COURSE MODULE: OPERATIONS RESEARCH

Course Coordinator: **Ms. LAKSHMI M R**				Academic Year: **2024-25**	
Department: **MBA**					
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours L: T: P	Total Hrs./ Sessions
MBA204	**Operations Research**	**Core**	**-**	**4:0:0**	**50**

Course Learning Objective:

1. To understand the mathematical tools that are needed to solve optimization problems.
2. To elucidate optimization techniques for various problems.
3. To understand and practice allocation problems, Assignment problems, Transportation problems and Network Analysis (PERT & CPM).

Teaching-Learning Process (General Instruction):

1. Classroom lectures with visual aids to introduce mathematical tools (e.g., linear programming, calculus, matrices).
2. Use of real-world examples to explain the significance of optimization.
3. Interactive discussions to reinforce key concepts.
4. Understand the foundational mathematical tools required for optimization.
5. Identify and apply appropriate optimization techniques for given problems.

Module-1

Introduction: Evolution of OR, Definitions of OR, Scope of OR, Applications of OR, Phases in OR, Characteristics and limitations of OR, models used in OR, Quantitative approach to decision making models (Theory Only)

TLP: Power Point Presentation, Video demonstration or simulations, Chalk and Talk

Module-2

Linear programming: Linear Programming Problem (LPP), Generalized LPP- Formulation of LPP, Guidelines for formulation of linear programming model, Assumption, Advantages, Limitations, Linear Programming problem (LPP), optimal and feasible Solutions by graphical method (minimization and maximization), Simplex method. (Theory and Problems)

TLP: Power Point Presentation, Video demonstration or simulations, Chalk and Talk.

Module-3

Decision Theory: Introduction, Decision under uncertainty- Maxmin &Minmax, Decision under Risk- Expected Value, Simple decision tree problems. (Only theory). Job Sequencing- 'n' jobs on 2 machines, 'n' jobs on 3 machines, 'n' jobs on 'm' machines. Sequencing of 2 jobs on 'm' machines. (Theory and Problems).

TLP: Power Point Presentation, Video demonstration or simulations, Chalk and Talk, Case Study analysis

Module-4

Transportation Problems: Formulation of transportation problem, types, initial basic feasible solution using North-West Corner Rule (NWCR), Least Cost Method (LCM) and Vogel's Approximation method (VAM). Optimality in Transportation problem by Modified Distribution (MODI) method. Unbalanced

T.P. Maximization T.P. Degeneracy in transportation problems, application of transportation problem. (Theory and Problems).
TLP: Power Point Presentation, Video demonstration or simulations, Chalk and Talk.

Module-5

Theory of Games: Definition, Pure Strategy problems, Saddle point, Max-Min and Min-Max criteria, Principle of Dominance, Solution of games with Saddle point. Mixed Strategy problems (Graphical and algebraic methods). Assignment Problem: Formulation, Solutions to assignment problems by Hungarian method, Special cases in assignment problems, unbalanced, Maximization assignment problems. (Theory and Problems)
TLP: Power Point Presentation, Video demonstration or simulations, Chalk and Talk.

Module-6

Project Management: Introduction, Construction of networks, Structure of projects, phases of project management-planning, scheduling, controlling phase, work breakdown structure, project control charts, network planning (Theory only) Critical path method to find the expected completion time of a project, determination of floats in networks, PERT networks, determining the probability of completing a project, predicting the completion time of project; (Theory and Problems)
TLP: Power Point Presentation, Video demonstration or simulations, Chalk and Talk Video demonstration.

Course Outcomes:

At the end of the course, the student will be able to:

CO1 Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases
CO2 Use appropriate quantitative techniques to get feasible and optimal solutions
CO3 Understand the usage of game theory, Queuing Theory and Simulation for Solving Business Problems
CO4 Understand and apply the network diagram for project completion.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing marks for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements (passed) and earned the credits allotted to each course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Continuous Internal Evaluation: There shall be a maximum of 50 CIE Marks. A candidate shall obtain not less than 50% of the maximum marks prescribed for the CIE
1. Two Unit Tests each of **40 Marks (Will be reduced to 25 marks)**
2. Two assignments each of **20 Marks** or **one Skill Development Activity of 40 marks**
to attain the COs and POs
The sum of two tests, two assignments/Skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.

- The question paper will have 8 full questions carrying equal marks.

- Each full question is for 20 marks with 3 sub questions.
- Each full question will have sub question covering all the topics.
- The students will have to answer five full questions; selecting four full questions from question number one to seven in the pattern of 3, 7 & 10 Marks and question number eight is compulsory

List of Text Books

Text Books:

1. Operation research .H.A. Taha, Person Publication 2012
2. Operation research , J.K.Sharma, McMillan Publication 2014
3. Quantitative Techniques in management, N D Vohra McGraw Hill 2015.
4. Quantitative Techniques: Theory and Problems, P.C. Tulsian and Vishal Pandey, Pearson India 2006

Weblinks:

links and Video Lectures (e-Resources):

1. https://youtu.be/vuKK3HAOB74
2. https://lipas.uwasa.fi/-tsottine/lecture_notes/or.pdf
3. https://onlinecourses.nptel.ac.in/noc20_ma23/preview
4. https://www.amirajcollege.in/wp-content/uploads/2020/10/3151910-operations-research-_theory-and-application-by-j.-k.-sharma-zlib.org_.pdf
5. https://youtu.be/vUMGvpsb8dc
6. https://youtu.be/fSuqTgnCVRg
   https://www.youtube.com/results?search_query=operation+research+transportation+problem
7. https://www.youtube.com/watch?v=fSuqTgnCVRg

Mapping of COS and POs

	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4
CO1	1				2	3			
CO2		2	2				2		
CO3				3		3		2	
CO4		2		2			1		2