

Course Syllabi: UMA031: Optimization Techniques (L : T : P :: 3 : 1 : 0)

1. **Course number and name:** UMA031 Optimization Techniques

2. **Credits and contact hours:** 3.5 and 4

3. **Text book, title, author, and year**

Text Books / Reference Books

- Chandra, S., Jayadeva, Mehra, A., *Numerical Optimization and Applications*, Narosa Publishing House, (2013).
- Taha H.A., *Operations Research-An Introduction*, PHI (2007).
- Pant J. C., *Introduction to optimization: Operations Research*, Jain Brothers (2004)
- Bazaarra Mokhtar S., Jarvis John J. and Shirali Hanif D., *Linear Programming and Network flows*, John Wiley and Sons (1990)
- Swarup, K., Gupta, P. K., Mammohan, *Operations Research*, Sultan Chand & Sons, (2010).
 - a. Other supplemental materials
 - Nil

4. **Specific course information**

a. Brief description of the content of the course (catalog description)

Scope of Operations Research: Introduction to linear and non-linear programming formulation of different models.

Linear Programming: Geometry of linear programming, Graphical method, Linear programming (LP) in standard form, Solution of LP by simplex method, Exceptional cases in LP, Duality theory, Dual simplex method, Sensitivity analysis.

Integer Programming: Branch and bound technique.

Transportation and Assignment Problem: Initial basic feasible solutions of balanced and unbalanced transportation/assignment problems, Optimal solutions.

Project Management: Construction of networks, Network computations, Floats (free floats and total floats), Critical path method (CPM), Crashing.

Game Theory: Two person zero-sum game, Game with mixed strategies, Graphical method and solution by linear programming.

5. **Specific goals for the course**

After completion of this course, the students will be able to:

- Formulate and solve linear programming problems.
- Solve the transportation and assignment problems
- Solve the project management problems using cpm.
- Solve two person zero-sum games.

6. **Brief list of topics to be covered**

- Scope of Operations Research
- Linear Programming
- Integer Programming
- Transportation and Assignment Problem
- Project Management
- Game Theory