JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF MECHANICAL ENGINEERING

III Year - II Semester		**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
OPERATIONS RESEARCH					

Course Objectives:
The objective of the course is to understand the availability of resources and constraints in an industry and optimize them through the applications of appropriate resource management tools.

UNIT – I
Development – definition– characteristics and phases – operation research models – applications.
LINEAR PROGRAMMING: problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle.

UNIT – II
TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem – degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem- traveling salesman problem.
SEQUENCING – Introduction **–** flow –shop sequencing **–** *n* jobs through two machines **–** *n* jobs through three machines **–** job shop sequencing **–** two jobs through 'm' machines.

UNIT – III
REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted **–** replacement of items that fail completely, group replacement.

UNIT – IV
THEORY OF GAMES: Introduction to decision theory – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.
WAITING LINES: Introduction to Kendallis notation–classification of queuing models, single channel **–** with infinite population and finite population models**–** multichannel **–** with infinite population.

UNIT – V
Network Analysis: Project planning, scheduling and controlling – tools for project management – critical path method – programme evaluation and review technique (PERT) – cost analysis and crashing – resource leveling – updating.

TEXT BOOKS:
1.Operations Research-An Introduction/Hamdy A Taha/Pearson publishers
2. Operations Research –Theory & publications / S.D.Sharma-Kedarnath/McMillan publishers India Ltd

REFERENCES:
1. Introduction to O.R/Hiller & Libermann/TMH
2. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
3. Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman/Wiley
4. Operations Research / R.Pannerselvam/ PHI Publications.
5. Operations Research / Wagner/ PHI Publications.

6. Operation Research /J.K.Sharma/MacMilan Publ.
7. Operations Research/ Pai/ Oxford Publications
8. Operations Research/S Kalavathy / Vikas Publishers
9. Operations Research / DS Cheema/University Science Press
10. Operations Research / Ravindran, Philips, Solberg / Wiley publishers

Course Outcomes:

After studying the course, the students are able to

1. Formulate the resource management problems and identify appropriate methods to solve them
2. Apply LPP, transportation and assignment models to optimize the industrial resources
3. Solve decision theory problems through the application of game theory
4. Apply the replacement and queuing models to increase the efficiency of the system
5. Model the project management problems through CPM and PERT