



PTVA'S Institute of Management

(Approved by AICTE, DTE and affiliated to University of Mumbai)

Chitrakar Ketkar Marg, Behind M. L. Dahanukar College of Commerce, Vile Parle (East), Mumbai –400 057.

Tel.: 022-31061594/31099598, Email: admin@ptvaim.com, Web: www.ptvaim.ac.in

ISO 9001:2015 Certified Institute & Accredited by NAAC

NPTEL-AICTE FDP on Introduction to Operations Research course

Introduction

The NPTEL-AICTE Faculty Development Program (FDP) on "Introduction to Operations Research" was designed to provide faculty members and researchers with an in-depth understanding of operations research methodologies and their applications. The FDP aimed to enhance the analytical and problem-solving skills of the participants, thereby contributing to the advancement of research and teaching in the field of operations research.

Day 1: Introduction to Operations Research

Sessions

- **Inauguration and Keynote Address:** The session commenced with an inauguration ceremony, followed by a keynote address highlighting the relevance of operations research in solving real-world problems and its impact on decision-making processes.
- **Workshop Overview:** An overview of the FDP's structure, objectives, and expected outcomes was presented, setting the tone for the sessions to follow.
- **Introduction to Operations Research:** The basics of operations research were introduced, covering its definition, scope, and historical background.

Activities

- Ice-breaking activities to foster interaction among participants.
- Group discussions on the applications of operations research in various industries.

Key Takeaways


- Recognized the significance of operations research in decision-making.
- Gained a foundational understanding of the scope and applications of operations research.

Day 2: Linear Programming and its Applications

Sessions

- **Formulation of Linear Programming Problems:** Detailed discussion on how to formulate linear programming problems, including defining decision variables, objective functions, and constraints.
- **Simplex Method:** Explanation of the simplex method for solving linear programming problems, including practical examples and step-by-step solutions.




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Activities

- Hands-on exercises on formulating and solving linear programming problems using the simplex method.
- Group problem-solving sessions to reinforce the concepts.

Key Takeaways

- Learned to formulate linear programming problems effectively.
- Gained practical experience in solving linear programming problems using the simplex method.

Day 3: Transportation and Assignment Problems

Sessions

- **Transportation Problem:** Introduction to the transportation problem, including methods for finding an initial feasible solution using the northwest corner rule, least-cost method, and Vogel's approximation method.
- **Assignment Problem:** Explanation of the assignment problem and the Hungarian method for solving it.

Activities

- Practical exercises on solving transportation and assignment problems using various methods.
- Case study analysis to illustrate the application of transportation and assignment problems in logistics and workforce management.

Key Takeaways

- Acquired skills in solving transportation and assignment problems using the northwest corner rule, least-cost method, and Hungarian method.
- Understood the practical applications of these problems in real-world scenarios.

Day 4: Network Models and Integer Programming

Sessions

- **Network Models:** Overview of network models, including the shortest path problem, maximum flow problem, and minimum cost flow problem. Discussion on solving these problems using algorithms such as Dijkstra's algorithm and the Ford-Fulkerson method.
- **Integer Programming:** Introduction to integer programming, its formulation, and techniques for solving integer programming problems, including branch and bound method.



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Activities

- Interactive sessions on solving network models and integer programming problems.
- Group discussions on the implementation of network models and integer programming in various industries.

Key Takeaways

- Gained practical knowledge of solving network models and integer programming problems.
- Learned to apply algorithms like Dijkstra's and the Ford-Fulkerson method to real-world problems.

Day 5: Advanced Topics and Applications

Sessions

- **Dynamic Programming:** Introduction to dynamic programming, its principles, and applications. Detailed discussion on the knapsack problem, shortest path problem, and optimal inventory control.
- **Queuing Theory:** Overview of queuing theory, including basic concepts, queuing models, and their applications in service systems and manufacturing processes.

Activities

- Case studies and problem-solving sessions on dynamic programming and queuing theory.
- Group presentations on the application of operations research techniques in various sectors.

Key Takeaways

- Enhanced understanding of dynamic programming and queuing theory.
- Gained insights into the practical applications of advanced operations research techniques in different industries.




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Assessment and Reflection

Sessions

- **Assessment of Learning Outcomes:** Discussion on tools and methods for assessing the impact of the FDP on participants' knowledge and skills in operations research.
- **Reflection and Feedback:** Participants shared their experiences, insights, and feedback on the FDP, discussing what they learned and how they plan to apply the knowledge gained.

Activities

- Designed assessment tools to evaluate the effectiveness of the FDP.
- Reflection sessions and feedback collection to gather participants' experiences and suggestions for future FDPs.

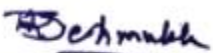
Key Takeaways

- Learned effective assessment techniques to measure the impact of the FDP.
- Gained valuable feedback to enhance the quality of future FDPs.

Conclusion

The NPTEL-AICTE FDP on "Introduction to Operations Research" successfully equipped participants with a comprehensive understanding of operations research methodologies and their applications. The program provided practical knowledge and hands-on experience in solving real-world problems using operations research techniques. Participants left with enhanced analytical skills and a commitment to integrate operations research principles into their research and teaching practices. The FDP concluded with a strong sense of accomplishment and a renewed focus on advancing operations research in their respective fields.




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