University of Kerala

Discipline	Mathematics				
Course Code	UK2MDCMAT102				
Course Title	Basic Operations Research				
Type of Course	MDC				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours per week
	3	3			3
Pre-requisites	Basic mathematical operations				
Course Summary	This course covers the fundamentals of Operations Research including the historical background, mathematical formulation, graphical solution methods. It delves into the Transportation Problem and Assignment Problem, exploring various methods for obtaining initial basic feasible solutions and introducing algorithms for solving the Assignment Problem and travelling salesman problem.				

Detailed Syllabus

Module	Unit	Contents	Hrs
I	**Introduction to Operations Research**		**9**
	1	The History of Operations Research	
	2	Methodology of Operations Research	
	3	Applications of Operations Research	
	(Chapter 1: Section 1.2, 1.9, 1.13 of Text [1].)		
II	**Linear Programming**		**9**
	4	Structure of linear programming model	
	5	Mathematical model of an LPP	
	6	Graphical solution of LP problem	

Module	Unit	Contents	Hrs
	(Chapter 2: Sections 2.2, 2.6,2.8.1, Chapter 3: sections 3.2, 3.3 (Examples 3, 5, 3.6, 3.7, 3.11) of Text [1].)		
III	**Transportation Problem**		**9**
	7	Mathematical model of transportation problem	
	8	Initial feasible solution to Transportation Problem	
	(Chapter 9: Section 9.2, 9.4.1, 9.4.2, 9.4.3 of Text [1].)		
IV	**Assignment Problem**		**9**
	9	Mathematical model of Assignment problem	
	10	Hungarian Method for solving Assignment problem	
	(Chapter10: Section 10.2, 10.3.1, 10.4 of Text [1].)		
V	**Suggestions for the teacher designed module**		**9**
	For internal assessment examinations only		
	11	Special Cases in Linear Programming The Optimal Solution by MODI method Traveling Salesman Problem	
	These topics can be found on Chapters 3, 9 and 10 of Text [1]		

Textbook

1. J. K. Sharma, Operations Research - Theory and Applications, Sixth Edition, 2016.

References

1. Goel B.S and Mittal S.K “Operations Research” Pragati Prakashan, Meerut ,1973.
2. Hardly G, “Linear Programming” Addison Wesley, Reading. Mass, 1962.
3. Kapoor V.K, “Operations Research” Sultan chand and sons, New Delhi 1985.
4. Nita H.Shah, Ravi M.Gor, Hardik Soni, “Operations Research”, Prentice Hall of India, New Delhi, 2007.
5. Ravindran A, Don.T. Phillips, James.J.Solberg, “Operations research-Principles and Practice”, Second edition, John Wiley and Sons, 2000.

Course Outcomes

CO No.	Upon completion of the course the graduate will be able to	PO/PSO	Cognitive Level	Knowledge Category	Lecture(L) Tutorial (T)	Practical (P)
CO 1	Understand and apply the concept of mathematical modelling	PSO2, PSO3, PO2	R,U, Ap	F,P	L	
CO 2	Apply the techniques of LPP to solve problems	PSO3, PO2	Ap , E	P	L	
CO 3	Recognize and formulate a transportation problem	PSO2, PSO3, PO2	R, U	F	L	
CO 4	Solve a travelling salesman problem.	PSO3	Ap, E	P	L	

(R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create)
(F-Factual, C-Conceptual, P-Procedural, M-Metacognitive)

Mapping of CO with PSOs and POs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	-	3	2	-	-	-	-	2	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	3	-	-	-	-	-	-
CO3	-	3	3	-	-	-	-	2	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-

(- -Nill, 1-Slightly/Low, 2-Moderate/Medium, 3-Substantial/High)

Assessment Rubrics

- Quiz/Assignment/Discussion/Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics

	Internal Examination	Assignment	Project Evaluation	End Semester Exam
CO1	✓	✓		
CO2	✓	✓		✓
CO3	✓	✓		✓
CO4	✓	✓		✓