

COURSE OBJECTIVES

- The course aims at building capabilities in the students for analyzing different situations in the industrial/ business scenario involving limited resources and finding the best feasible solution (Optimum Solution) within constraints.
- The objective of this course is to enable the student to understand and analyze managerial problems to equip him/ her to use the resources such as capitals, materials, production controlling, directing, staffing, and machines more effectively.
- **PRE – REQUISITE**
- The world of Operations Research is dynamic and fast paced. It is also the blending of mathematics, optimization, statistics, and computer science, techniques to improve decision making, processes and systems. The learners should have knowledge of mathematics up to higher school level to learn basic contents of Operations Research.
- **CO – REQUISITE**
- The learner should have basic understanding of management and economic concepts.

COURSE OUTCOMES

- Understanding the basic concept and working of O.R. to solve the Industrial/ Organizational problem in optimum manner.
- Solve linear programming problems using appropriate technique and interpret the results obtained.
- Determine feasible strategy for Minimization of Cost of shipping of products from source to Destination using various methods, finding initial basic feasible solution of the Transportation problems.
- Optimize the allocation of resources to Demand points in the best possible way using various techniques and minimize the cost or time of completion of number of jobs by number of persons as well as maximize the profit or sale.

- Allocation of work to appropriate persons to minimize the cost or time or to maximize the profit.
- To know the appropriate time to replace the machine for getting maximum benefit.

UNIT	CONTENT	WEIGHTAGE
1	INTRODUCTION TO OPERATIONS RESEARCH <ul style="list-style-type: none"> ➤ Origin of OR ➤ Definitions of Operations Research (OR) ➤ Nature and Scope of OR ➤ Characteristics of OR ➤ Phases of OR ➤ Limitations of OR ➤ Different types of Models in OR ➤ Applications of OR in the fields of Marketing, Financial Planning ➤ Different Techniques of OR 	25%
2	LINEAR PROGRAMMING PROBLEM (LPP) <ul style="list-style-type: none"> ➤ Meaning of Linear Programming Problems (LPP) ➤ Advantages / Uses, Assumptions and Limitations of LPP ➤ Understanding of Terms used in LPP ➤ Mathematical form of LPP ➤ Conversion of practical problem into mathematical form up to 3 variables only ➤ Solution of LP problem for two variables only by graphical method 	25%
3	TRANSPORTATION PROBLEM (TP) <ul style="list-style-type: none"> ➤ Meaning of balanced and unbalanced Transportation Problem (TP) ➤ General Transportation table and its mathematical form ➤ Initial basic feasible solution (IBFS) and its cost By using <ul style="list-style-type: none"> • North-West Corner Method (NWCM), • Least Cost (Matrix Minima) Method (LCM) • Vogel's Approximation Method (VAM) ➤ Examples based on these methods 	25%
4	ASSIGNMENT PROBLEM (AP) AND REPLACEMENT PROBLEM (RP) <ul style="list-style-type: none"> ➤ Meaning of balanced Assignment Problem (AP) ➤ Mathematical form of AP ➤ Hungarian method for solving AP in the cases of Minimization and Maximization problem ➤ Meaning of Replacement Problem (RP) ➤ Simple examples of Replacement Problem when the units are deteriorating with time and the value of money remains unchanged 	25%

MODE OF EVALUATION

Evaluation will be divided in two parts.

- **External:** Semester end Examination will be conducted by the Gujarat University of 70 Marks
- **Internal:** Internal Evaluation of 30 marks will be decided by the colleges / Institutes/ University departments as per the instruction given by the University time to time.

FBLD (Flip Blended Learning Design Template)

- Any One Unit from the above syllabus can be discussed by the faculty through online mode.
- Online mode can be SWAYAM MOOC Course or any other suggested by the UGC or Gujarat University.

REFERENCE BOOKS:

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| 1. Operation Research - Kanti Swaroop | 6. Operations research - Models and methods by Chandrasekar Salimath, Bhupendar Parashar. |
| 2. Operation Research : P. K. Gupta and Man Mohan | 7. Operations Research – Taha |
| 3. Operation Research : Dr R. V. S. Prasad | 8. Operations Research – N. D. Vora |
| 4. Operation Research : Dr. D. Giri | |
| 5. Operation Reach – S. D. Sharma and J. K. Sharma | |