## GUJARAT UNIVERSITY SYLLABUS FOR T.Y.B.B.A. SEMESTER V

**COURSE CODE-30**4

**OPERATIONS RESEARCH & QUANTITATIVE TECHNIQUES**

**Introduction:**

The student will understand the basic operations research concepts and terminology involved in Linear Programming Problem, Transportation & Assignment Problems, PERT & CPM, Game Theory. The course focuses on how to interpret and solve business-related word problems and to develop simple O.R. models from a business perspective.

## Objective:

To create a better understanding of Operations Research concepts in solving business and commerce related problems. The course serves as a good foundation for further study in management, accounting ,marketing and finance.

## Number of credits: 3

**Lectures per week: 3 of one hour each Total Hours : 40**

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| Unit | Weige | |
| Unit | 25% | 25% |
| Unit | 25% | 25% |
| Unit | 25% | 25% |
| Unit | 25% | 25% |
| Total | 100% | 100% |

**Unit I: 10 Sessions**

1. Overview of Operations Research(OR)
   1. Origin of OR
   2. OR Models and Modeling
   3. Application and Scope of OR
2. Linear Programming Problem (LPP)
   1. Introduction and General Mathematical Formulation of LPP
   2. Assumptions of LPP
   3. Formulation of LPP – application of LPP
   4. Graphical Solution
   5. Dual formulation of LPP

## Unit II: 10 Sessions

1. Transportation Problems (TP)
   1. General Mathematical Formulation of TP
   2. IBFS using North West Corner Rule (NWCR), Least Cost Method (LCM) and Vogel’s Approximation Method (VAM)
   3. Optimum solution using Modified Distribution (MODI) method
   4. Solutions of TP under special cases of degeneracy, multiple, unbalanced, restricted and maximization.

## Unit III: 10 Sessions

1. Network Models and Methods
   1. Introduction to network, network diagram, concepts of event and Activity, critical path
   2. PERT
   3. CPM
   4. Forward pass, Backward pass
   5. Calculating EST, EFT, LST, LFT, Float of an activity and event

## Unit IV: 10 Sessions

1. Game Theory
   1. Introduction of Game Theory and some basic terms
   2. Pure and Mixed strategy games
   3. Two-Persons Zero-Sum Games
   4. The Maximin- Minimax Principle
   5. Games without saddle point (Mixed strategies)
   6. Reduce game by Dominance
2. Assignment Problems(AP)
   1. General Mathematical Formulation of AP
   2. Hungarian Method of solving AP
   3. Solutions of AP under special cases of unbalanced , maximization & restricted

## Assignments:

Assignments on Linear Programming Problem Assignments on Transportation Problems Assignments on Network Analysis

Assignments on Game Theory and Assignment Problem

## Seminar Topics:

Prepare a project on application of Linear Programming Problem Prepare a project on application of Assignment Problem

## Reference Books:

1. An Introduction to Management Science: Quantitative Approach to Decision Making by Anderson, Sweeney & Williams – Cengage (Erstwhile Thomson) Publications 11e
2. Practical Management Science by Winston & Albright – Cengage Erstwhile Thomson) Publications
3. Introduction to Operations Research by Hillier & Lieberman – TataMcGraw Hill Publication
4. Introduction to Operations Research by H. A. Taha- PHI Publications
5. OR Techniques for Management by V. K. Kapoor – Sultan Chand & Sons
6. OR Theory & Practice by J. K. Sharma – McMillan Publications
7. Operations Research by Premkumar Gupta & D. S. Hira - S. Chand Publications
8. Quantitative Analysis for Management by Render, Stair, Hanna & Badri – Pearson Publications Quantitative Techniques in Management by N. D. Vohra – Tata Mcgraw Hill Publications