

DEPARTMENT OF COMPUTER SCIENCE				CLASS: II B.Sc. Computer Science				
Sem	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
IV	Allied-4	20U4DAT4	Resource Management techniques	5	6	25	75	100

Nature of Course			
Knowledge and skill	✓		Employability oriented
Skill oriented			Entrepreneurship oriented

COURSE OBJECTIVES :

- To impart the knowledge of Linear programming, integer programs and queueing models.
- Learning the various problems and methods to solve mathematical models that represents real-world problems.

Units	Topics	Total Hours: 90 hrs.	K-Levels
Unit -1	Linear Programming Problem – I Mathematical Formulation of the problem – Graphical Solution – Introduction- Graphical Solution Method – Some exceptional cases- General L.P.P. – Canonical and Standard forms of L.P.P.	18 hours	Up to K2
Unit-2	Linear Programming Problem – II Simplex Method – Introduction – Fundamental Properties of Solutions – The computational procedure – Use of Artificial Variable.	18 hours	Up to K3
Unit-3	Transportation and Assignment problem Transportation Problem – Introduction – General Transportation Problem – The transportation table – Solution of a Transportation problem – Finding an initial basic feasible solution – Test for optimality – Transportation Algorithm (MODI method). Assignment Problem – Introduction – Mathematical formulation of the problem – The assignment method – Special cases in assignment problems – A typical assignment problem – The traveling salesman problem.	18 hours	Up to K4
Unit-4	Game Theory Introduction – Two-person zero-sum games – Some basic terms – The MaxminMinimax principle – Games without Saddle points-mixed strategies – Graphic solution of 2 x n and m x 2 games – Dominance property.	18 hours	Up to K3
Unit-5	Network Scheduling Introduction Network and basic components – Logical sequencing – Rules of network Construction – Critical path analysis – Distinction between PERT and CPM.	18 hours	Up to K3

Books for Study:

Kanti Swarup, P.K. Gupta, Man Mohan – “Operations Research” – 18th edition, Sultan Chand & Sons Educational Publishers, New Delhi. **Chapters:**

Unit – I : 2.1 – 2.3, 3.1-3.5

Unit – II : 4.1-4.4

Unit – III: 10.1, 10.2, 10.5, 10.8-10.10, 10.13, 11.1-11.5, 11.7.

Unit – IV : 7.1-7.7.

Unit – V : 25.1-25.4, 25.6, 25.8.

Books for Reference :

1. Hamdy A. Taha – “Operations Research an Introduction” – PHI, 8th edition.

2. S.D. Sharma – “Operations Research” – 12th edition, Kedar Nath Ram Nath & Co Publishers, Meerut.

Web resources:

1. [https://drive.google.com/file/d/13l4Cd61gbhx_fWpyizZfDHI9mEEQ-](https://drive.google.com/file/d/13l4Cd61gbhx_fWpyizZfDHI9mEEQ-Btd/view2)

[Btd/view2.https://web.itu.edu.tr/topcuil/ya/OR.pdf](https://web.itu.edu.tr/topcuil/ya/OR.pdf)

Rationale for Nature of the course:

Resource management technique is the process of planning, scheduling, and allocating organizational and project **resources** in the best possible way. By Learning this course learners will gain the knowledge to solve the various problems and methods of mathematical models that represents real-world problems.

Activities having direct bearing on Skill development / Employability /Entrepreneurship

- Seminar
- Assignment preparation
- Thinking and analysis on theoretical concepts

Pedagogy:

The teaching methods includes Chalk and talk, PowerPoint, demonstrations, assignments and group discussions on the theoretical topics.

Lecture schedule:

Unit	Topics	Hrs	Mode
Unit I	Mathematical Formulation of the problem – Graphical Solution – Introduction	4	Chalk and talk, Quiz and assignment
	Graphical Solution Method – Some exceptional cases	4	
	General L.P.P.	4	
	Canonical and Standard forms of L.P.P.	6	
Unit II	Simplex Method – Introduction	2	Chalk and talk, Group discussion
	Fundamental Properties of Solutions – The computational procedure	5	
	Use of Artificial Variable.	3	
	The assignment method – Special cases in assignment problems	4	
	A typical assignment problem – The traveling salesman problem.	4	
Unit III	Transportation Problem – Introduction – General Transportation Problem – The transportation table	4	Chalk and talk, Quiz and assignment
	Solution of a Transportation problem – Finding an initial basic feasible solution – Test for optimality	4	
	Transportation Algorithm (MODI method). Assignment Problem – Introduction – Mathematical formulation of the problem	4	
	The assignment method – Special cases in assignment problems	3	
	A typical assignment problem – The traveling salesman problem.	3	
Unit IV	Introduction – Two-person zero-sum games	4	PPT, Chalk and talk, Quiz and assignment
	Some basic terms – The Maxmin-Minimax principle	5	
	Games without Saddle points-mixed strategies	4	
	Graphic solution of $2 \times n$ and $m \times 2$ games – Dominance property.	5	
Unit V	Introduction – Network and basic components	6	PPT, Chalk and talk, Quiz and assignment
	Logical sequencing – Rules of network Construction	6	
	Critical path analysis – Distinction between PERT and CPM.	6	

Learning Outcome Based Education & Assessment (LOBE)
Blue Print – Resource Management techniques
Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)
BLUE PRINT FOR INTERNAL ASSESSMENT – I

S. No.	CLOs	K-Level	Section A		Section B		Section C (Either / or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of Questions	K-Level	No. of Questions	K-Level		
1.	CLO 1	Up to K 2	2	K1 & K2	1	K1	2 (K1&K1)	1(K2)
2.	CLO 2	Up to K 3	2	K1 & K2	1	K2	2 (K2&K2)	1(K3)
No. of Questions to be asked			4		3		4	3
No. of Questions to be answered			4		3		2	2
Marks for each Question			1		2		5	10
Total Marks for each Section			4		6		10	30

BLUE PRINT FOR INTERNAL ASSESSMENT – II

S. No.	CLOs	K-Level	Section A		Section B		Section C (Either / or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of Questions	K-Level	No. of Questions	K-Level		
1.	CLO 3	Up to K 4	2	K1 & K2	1	K2	2 (K3&K3)	1(K4)
2.	CLO 4	Up to K 3	2	K1 & K2	1	K1	2 (K3&K3)	1(K3)
No. of Questions to be asked			4		3		4	3
No. of Questions to be answered			4		3		2	2
Marks for each Question			1		2		5	10
Total Marks for each Section			4		6		10	30

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			MCQs		Short Answers			
			No. of Questions	K-Level	No. of Questions	K- Level		
1	CLO 1	Up to K-2	2	K1 & K2	1	K1	2 (K1&K1)	1(K2)
2	CLO 2	Up to K-3	2	K1 & K2	1	K2	2 (K2&K2)	1(K3)
3	CLO 3	Up to K-4	2	K1 & K2	1	K2	2 (K3&K3)	1(K4)
4	CLO 4	Up to K-3	2	K1 & K2	1	K1	2 (K3&K3)	1(K3)
5	CLO 5	Up to K-3	2	K1 & K2	1	K2	2 (K4&K4)	1(K3)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each Question			1		2		5	10
Total Marks for each Section			10		10		25	30

Distribution of Section-wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	Total Marks	% of Marks without choice	Consolidated
K1	5	4	10	-	19	15.83	42%
K2	5	6	10	10	31	25.83	
K3	-	-	20	30	50	41.67	42%
K4	-	-	10	10	20	16.67	16%
Total Marks	10	10	50	50	120	100.00	100%

Distribution of Unit-wise questions with K Levels

Section A	Section B	Section C	Section D
2 Questions for each Unit (K1 & K2 Level)	1 Question from each Unit (K1 & K2 Level)	2 Questions from Unit-I (K1 Level)	1 Question from Unit-I (K2 Level)
		2 Questions from Unit-II (K3 Level)	1 Question from Unit-II (K3 Level)
		2 Questions from Unit-III (K3 Level)	1 Question from Unit-III (K4 Level)
		2 Questions from Unit-IV (K2 Level)	1 Question from Unit-IV (K3 Level)
		2 Questions from Unit-V (K4 Level)	1 Question from Unit-V (K3 Level)

K1 –Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 – Examining, analyzing, presentation and make interferences with evidences

COURSE OUTCOMES:

On the completion of the course the students will be able to

COs	COURSE OUTCOME	Knowledge Level (basis of Bloom's Taxonomy)
CO-1	Understand the theoretical workings of the simple method for linear programming	Up to K2
CO-2	Know the relationship between a linear program and its dual, including strong duality and complementary slackness	Up to K2
CO-3	Solve specialized linear programming problems like the transportation and assignment problems	Up to K3
CO-4	Solve network models like the shortest path, minimum spanning tree, and maximum flow problems	Up to K4
CO-5	Understand the applications of, basic methods for, and challenges in integer programming	Up to K2

MAPPING OF COs WITH PSOs:

Course Outcomes	PSO 1 (Knowledge Base)	PSO 2 (Problem Analysis & Investigation)	PSO 3 (Communication Skills & Design)	PSO 4 (Individual and Team Work)	PSO 5 (Professionalism Ethics and equity)	PSO 6 (Life Long Learning)
CO-1	3	1	1	2	1	1
CO-2	2	3	2	1	1	1
CO-3	2	3	1	1	1	2
CO-4	3	2	2	1	2	1
CO-5	2	2	2	3	2	1

3- Advanced Application 2- Intermediate 1- Introductory **Course Designer(s):**

1. Prof.P.Sridevi

2. Prof.J.Mayajothi