M.Sc. (Mathematics) Semester-II

Program	Subject	Year		Semester	
M.Sc.	Mathematics	1		II	
Course Code	Course Title		Course Type		
MAT610	Elementary Mathematics for Social Sciences			Elective	
Credit	Hours Per Week (L-T-P)				
	L	Т		Р	
3	3				
Maximum Marks	CIA	CIA		ESE	
100	30	70		30	

(Offered to PG students of other Departments/SoS only)

Learning Objective (LO):

The course aims to equip students with the knowledge and skills necessary to explore fundamental algebraic concepts, functions, exponential and logarithmic functions, as well as systems of linear equations and matrices.

Course Outcomes (CO):

CO	Expected Course Outcomes	CL
No.	At the end of the course, the students will be able to :	
1	Find factors and roots of polynomials simplify rational expressions solve	Ān
-	linear and quadratic equations.	₽
2	Interpret and manipulate graphs and equations, Illustrate linear equations	U
	and inequalities.	
3	Apply a variety of functions, including linear, quadratic, polynomial, and	Ар
	rational functions, to solve problems.	_
4	Explain and manipulate exponential and logarithmic functions, solve	Ар
	equations involving these functions.	-
5	Solve system of linear equations, perform matrix operations, including	An
	products and inverses. Apply matrices to solve system of equations.	

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

Detailed Syllabus:

Un	Topics	No. of	С
it		Lectur	0
No		es	Ν
			о.
Ι	Algebra and Equations:	9	1
	The Real Numbers, Polynomials, Factoring, Rational Expressions, Expo		
	nents and Radicals, First Degree Equations, Quadratic Equations.		
II	Graphs, Lines, and Inequalities	9	2
	Graphs, Equations of Lines, Linear Models, Linear Inequalities, Polynomi		
	al and Rational Inequalities.		
III	Functions and Graphs	9	3
	Functions, Graphs of Functions, Applications of Linear Functions,		
	Quadratic Function and Applications, Polynomial Functions, Rational		
	Functions.		
IV	Exponential and Logarithmic Functions	9	4
	Exponential Functions, Applications of Exponential Functions,		
	Logarithmic Functions, Logarithmic and Exponential Equations.		
V	Systems of Linear Equations and Matrices	9	5
	Systems of Two Linear Equations in Two Variables, Larger Systems of		
	Linear Equations. Applications of Linear Equations, Basic Matrix		
	Operations, Matrix Products and Inverses, Applications of Matrices.		

Books Recommended:

1. M.L. Lial, T.W. Hungerford, J.P. Holcomb, B. Mullins: *Mathematics with Applications in the Management, Natural and Social Sciences*, 12th ed, Pearson, 2018.

M.Sc. (Mathematics) Semester-III

Program	Subject	Year		Semester	
M.Sc.	Mathematics	2		III	
Course Code	Course Title			Course Type	
MAT620	Mathematics for Social Sciences			Elective	
Credit	Hours Per Week (L-T-P)				
	L	Т		Р	
3	3				
Maximum Marks	CIA		ESE		
100	30		70		

(Offered to PG students of other Departments/SoS only)

Learning Objective (LO):

The course objective is to provide students understanding and practical application of advanced mathematical concepts, including linear programming techniques, sets, probability theory, limits, derivatives, and integrals.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Solve problem related to linear inequalities, linear programming, and the simplex method for maximization, minimization, duality, and nonstandard problems.	Ар
2	Analyze and apply principles of set theory, Venn diagrams, contingency tables, and probability concepts, including conditional probability and Bayes' formula.	An
3	Apply the principles of limits, derivatives, and continuity, and employ various techniques, including the chain rule, to compute derivatives of a wide range of functions.	Ар
4	Apply the concepts of derivatives to optimization problems, implicit differentiation, related rates, and curve sketching.	Ар
5	Describe integral as antiderivative, evaluate integration by substitution, definite integrals. Explain and apply Fundamental Theorem of Calculus, solve differential equations.	Ар

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

Detailed Syllabus:

Unit	Topics	No. of	CO
No.		Lectures	No.
I	Linear Programming:	9	1
	Graphing Linear Inequalities in Two Variables, Linear		
	Programming: The Graphical Method, Applications of		
	Linear Programming, The Simplex Method: Maximization,		
	Maximization Application, The Simplex Method: Duality and		
	Minimization, The Simplex Method: Nonstandard Problems		
II	Sets and Probability:	9	2
	Sets, Applications of Venn Diagrams and Contingency		
	Tables, Introduction to Probability, Basic concepts of		
	Probability, Conditional Probability and Independent		
	Events, Bayes' Formula.		
III	Differential Calculus:	9	3
	Limits, One-Sided Limits and Limits Involving Infinity, Rates		
	of Change, Tangent Lines and Derivatives, Techniques for		
	Finding Derivatives, Derivatives of Products and Quotients,		
	The Chain Rule, Derivatives of Exponential and Logarithmic		
	Functions, Continuity and Differentiability.		
IV	Applications of the Derivative:	9	4
	Derivatives and Graphs, The Second Derivative,		
	Optimization Applications, Implicit Differentiation, Related		
	Rates, Curve Sketching.		
v	Integral Calculus:	9	5
	Antiderivatives, Integration by Substitution, Area and the		
	Definite Integral, The Fundamental Theorem of Calculus,		
	Applications of Integrals, Differential Equations.		

Books Recommended:

1. M.L.Lial, T.W.Hungerford, J.P.Holcomb, B.Mullins: *Mathematics with Applications in the Management, Natural and Social Sciences*, 12th ed, Pearson, 2018.