

## UMA031 OPTIMIZATION TECHNIQUES

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

**Course Objective:** The main objective of the course is to formulate mathematical models and to understand solution methods for real life optimal decision problems. The emphasis will be on basic study of linear programming problem, Integer programming problem, Transportation problem, Two person zero sum games with economic applications and project management techniques using PERT and CPM.

**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.

**Course learning outcome:** Upon Completion of this course, the students would be able to:

- 1) formulate and solve linear programming problems.
- 2) solve the transportation and assignment problems
- 3) solve the Project Management problems using CPM
- 4) to solve two person zero-sum games

### Text Books:

- 1) Chandra, S., Jayadeva, Mehra, A., Numerical Optimization and Applications, Narosa Publishing House, (2013).
- 2) Taha H.A., Operations Research-An Introduction, PHI (2007).

### Recommended Books:

- 1) Pant J. C., Introduction to optimization: Operations Research, Jain Brothers (2004)
- 2) Bazaarra Mokhtar S., Jarvis John J. and Shirali Hanif D., Linear Programming and Network flows, John Wiley and Sons (1990)
- 3) Swarup, K., Gupta, P. K., Mammohan, Operations Research, Sultan Chand & Sons, (2010).

### Evaluation Scheme:

Sr.No.	Evaluation Elements	Weight age (%)
1.	MST	30
2.	EST	45
3.	Sessionals (May include assignments/quizzes)	25