M.Sc. (Mathematics)

Semester - IV

Course Code	PS04EMTH30	Title of the Course	Operations Research
Total Credits of the Course	4	Hours per Week	04 (Four)

Main Focus of the Course outcomes	Employability	Skill Development	Entrepreneurship
	✓	✓	
Course Objectives:	1. 1 The students will learn about basic linear programming and its role in decision making. 2. Students will get exposure of various techniques in linear programming used in transportation problems and assignment problem. 3. Students will get an idea of non-linear programming.		

Course Content		
Unit	Description	Weightage* (%)
1.	Modelling with Linear Programming: two-variable LP model, graphical LP solution, LP model in equation form, the simplex method, artificial starting solution, M-method, Two-Phase method, graphical sensitivity analysis.	25
2.	Special Cases in the Simplex Method: degeneracy, alternative optima, unbounded solution, infeasible solution, definition of dual problem, primal-dual relationships, economic interpretation of duality, dual simplex algorithm.	25
3.	Transportation Model and its Variants, definition of the transportation model, non-traditional transportation models, the transportation algorithm, determination of starting solution, iterative computations of the transportation algorithm, simplex method explanation of the method of multipliers, the Assignment model, the Hungarian method, Simplex explanation of the Hungarian method.	25
4.	Classical Optimization Theory: unconstrained problems, necessary and sufficient conditions, constrained problems, equality constraints, inequality constraints – Karush-Kuhn-Tucker (KKT) conditions.	25

Teaching-Learning Methodology	Class room Teaching

Evaluation Pattern		
Sr.No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form ofQuizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learnerwill be able to	
1.	Students will be able to generalize some standard topological concepts.
2.	Students will know some more advance level ideas and results.
3.	Students will realize that some standard results do not remain true in generalization.

Suggested References:	
Sr.No.	References
1.	Kanti Swarup, Gupta P.K., and Man Mohan, Operations Research, S. Chand & sons, 2004.
2.	G. Hadley, Linear Programming, Addition Wesley Publ., 1962.
3.	F. S. Hillier and G. J. Lieberman, Introduction to Operations Research, Mcgraw-Hill Higher Education, 2001.

On-line resources to be used if available as reference material
On-line Resources

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