamic programming, flow in networks,	CO5			
17	elementary graph theory, game theory simulation	CO5			
18	Mid-Test 2	CO-3, CO-4, CO-5			
19/20	END EXAM	All Cos			