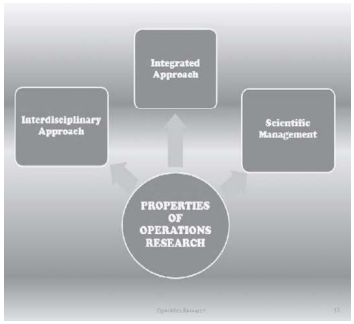
19ME401 OPERATIONS RESEARCH



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Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P
45	-	-

WA/RA	SSH/HSH	CS	SA	S	BS
20	30	5	-	-	-

COURSE DESCRIPTION AND OBJECTIVES:

This course deals with solving problems of industrial activities at various phases of production, planning and scheduling through Operations Research techniques. The objective of this course is to impart the knowledge of linear programming, transportation, assignment, inventory and network techniques for various engineering applications.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Understand the various models in operations research & its scope.	1
2	Formulation of LP models and learn the techniques to solve them.	2
3	Build and solve Transportation, Assignment and sequencing models.	3,11
4	Analyze game theory models, queuing theory models and replacement models.	2
5	Design and solve simple inventory models.	3

SKILLS:

- ✓ *Recognize the importance of Operations Research and mathematical modelling for solving practical problems in industries.*
- ✓ *Implement transportation and assignment solutions using appropriate optimization algorithms.*
- ✓ *Apply game and queuing theory appropriately to solve problems.*
- ✓ *Analyze inventory control and project management techniques.*

UNIT- I **L-9**

DEFINITION: Definition, Characteristics and phases, Applications of OR.

ALLOCATION MODELS: Linear Programming Problem Formulation, Graphical solution, Simplex method, Artificial variables technique (i.e. Big M method only), Duality principle - simple problems on dual formulation only.

UNIT- II **L-9**

TRANSPORTATION MODEL: Formulation, IBFS-North West Corner method, LCEM, VAM, Unbalanced transportation problem, Optimality test by MODI method.

ASSIGNMENT MODEL: Formulation, Optimal solution by Hungarian method, Unbalanced Assignment problem, Restricted case, Introduction to Knapsack problem.

UNIT- III **L-9**

SEQUENCING: Introduction, Assumptions in job sequencing, Johnson's algorithm, optimal solution for processing 'n' jobs through two machines, 'n' jobs through three machines, 'n' jobs through m machines.

REPLACEMENT MODEL: Introduction, Replacement of resources that deteriorate with time, when money value is not counted and counted.

UNIT- IV **L-9**

THEORY OF GAMES: Introduction, classification of games - 2 person zero sum games, assumptions, solution of games with saddle points, Rectangular games without saddle points, dominance principle - 2 x 2 games by Algebraic method, m x 2 and 2 x n games by graphical method.

WAITING LINE MODELS: Introduction, Kendall's Lee notation- single channel with infinite population.

UNIT- V **L-9**

INVENTORY MODELS: Introduction, single item deterministic models (EOQ & EBQ) without shortages, Purchase inventory models with one price break and multi-price break when shortages are not allowed.

TEXT BOOKS

1. S.D. Sharma, "Operations Research", 15th edition, Kedarnath Publishers, 2012.
2. P.K.Gupta and Manmohan, "Problems in Operations Research", 14th edition, S.Chand& Co., 2014.

REFERENCE BOOKS

1. Taha, "Introduction to Operations Research", 8th edition, PHI Publications, 2008.
2. Hiller &Libermann, "Introduction to Operations Research", 8th edition, Tata McGraw-Hill, 2010.
3. ManoharMahajan, "Operation Research", 1st edition, DhanpatRai & Co., 2008.
4. Premkumar Gupta and D.S.Hira, "Problems in Operations research", S.Chand, 2009.