

SEMESTER – V (Open Course)
(For students not having Mathematics as Core Course and
Mathematics and Physics dual Core programme)

MTS5D03 : LINEAR MATHEMATICAL MODELS

3 Hours/Week

3 Credits 75 Marks[Int: 16 + Ext : 60]

Aims, Objectives and Outcomes

The aim of this course is to explain the basic concepts of linear functions, solve system of linear equations using various methods, solve linear programming problems geometrically. And to solve LP problems more effectively using Simplex algorithm and also explain duality theory.

On successful completion of this course, the students will be able to Understand the idea of slope of the lines, understand to find solution of Linear Systems by the Echelon Method and Gauss Jordan method. Gets an idea of matrices, understand how to add, subtract and multiplication of matrices and understand how find the inverse of a matrix. Understand the methods of solving linear programming problems geometrically and understands the drawbacks of geometric methods and to solve LP problems more effectively using Simplex method. Understand duality theory, a theory that establishes relationships between linear programming problems of maximization and minimization.

Syllabus

Text	Finite Mathematics and Calculus with Applications (9/e) Margaret L. Lial, Raymond N. Greenwell & Nathan P. Ritchey Pearson Education, Inc (2012), ISBN 0-321-74908-1
------	--

Module – I

(18 hrs)

Chapter - 1 : Linear Functions

- 1.1 : Slopes and Equations of Lines
- 1.2 : Linear Functions and Applications
- 1.3 : The Least Squares Line

Chapter - 2 : Systems of Linear Equations and Matrices

- 2.1 : Solution of Linear Systems by the Echelon Method
- 2.2 : Solution of Linear Systems by the Gauss-Jordan Method
- 2.3 : Addition and Subtraction of Matrices
- 2.4 : Multiplication of Matrices

Page 85 of 115

85

- 2.5 : Matrix Inverses
- 2.6 : Input-Output Models

Module –II

(12 hrs)

Chapter - 3: Linear Programming: The Graphical Method

- 3.1 : Graphing Linear Inequalities
- 3.2 : Solving Linear Programming Problems Graphically
- 3.3 : Applications of Linear Programming

Module – III

(18 hrs)

Chapter - 4 : Linear Programming: The Simplex Method

- 4.1 : Slack Variables and the Pivot
- 4.2 : Maximization Problems
- 4.3 : Minimization Problems; Duality
- 4.4 : Nonstandard Problems