SEMESTER S4

OPERATIONS RESEARCH

Course Code	PEPOT417	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objectives:

1. To understand the role of Operation Research in decision making
2. To impact the various Operation Research techniques for effective problem solving

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SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction to Operations Research**: - Concept of Optimization, Decision making through Operations Research, Models and Modelling in OR, General methods for solving OR models, Application and Scope of OR – Basic OR models. **Linear programming**: - Formulation of LPP, Graphical method, Simplex method, Maximization problems – Minimization problems, Problems involving artificial variables. Concepts of- Duality, Sensitivity analysis, Degeneracy in LPP	9
2	**Transportation problems:** Formulation, Methods of finding initial solution (North West Corner Rule, Least Cost Method and Vogel's Approximation Method), Test for optimality (MODI Method), Unbalanced Transportation Problems, Maximization Transportation Problems. Assignment Problems: Formulation, Methods of solution, Hungarian method, Unbalanced problems, Maximization problems.	9

3	**Introduction to queuing theory**: – Terminologies– Classification of queuing model 1, Single server problems 1, Multi server problems 1. **Inventory contro**l: – variables – deterministic inventory models – purchasing model without shortages 1, manufacturing model without shortages 1, purchasing model with shortages 1, manufacturing model with shortages 1	**9**
4	**Network Analysis:** CPM and PERT-Time Estimation-Critical Path, Basic Concepts of Crashing. **Replacement Problems**: Replacement of assets that deteriorate with time, Replacement of assets that fail completely.	**9**

Course Assessment Method

(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

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Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination-2 (Written)	Total
5	**15**	**10**	**10**	**40**

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Explain scope and limitations of OR and various methods to find the optimal solution.	**K2**
CO2	Determine the various methods in Transportation problem	**K5**
CO3	Explain Assignment problems	**K2**
CO4	Summarize various queueing models and inventories	**K2**
CO5	Compare and contrast CPM and PERT	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table:

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**2**	**2**	**1**									
CO2	**2**	**3**							**1**			
CO3	**2**	**2**	**3**									
CO4	**2**	**3**										
CO5	**2**	**3**										

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Operations Research Theory and Applications	Sharma J K.	Laxmi Publications	2013
2	Operations Research	Kanti Swarup P K Gupta Manmohan	Sulthanchand & Sons	2019
3	Operations Research	S Kalavathy	VIKAS Publications	2012

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Quantitative Techniques for Management	Vohra N D	Tata McGraw-Hill Education	2015
2	Operations Research: An Introduction	Taha, Hamdy A	Prentice Hall	2010
3	Operations Research: Principles and Practice.	Ravindran, A and Don T Phillips	John Wiley & Sons	1987

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://youtu.be/zTpmyvkNxp4?si=x1Xswk9Pt9_HOAdK
2	https://youtu.be/BDBhpxRzImI?si=Gg3eGmzwioZRTN3Y
3	https://youtu.be/BDBhpxRzImI?si=Gg3eGmzwioZRTN3Y
4	https://youtube.com/playlist?list=PLjc8ejfjpgTf0LaDEHgLB3gCHZYcNtsoX&si=d66td1vYNntU8eIR

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