NATIONAL UNIVERSITY
of Computer & Emerging Sciences, Lahore

D e p a r t m e n t o f C o m p u t e r S c i e n c e

MT4031– Operations Research
Spring - 2024

Program: BSCS **Credit Hours:** 3

Course Moderator: Dr. Hira Iqbal

Textbook:

Hamdy A Taha "Operations Research: An Introduction" 10th edition

Reference Books

Prem Kumar Gupta and D.S. Hira, "Operations Research"
Frederick S. Hiller, Gerald J. Lieberman, "Introduction to Operations Research", 9th Edition.

Evaluations

1. Assignments: 10%
2. Quizzes: 10%
3. Midterm Exams:30%
4. Final Exam: 50%

Course Policies

1. No makeup for missed quizzes or assignments.
2. 80% attendance is essential.

Grading Scheme

Relative

Weekly lesson plan

week	Lecture	Topics to be covered	Section/chapter
1	1	Introduction and review of OR study Introduction to development of LP models	(chapter 1 go through it) 2.1 and 2.2
	2	Development of LP model and graphical solution of LP models involving 2 variables Chapter 2 – excel solver	2.3 (2.3.1) and 2.4
2	3	More practice of previous topic and Introduction to analytical solutions Introduction to simplex method	(3.1 and 3.2, 3.3)
	4	Simplex method and its interpretation continues	3.1 , 3.2 and 3.3 continues
3	5	Big M and two phase methods	3.4
	6	Variants of the Simplex Method; Tie for the Key Column, Unbounded Solution, Degeneracy	3.5
4	7	Variants of the Simplex Method; Multiple Solutions, Infeasible Solution / Non–existing feasible Solution, Unrestricted–in–Sign Variables	Continued 3.5
	8	Sensitivity Analysis: Sensitivity Analysis Using Simplex Method	3.6
5	9	Concept of the Duality,	4.1 and 4.2.1
	10	Interpretation of The Primal–Dual Solution Relationship	4.2
		MID TERM I	
6	11	Properties of the Duality, Dual Simplex Method And generalized simplex method	4.4
	12	Excel solver and coding	
7	13	Introduction to Transportation Problem, Types of Transportation Problem, Methods to Solve Transportation Problem (Basic Feasible Solution Methods)	5.1 5.2
	14	Method to Solve Transportation Problem: Test for Optimality	5.3
8	15	Method to Solve Transportation Problem: Test for Optimality, Introduction to Assignment Problem	5.3, 5.4
	16	Transshipment model, Types of Assignment Problem, Assignment Problem: Hungarian Method	5.4
9	17	Routing Techniques (Network Techniques); Introduction, Minimum Spanning Tree Problem, Shortest–Path Model	6.1, 6.2
	18	Dijkstra's Algorithm	6.3
10	19	Floyd's Algorithm	6.3, 6.4
	20	Maximal Flow Problem	6.4
11	21	Continues Excel solver coding etc.	
	22	Introduction to Integer Programming, Branch & Bound Method	9.1
		MID Term II	
12	23	Cutting Plane Method	9.2
	24	Continues excel solver and coding	
13	25	Dynamic Programming: An Introduction, Deterministic dynamic programming	12.1
	26	Dynamic Programming;	12.2
14	27	Simulation, Types of Simulation, Major steps of simulation	19.119.2
	28	Monte Carlo simulations and application	19.119.2