

Course Code	Course Name	Credits
26EC007	QUANTITATIVE TECHNIQUE (MATHEMATICS)	04

Course Objectives

- To enable students to explain and apply the basic concepts of set theory and to draw and interpret Venn diagrams representing set relations.
- To develop the ability to solve systems of linear equations using matrices and determinants.
- To understand and apply various rules of differentiation in the dataset
- Understand and apply various integration rules like substitution, definite integral in mathematical problems.
- To apply and evaluate the concepts of linear programming in solving real-life business and economic problems.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Interpret and apply sets and Venn diagrams of set relations and operations to solve real-life problems.
- Explain, compute, and apply concepts of matrices and determinants, including solving minor and higher-order matrices.
- Evaluate different rules of derivative in the actual world
- Derive, analyze, and solve different types integration arising in real-life situations
- Design proper business planning using LLP

Unit 1 – Sets and System of Equation (12Hrs)

Sets- concepts and types, operations on sets, number of elements in a set, relations and Cartesian product functions, system of simultaneous linear equation and inequalities in market equilibrium

Unit 2 – Matrix and Determinant (12Hrs)

Matrix and determinants- concept of matrix, inverse of a matrix, types of Matrix. Determinants- concept, properties, solution of simultaneous equation through Cramer's rule.

Unit 3 – Differentiation (12Hrs)

Differentiation- rules of differentiation, average revenue, marginal revenue, total revenue, marginal cost, average cost, maxima and minima, profit maximization

Unit 4 – Integration (12Hrs)

Integration- concept, rules of integration, methods of integration, integration by parts, definite integrals, consumer's and producer's surplus

Unit 5 –Linear Programming and Input-Output analysis (12Hrs)

Linear programming- concepts and formulation, solution of linear programming through graph and simplex method, input-output analysis.

Reference Books:

1. Mathematics for Economists- Mehta Madhani, Sultan Chand & Son, 9th Edition 2008.
2. Fundamentals of Mathematical Statistics- S.C Gupta & V.K Kapoor, Sultan Chand & Sons Publication, 11th Revised Edition (2002).
3. Mathematics & Statistics for Economics- G.S Monga, Vikas Publishing House Pvt,Ltd, 2nd Revised Edition (2009).
4. An Introduction to Mathematical Statistics and its Application- Richard J. Larsen & Morris L.Marx, Prentice Hall. (2011).
5. Comprehensive Statistical Methods: P.N Arora, Sumeet Arora, S.Arora, S.Chand& Company, 4th Revised Edition (2012).

Websites and eLearning Sources:

1. <https://www.sciencedirect.com/journal/journal-of-mathematical-economics>
2. <https://mathoverflow.net/questions/60685/reference-for-mathematical-economics>
3. <https://www.springerprofessional.de/en/mathematical-economics/17341494>

COs and Bloom's Taxonomy Mapping – 26EC007

Course Outcomes	On successful completion of this course, students will be able to	BTL
CO1	Understand the basic concept of mathematical foundation through sets and recall the fundamental simultaneous linear equation and market equilibrium	K1, K2
CO2	Apply Using matrix methods (e.g., inverse method, Cramer's Rule) Analyze – breaking down systems of equations and selecting appropriate methods	K3, K5
CO3	Understanding and learning rules of differentiation and Analyzing and identifying which rule or technique to use in complex problems	K2,K4
CO4	Understanding and learning rules of integration techniques Analyzing and identifying which rule or technique of integration to use in complex problems	K2,K4
CO5	Applying the formulation of LPP and solving LPP problems, Analyze and translating real-life situations into mathematical models and Evaluate and interpreting optimal solutions and making decisions based on results	K3,K4,K5

BTL (Bloom's Taxonomy Level) - K1 – Remembering, K2 – Understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6 - Create

Relationship Matrix – 26EC007

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	2	2	2	2	2	2	3	2	2.09
CO2	3	2	2	3	2	3	2	2	1	2	2	2.36
CO3	2	2	3	2	2	2	2	2	2	3	2	2.18
CO4	2	2	2	2	1	2	2	2	3	2	2	2.00
CO5	3	2	3	3	2	3	3	3	3	3	2	2.71
Total												2.26

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

