Course Title	**Math Deficiency-I**		
Course Code	**MD-001**		
Credit Hours	3*		
Category	Mathematics Deficiency		
Prerequisite	None		
Co-Requisite	None		
Follow Up	Math Deficiency – II		
Course Introduction	This course introduces fundamental concepts in algebra, functions, and trigonometry, providing a strong base for further study in mathematics. It covers sets and their operations, relations and functions with their properties and graphs, and techniques for solving systems of equations using algebraic and matrix methods. Students explore sequences, series, and various types of functions, including polynomial, rational, exponential, and logarithmic forms. The course also includes trigonometry, conic sections, and polar and parametric equations, helping students develop analytical and problem-solving skills essential for advanced mathematical applications.		
Course Learning Outcomes (CLOs)	At the end of the course, the students will be able to:	**BT**	**PLO**
	CLO1: Know the concepts and applications of sets, relations, functions, systems of equations, trigonometric functions and matrix algebra	C1 (Know)	1
	CLO2: Describe system of linear equations, matrix algebra, trigonometry, and related techniques.	C2 (Describe)	1
	CLO3: Solve problems related to system of linear equations, matrix algebra, and trigonometry.	C3 (Apply)	1,3
	CLO4: Know the general form of Conic, polar coordinate and parametric equations.	C1 (Know)	1
Text Book(s)	1. Textbook of Algebra and Trigonometry Class XI is published by Punjab Textbook Board (PTB) Lahore, Pakistan. 2. Calculus and Analytic Geometry, MATHEMATICS 12 (Mathematics FSc Part 2 or HSSC-II), Punjab Text Book Board Lahore, Pakistan		
Reference Material	1. Gilbert, S. S., B. C. Andy and B. Andrew, B. 2005. Linear Algebra and Its Applications. 4th Ed. Thomson Brooks/Cole, Belmont, CA, USA.		

Weekly Lesson Plan

Week No.	Course Content	Assignments/Readings
Week 1	Definition of sets Types of sets (finite, infinite, empty, singleton, universal) Set representation (roster & set-builder form)	Book1: Chapter 2
Week 2	Set operations: union, intersection, difference, complement Venn diagrams Basic applications and word problems	Book1: Chapter 2 Quiz 1
Week 3	Relations and functions (definitions) Domain and range Types of functions Graphing basic functions	Thomas Jr. et al.: Chapter 1 Assignment 1
Week 4	Function transformations (shifts, reflections, stretches) Composition of functions Inverse functions	Thomas Jr. et al.: Chapter 1

Week 5	Increasing/decreasing functions Maximum and minimum values Zeros and intercepts Piecewise functions	Thomas Jr. et al.: Chapter 1
Week 6	Continuity and discontinuity	Thomas Jr. et al.: Chapter 1
	Polynomial functions (intro) Rational functions (intro)	
Week 7	Polynomial long division Synthetic division Solving rational functions Graphing rational functions	Lecture handouts Assignment 2
Week 8	Absolute value functions & properties Asymptotes (horizontal, vertical, oblique) Exponential functions and properties Logarithmic functions and properties	Thomas Jr. et al.: Chapter 2 Quiz 2
Week 9	Systems of two equations (graphical & algebraic methods) Systems of three equations	Book1: Chapter 3
Week 10	Matrix algebra (addition, subtraction, multiplication) Row operations and row echelon form Augmented matrices	Book1: Chapter 3
Week 11	Determinants & Inverses Determinants (2×2 and higher order) Cramer's Rule Inverse matrices Solving systems using matrices	Book1: Chapter 3 Assignment 3
Week 12	Sequences & Series Introduction to sequences Arithmetic and geometric sequences Series basics	Book1: Chapter 6 Quiz 3
Week 13	Angles (degrees & radians) Right triangle trigonometry Law of Sines and Cosines Area of triangle	Thomas Jr. et al.: Chapter 1
Week 14	Graphs of trigonometric functions Inverse trigonometric functions Basic identities (Pythagorean, sum/difference, double/half angle)	Thomas Jr. et al.: Chapter 1 Quiz 4
Week 15	Trigonometric Equations & Conics Solving trigonometric equations General form of conics Parabolas Circles	Book 2: Chapter 6 Assignment 4
Week 16	Ellipses Hyperbolas Polar and rectangular coordinates Parametric equations	Book 2: Chapter 6