

**FACULTY OF COMPUTER APPLICATIONS**  
**Bachelor of Science (Information Technology)**  
**B.Sc. (IT)**

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- **Sem.** : 4
- **Subject Code** : 05BS0401
- **Subject** : Applied Mathematics – 4 (Operations Research)
- **Course Objectives** :
  1. To find out use of Operation Research techniques of strategic decision planning for optimum utilization of constraint resources in various span of human life.
  2. To formulate & solve the linear programming model of real-life problem
  3. To determine optimal sequence of real-life sequencing problems
  4. To demonstrate the algorithmic approach rather than on theoretical side
  5. To analyze & solve inventory & replacement related problems
- **Prerequisites** : Basic Knowledge of Mathematics

Unit No	Topics Covered	No of lectures required
1	<b>Basics of Operations Research, Transportation Problem:</b> <ul style="list-style-type: none"> <li>• Operations Research Introduction</li> <li>• Definitions of Operations Research</li> <li>• Features of O.R.</li> <li>• Advantages &amp; Disadvantages of O.R.</li> <li>• Applications of O.R.</li> <li>• Mathematical Definition of Transportation Problem</li> <li>• Formulation of T.P.</li> <li>• Methods to find Initial Basic Feasible Solution North West Corner Rule</li> </ul>	10

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	<p align="center">Least Cost Cell Entry Method Vogel's Approximation Method</p> <ul style="list-style-type: none"> <li>• Test of optimality for finding an optimum solution – MODI method</li> <li>• Variations of Transportation Problems</li> </ul>	
<b>2</b>	<p><b>Assignment Problem, Theory of Games, Queuing Theory:</b></p> <ul style="list-style-type: none"> <li>• Mathematical Definition of an Assignment Problem</li> <li>• Formulation of an Assignment Problem</li> <li>• Method to find an optimum solution - Hungarian Assignment Method</li> <li>• Variations of assignment problem</li> <li>• Theory of Games Introduction</li> <li>• Two-Person Zero Sum game</li> <li>• Pure strategies (Minimax &amp; Maximin principles)</li> <li>• Games with Saddle Point</li> <li>• Rule to determine Saddle Point</li> <li>• Queuing Theory Introduction</li> <li>• Queuing system and problem, transient and steady states, traffic intensity</li> <li>• Probability distributions in queuing systems</li> <li>• Single service queuing model(s)</li> </ul>	<b>12</b>
<b>3</b>	<p><b>Project Management and Scheduling:</b></p> <ul style="list-style-type: none"> <li>• Introduction to PERT &amp; CPM</li> <li>• Network concepts &amp; components</li> <li>• Rules for network construction,</li> <li>• Critical Path Method (CPM)</li> <li>• Project evaluation and Review Techniques (PERT)</li> <li>• Introduction to Job Scheduling</li> <li>• Rules of Job Scheduling</li> <li>• Johnson's algorithm for N jobs on 2 machines</li> <li>• Johnson's algorithm for N jobs on 3 machines</li> <li>• Johnson's algorithm for N jobs on M machines</li> </ul>	<b>10</b>
<b>4</b>	<p><b>Management of Inventory and Replacement:</b></p> <ul style="list-style-type: none"> <li>• Introduction of the Inventory management</li> <li>• Terminologies used in Inventory management</li> <li>• Problem including Objective(s) and Constraints</li> <li>• Single Item Inventory Control without Shortages</li> <li>• Model – I: EOQ model with constant rate of demand</li> <li>• Replacement Introduction</li> </ul>	<b>08</b>





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**Text Book:**

1. Operations Research – Theory and Application, J. K. Sharma, Macmillan Publishers India Ltd, Fourth Edition

**Reference Books:**

1. Operations Research – Problems & Solutions, V. K. Kapur, Sultan Chand & Sons, First Edition
2. Operations Research, Verma A.P., S.K.Kataria & Sons, First Edition
3. Operations Research, Shah Nita H., Gor Ravi M., Soni Hardik, PHI Learning Pvt. Ltd., First Edition

**Web References:**

1. <https://stemez.com/subjects/science/1HOperationsReseach/1HOperationsReseach.php>
2. <https://mathworld.wolfram.com/OperationsResearch.html>

**App References:**

1. <https://play.google.com/store/apps/details?id=com.swastik.operationalresearch>
2. <https://play.google.com/store/apps/details?id=com.HarderBooks.OperationResearchBookFree>

**Syllabus Coverage from text book:**

Unit #	Text Book #	Chapter Numbers
1	1	1(1.1 to 1.5, 1.10,1.13), 9 (9.1 to 9.5)
2	1	10 (10.1 to 10.4), 12 (12.1 to 12.3), 16(16.1 to 16.6)
3	1	13(13.1 to 13.6), 20(20.1 to 20.5)
4	1	14(14.1 to 14.5), 17(17.1 to 17.4)
5	1	2 (2.1 to 2.4, 2.6 to 2.8), 3(3.1 to 3.3.3, 3.4), 4 (4.1 to 4.6), 5 (5.1, 5.2)



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