	ITER, SIKSHA 'O' ANUSANDHAN **(Deemed to be University)**		**LESSON PLAN**
Programme	**B.Tech.**	Academic Year	**2023-24**
Department	**CSE/CE/CSIT/ECE**	Semester	**8th**
Credit	**4**	Grading Pattern	**6**
Subject Code	**MEL 4438**		
Subject Name	**Operation Research**		
Weekly Course Format	**4L - 0P**		
Instructor	**Dr. Anupama Routray**		

Text Books(s):

(1) Operation Research, An Introduction by Hamdy A. Taha, Pearson (HAT).

Course Outcomes	Students will be able to	
	CO1	Recognize the importance and value of operations research and linear programming in solving practical problems in industry.
	CO2	Interpret the transportation models, assignment problems and infer solutions to the real-world problems.
	CO3	Gain knowledge of drawing project networks for quantitative analysis of projects.
	CO4	Know different models for future prediction and applied in real world problems.
	CO5	Usage of different mathematical models in stock, various designs and its application in real life.
	CO6	Recognize the importance of quality and different control charts and its application in the Industry.

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
1	Operation Research Models, Solving OR model by linear programming technique.	HAT_1.1-1.2 (pg.31-34)	**CO1**	
2	Two- variable LP Model, Mathematical Formulation of LP model and problems.	HAT_2.1 (pg.45-47)	**CO1**	
3	Graphical method of LP solution .	HAT_2.2 (pg.47)	**CO1**	
4	Problems on Graphical method of solving Maximization Model .	HAT_2.2.1 (pg.48-50)	**CO1**	
5	Problems on Graphical method of solving Minimization LP Model .	HAT_2.2.2 (pg.50-52)	**CO1**	
6	Simplex method: LP model in equation form	HAT_3.1 (pg.99-100)	**CO1**	
7	Computational details of the Simplex Algorithm	HAT_3.2.1-3.3 (pg.101-111)	**CO1**	
8	Concept of Big M and Two-phase method of linear programming method and its standard form	HAT_3.4.1-3.4.2 (pg.112-117)	**CO1**	
9	Special cases using graphical methods Degeneracy, Alternative optima problem	HAT_3.5.1-3.5.2 (pg.117-121)	**CO1**	
10	Special cases using graphical methods Unbounded Solutions, Infeasible solutions	HAT_3.5.3-3.5.4 (pg.121-123)	**CO1**	**Assignment-1**
11	Duality: Definition of Dual Problem, Primal-Dual Relationships	HAT_4.1 (pg.169-172)	**CO1**	**Quiz-1**

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
12	Transportation Model and Its variant: Definition of Transportation Problem. Transportation Algorithm	HAT_5.1 (pg. 207-208)	**CO2**	
13	Different methods of Transportation Problem	HAT_5.3.1.1-5.3.1.3 (pg.216-218)	**CO2**	
14	Problems on Transportation method	HAT_5.3.1.1-5.3.1.3 (pg.216-218)	**CO2**	
15	Optimality of Transportation Model	HAT_5.3.2 (pg.220-224)	**CO2**	
16	Problems on optimality of Transportation Model	HAT_5.3.2 (pg.220-224)	**CO2**	
17	Assignment Model: Hungarian Method	HAT_5.4.1 (pg.227)	**CO2**	**Assignment-2**
18	Problems on Assignment model	HAT_5.4.1 (pg.227)	**CO2**	**Assignment-2**
19	Network Model: Network Diagram	HAT_6.1 (pg.247-248)	**CO3**	
20	Problems on Network Diagram	HAT_6.1 (pg.247-248	**CO3**	
21	Critical Path Method computations, construction of time schedule)	HAT_6.5.1-6.5.2 (pg.274-278)	**CO3**	

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
22	Problems on CPM	HAT_6.5.1-6.5.2 (pg.274-278)	**CO3**	
23	Project Evaluation Review Technique (PERT)	HAT_6.5.5 (pg.283-284)	**CO3**	
24	Problems on PERT	HAT_6.5.5 (pg.283-284)	**CO3**	
25	Deterministic Dynamic Programming: Recursive nature of Dynamic Programming	HAT_12.1 (pg.469-471)	**CO3**	
26	Dual Programming (Knapsack Model) and Probability	HAT_12.3.1 (pg.475-477)	**CO3**	**Assignment-3**
27	Problems on Dual Programming (Knapsack Model) and Probability	HAT_12.3.1 (pg.475-477	**CO3**	**Quiz-3**
28	Queuing Systems: Elements of Queuing Model, Pure birth and Death Models	HAT _18.2-18.4 pg.(654-659)	**CO4**	
29	Review of probability Systems: Laws of Probability, Random variables	hat_14.1-14.3 (pg.543-548)	**CO4**	
30	Probability Distributions	HAT_14.4 (pg.551-553)	**CO4**	
31	Problems on Binomial distribution, poissons distribution and Normal distribution	HAT_14.4 (pg.551-553)	**CO4**	

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
32	Requirements of Forecasting for operations. Basic categories of Forecasting Methods. Qualitative Methods	ESB_4 (pg. 54-64)	**CO4**	
33	Extrapolative Methods of Forecasting	ESB_4 (pg. 54-64)	**CO4**	
34	Problems on Forecasting	ESB_4 (pg. 54-64)	**CO4**	
35	Problems on Forecasting	ESB_4 (pg. 54-64)	**CO4**	
36	Forecasting Errors	ESB_4 (pg. 54-64)	**CO4**	**Assignment-4**
37	Problems on Forecasting error	ESB_4 (pg. 54-64)	**CO4**	**Quiz-4**
38	Inventory Planning and Control: Basic Inventory systems	HAT_16.1 (pg.611-617)	**CO5**	
39	Inventory Control Systems, ABC classification of Inventory items	HAT_16.1 (pg.611-617	**CO3**	
40	Different inventory models	HAT_16.2 (pg.617-619)	**CO5**	
41	Problems on inventory models	HAT_16.2 (pg.617-619)	**CO5**	
42	Problems on EOQ	HAT_16.1 (pg.611-617)	**CO5**	**Assignment-5**
43	Problems on EOQ	HAT_16.1 (pg.611-617)	**CO5**	**Quiz-5**
44	Quality Assurance	ESB_12 (pg.367-385)	**CO6**	

Sl.No.	Lessons/Topics to be covered	Book Reference (sections)	Mapping with COs	Home Work/ Assignments/ Quizzes
45	Quality Assurance	ESB_12 (pg.367-385)	**CO6**	
46	Statistical Control charts X,R chart	ESB_13 (pg.400-408)	**CO6**	
47	Statistical Control charts X,R chart	ESB_13 (pg.400-408)	**CO6**	**Assignment-6**
48	Problems on X, R Chart	ESB_13 (pg.400-408)	**CO6**	**Quiz-6**

✡ Reference Book : Modern Production/Operations Management by Elwood S. Buffa, Wiley India (ESB)