COURSE HANDOUT

OPERATION RESEARCH (MBA-203)

MBA-2nd SEMESTER

ACADEMIC YEAR (2024-25)

Dr. Amanpreet Kaur
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School of Management

School of Management
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Detailed Syllabus

UNIT I

Introduction to Operation Research: Scope, Phases, Models of Operations Research, Opportunities and Limitations of Management Science Approach. Decision Making Environments: Certainty, Uncertainty, Risk & Conflict, Conditional Payoff, Expected loss &Opportunity loss. Single stage Decision making cases, Multi- stage Decision making Cases, Decision Tree analysis.

UNIT II

Transportation Model: Mathematical formulation, Least Cost Method, N-W Corner Method, VAM. Optimality Tests: Steppingstone method, MO-DI method; Application of transportation Model, Maximisation cases, Unbalanced Cases, Degeneracy in transportation. Assignment Model: Hungarian method, Special cases: Maximization, Unbalanced cases, Travelling Salesman, Restricted routes, Flight/ Transport Scheduling.

UNIT III

Linear Programming: Formulation of problems, Graphical method, Simplex method, Big M Method, Sensitivity Analysis, and Minimization/Maximization cases, Special cases, Duality in linear programming.

UNIT IV

Network Construction and Analysis, Time analysis: Forward Path analysis, Backward Path analysis, Floats, Slack, Three- time estimate. Critical Path Method (CPM), PERT Procedure & Analysis, Crashing technique.

UNIT V

Game Theory: Two- person Zero Sum Game, Mini-max, Maxi-min Principles, Saddle point, Mixed Strategies, Graphical method for 2 x n and m x 2 games, Dominance technique. Simulation for Business: Types of Simulation, Random variables, Monte Carlo method, Application of Simulation: Simulation of Inventory system and Queuing system, Advantages & Disadvantages of Simulation.

Books Recommended:

Text Books

S.No.	Name of the Books	Author	Publisher	Edition
1	Operations Research an Introduction	Taha, Hamdy	Pearson Publications	8th (2007)
2	Operations Research	S Kalavathy	UBS Publications	4th (2013)

Reference Books

S.No.	Name of the Books	Author	Publisher	Edition
3	Quantitative Techniques in Management	Vohra, N. D	McGraw Hill Publishing House	3rd (2006)
4	Operation Research (Quantitative Techniques in Management)	Kapoor, V. K	Sultan Chand Publications	8th (2007)
5	Introduction to Operations Research	Hillier, Frederic & Gerald Lieberman	Tata McGraw Hill Publications	8th (2009)

COURSE PLAN		
Unit-I Introduction to Operation Research		
S.No	**Topics**	**Recommended Books**
1	Introduction to Operations Research	Book 1, Ch.1
2	Phases and Models of Operations Research	Book 1, Ch.1
3	Opportunities and Limitations of Management Science Approach.	Book 1, Ch.1
4	Decision Making Environments: Certainty, Uncertainty, Risk & Conflict	Book 2, Ch.2
5	Conditional Payoff, Expected loss & Opportunity loss	Book 2, Ch.2
6	Single stage Decision making cases	Book 2, Ch.2
7	Multi- stage Decision making Cases, Decision Tree analysis.	
Unit-II Transportation Model		
8	2.1 North – West Corner Rule, Least Cost Method And Vogal's Approximation Method	Book 1, Ch.2
9	2.2 Stepping Stone method and Modified Distribution Method	Book 1, Ch.2
10	2.3 Application of Transportation Model	Book 1, Ch.1
11	2.4 Degeneration in Transportation	Book 2, Ch.2
12	2.5 Restricted routes	Book 2, Ch.2
13	2.6 Hungarian method	Book 2, Ch.2
14	2.7 Special cases: Maximization, Unbalanced cases, Travelling Salesman, Restricted routes, Flight/ Transport Scheduling.	Book 2, Ch.2
Unit-III Linear Programming		
15	3.1 Formulation of problems	Book 2, Ch.2
16	3.2 Graphical Method	Book 2, Ch.2
17	3.3 Simplex Method	Book 2, Ch.2
18	3.4 Big M Method	Book 2, Ch.2
19	3.5 Duality in LPP	
20	3.6 Sensitivity Analysis	
21	3.7 Special Cases of LP	
Unit-IV Network Construction and Analysis		
22	Forward Path analysis	Book 2, Ch.3
23	Backward Path analysis	Book 1, Ch.4
24	Floats, Slack, Three- time estimate	Book 1, Ch.4

25	Critical Path Method (CPM)	Book 2, Ch.3
26	PERT Procedure & Analysis	
27	Crashing technique.	Book 1, Ch.3
Unit-V Game Theory		
28	Two person zero sum game-Minimax & Maximin Principles, Saddle Point & Mixed Strategies	Book 2, Ch.8
29	Graphical method for 2 x n and m x 2 games, Dominance technique	Book 1, Ch.8
30	Types of Simulation Random variables	Book 2, Ch.8
31	Monte Carlo method	Book 1, Ch.8
32	Application of Simulation: Simulation of Inventory system and Queuing system	Book 2, Ch.8
33	Advantages & Disadvantages of Simulation	Book2, Ch. 8

ADDITIONAL WEB RESOURCES

1.	E Book on Operations Research : https://www.bbau.ac.in/dept/UIET/EME-601%20Operation%20Research.pdf https://orc.mit.edu/impact/textbooks
2.	Case Studies on OR: https://eco.nahrainuniv.edu.iq/wp-content/uploads/2020/12/Katta_G._Murty_eds._Case_Studies_in_OperationsBook4You.pdf https://www.multidisciplinaryjournals.in/assets/archives/2019/vol4issue3/4-3-24-812.pdf
3	Importance of Operation Research in Decision Making https://www.bobstanke.com/blog/operations-research-overview https://smallbusiness.chron.com/importance-operations-research-decisionmaking-52346.html
4	HBP Course pack https://hbsp.harvard.edu/coursepacks/1142243

GRADING AND ASSESSMENT

- **Sessional Test**: 15 marks
- **Assignment**: 10 marks
- **Attendance**: 5 marks
- **Final Examination**: 70 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Monday (12:55 PM – 1:45 PM)
  Friday (12:55 PM – 1:45 PM)

- **Contact Information**
  amanpreet.llb@mietjammu.in