C P PATEL AND F H SHAH COMMERCE (AUTONOMOUS) COLLEGE, ANAND
(Managed by SARDAR PATEL EDUCATION TRUST, ANAND)
AFFILIATED TO SARDAR PATEL UNIVERSITY, V V NAGAR
An ISO 9001 2015 Certified / An ISO 14001-2015 Certified / An ISO 21001-2018 Certified
GUJARAT INSTITUTIONAL RATING FRAMEWORK (4 STAR)

AAA Reaccredited CGPA 3.56 – GRADE A^+ KCG-Dept of Edu. Got of Gujarat-April 2017

NAAC Reaccredited - CGPA 3.30 - GRADE 'A^+' UGC – MHRD, Govt of India – June 2022
Syllabus as per NEP 2020 with effect from the Academic Year 2023-2024

Bachelor of Business Administration (BBA)

Semester - II

Course Code	UM2MDBBA01	Title of the Course	Operations Research for Business
Total Credits of the Course	04	Hours per Week	04

Course Objectives	1. Apply mathematical modelling to formulate and solve real-world problems using Operations Research techniques.
	2. Develop proficiency in solving Linear Programming Problems to optimize resource allocation and improve efficiency in production, supply chain management, and other business processes.
	3. Apply Transportation Problems and Assignment Problems to optimize transportation and assignment of resources in logistics, distribution, and project scheduling.
	4. Understand and utilize Replacement Problems to make cost-effective decisions regarding the replacement of assets or equipment over time.
	5. Explore Decision Theory to make rational choices under uncertainty, incorporating risk and probability concepts in the decision-making process.

Course Content		
Unit	**Description**	**Weightage (%)**
1.	**Linear Programming Problem (LPP):** Meaning and Mathematical form of LPP, Assumptions and limitations of LPP, uses of LPP, Definitions: Objective functions, Constrains, Solution, Feasible Solution, Optimum Feasible solution, Optimum Feasible Solution of LPP by Graphical Method. Application of LPP in business and Management.	**25 %**
2.	**Transportation Problem:** Meaning of Transportation Problems, Mathematical form of Transportation Problem, Solution of Transportation problems by North-West Corner Rule, Matrix Minima (Least Cost) Method, Vogel's Approximation Method.	**25 %**

C P PATEL AND F H SHAH COMMERCE (AUTONOMOUS) COLLEGE, ANAND
(Managed by SARDAR PATEL EDUCATION TRUST, ANAND)
AFFILIATED TO SARDAR PATEL UNIVERSITY, V V NAGAR
An ISO 9001 2015 Certified / An ISO 14001-2015 Certified / An ISO 21001-2018 Certified
GUJARAT INSTITUTIONAL RATING FRAMEWORK (4 STAR)

AAA Reaccredited CGPA 3.56 – GRADE A^+ KCG-Dept of Edu. Got of Gujarat-April 2017

NAAC Reaccredited - CGPA 3.30 - GRADE 'A^+' UGC – MHRD, Govt of India – June 2022
Syllabus as per NEP 2020 with effect from the Academic Year 2023-2024

3.	**Assignment problems (AP) and Replacement Problems (RP):** Meaning of Assignment Problem, Mathematical form of Assignment problems, Hungarian method for solving Assignment problems in the cases of maximization and minimization problems, Meaning of Replacement problem, Examples of Replacement problems.	**25%**
4.	**Decision Theory**: Meaning and importance of Decision theory, components of decision theory, different methods of taking decision: Maxi-Min Principle, Maxi-Max Principle, Laplace's Principle, Horwitz's Rule, EMV (Expected Monetary Value), EPPI and EVPI. Problem solving by above methods	**25 %**

Teaching-Learning Methodology	Lectures, Assignments, Quizzes, Seminars, Content- Focused Methods, Interactive / Participative Methods and Online lectures.

Evaluation Pattern		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	Written Examination	25%
2.	Internal Continuous Internal Assessment in the form of Quizzes, Seminars, Assignments, Viva voce, Attendance	25%
3.	Semester End Examinations	50%

Course Outcomes	
1.	Students will be able to analyze and interpret results from OR models, providing valuable insights and making data-driven decisions.
2.	Students will be able to analyze and interpret the results to determine the optimal transportation plan, including the optimal shipment quantities and routes.
3.	Students will be able to analyzing and interpreting the results to determine the best assignment strategy, considering factors such as cost, time, or efficiency.
4.	Students will be analyzing and interpreting the results to identify the most cost-effective and efficient replacement strategy for different types of assets and equipment.

C P PATEL AND F H SHAH COMMERCE (AUTONOMOUS) COLLEGE, ANAND
(Managed by SARDAR PATEL EDUCATION TRUST, ANAND)
AFFILIATED TO SARDAR PATEL UNIVERSITY, V V NAGAR
An ISO 9001 2015 Certified / An ISO 14001-2015 Certified / An ISO 21001-2018 Certified
GUJARAT INSTITUTIONAL RATING FRAMEWORK (4 STAR)

AAA Reaccredited CGPA 3.56 – GRADE A^+ KCG-Dept of Edu. Got of Gujarat-April 2017

NAAC Reaccredited - CGPA 3.30 - GRADE 'A+' UGC – MHRD, Govt of India – June 2022
Syllabus as per NEP 2020 with effect from the Academic Year 2023-2024

5.	Student will be capable to enhance decision-making abilities under uncertainty and incorporating risk analysis in the decision-making process.

Suggested References	
Sr. No.	**References**
1	Sancheti & Kapoor: Statistic: Theory, Methods and Applications, Sultan Chand & Sons, New-Delhi.
2	Kapoor, V. K (2011): Operation Research, Techniques for Management, Sultan Chand and Sons, New Delhi.
3	Sharma, J. K.(2006): Quantitative Techniques For Management Decisions, Macmillan
4	Philips, Ravindran and Solberg (1987): Operation Research principles and practices, Wiley
5	H A Taha (2007): Operations Research: An Introduction, Pearson/ Prentice Hall
6	Soni, R. S.: Business Mathematics, Pitamber Publishing House.
7	H R Vyas (2017): Operation Research and Quantitative Techniques: B S Shah Publication, Ahmedabad

On-line resources to be used if available as reference material
On-line Resources:
https://atozmath.com/default.aspx
https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=ZLCHeZEhCZ8yCri36nSF3A==