

**LAGUARDIA COMMUNITY COLLEGE  
CITY UNIVERSITY OF NEW YORK  
DEPARTMENT OF MATHEMATICS, ENGINEERING AND COMPUTER SCIENCE**

**MAT241 Technical Mathematics 1**

4 Hours; 4 credits

Prerequisite: MAT 096 or Waiver

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**CATALOG DESCRIPTION :**

This course helps students to appreciate the usefulness of mathematics in to-day's world. The basic the concepts of college algebra and trigonometry with emphasis on their application in technologies are presented. Topics include analytic geometry, trigonometric, exponential and logarithmic function and their graphs, system of linear equations and matrices, and complex numbers.

**INSTRUCTIONAL OBJECTIVES:**

1. Reinforce student's basic algebraic skills.
2. Study analytic geometry using the Cartesian Plane.
3. Study the exponential, logarithmic and trigonometric functions.
4. Familiarize the student with the operations with complex numbers.
5. Introduce the concept of matrices through the study of linear equations.
6. Provide the students with a historical background of the terms and concepts that will enhance their understanding of the subject matter.
7. Provide the students with the opportunity to experience different methods of solving problems through the cultural diversity and educational background of the class.

**PERFORMANCE OBJECTIVES :** The student will be able to

1. Sketch graphs of linear and quadratic equations.
2. Compute the functional values and sketch the graphs of exponential, logarithmic and trigonometric functions.
3. Prove simple trigonometric identities.
4. Perform operations with complex numbers.
5. Solve systems of linear equations using matrices.
7. Demonstrate understanding of historical background of and concepts.

<b><u>GRADING:</u></b> 3 Exams	50%
2 projects	20%
Homework/Quiz	5%
FINAL	25%

**ATTENDANCE:** Attendance is mandatory. Excessive absenteeism (more than 6 classes) may result in a WU or F grade. No class should be missed unless absolutely necessary.

**TEXTBOOK:** Basic Technical Mathematics with Calculus, 10th Edition,  
By Allyn J. Washington, Pearson

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**TECH MATH 1 (MAT241)**

Please note that there are many applications of mathematics in electronics, but mathematics is not electronics. In the MAT241 component, you are to learn and master many mathematics skills and concepts, which is a basic training for any science student. As you progress, you will encounter tools which have direct applications in electronics (such as trigonometric functions, exponential and logarithmic functions, complex numbers), but you will also learn many important concepts that their application to electronics is not direct, but is useful in general.

<b>WEEK</b>	<b>LESSON</b>	<b>SECTION</b>	<b>TOPIC</b>	<b>PAGE</b>
<b>1</b>	1	1-4	Exponents	16
		1-5	Scientific Notation	21
	2	3-1	Introduction to Functions	81
		3-2	More About Functions	84
	3	3-3	Rectangular Coordinates	89
3-4		The Graph of a Function	91	
4	3-4	The graph of a Function (continued)	91	
<b>2</b>	5	5-1	Linear Equations	136
		5-2	Graphs of Linear Equations	139
	6	21-1	Basic Definitions	565
		21-2	The Straight Line	569
	7	5-3	Solving Systems of Two Linear Equations in Two unknowns Graphically	143
5-4		Solving Systems of Two Linear Equations in Two unknowns Algebraically	147	
8	5-5	Solving Systems of two Unknowns by determinants	154	
<b>3</b>	9	5-7	Solving Systems of Three Linear Equations in three unknowns by determinants	165
	10	<b>Review</b>		
	11	<b>Test 1</b>		
	12	4-1	Angles	109
<b>4</b>	13	4-2	Defining the Trigonometric Functions	112
	14	4-3	Values of the Trigonometric Functions	115
	15	4-4	The Right Triangle	119
	16	4-5	Applications of the Right Triangles	124
<b>5</b>	17	4-5	Applications of the Right Triangles (Continued)	124
	18	8-1	Signs of the Trigonometric Functions	235

	19	8-2	Trigonometric Functions of Any Angle	237
	<b>LESSON</b>	<b>SECTION</b>	<b>TOPIC</b>	<b>PAGE</b>
<b>5</b>	20	8-3	Radians	243
<b>6</b>	21	8-4	Applications of Radian Measure	247
	22	10-1	Graph of $y = a \sin x$ and $y = a \cos x$	292
	23	10-2	Graph of $y = a \sin bx$ and $y = a \cos bx$	295
	24	10-3	Graph of $y = a \sin(bx + c)$ and $y = a \cos(bx + c)$	298
<b>7</b>	25	<b>Review</b>		
	26	<b>Midterm</b>		
	27	10-5	Applications of the Trigonometric Graph	304
	28	20-1	Fundamental Trigonometric Identities	532
<b>8</b>	29	20-2	The Sum and Difference Formulae	543
	30	20-6	The Inverse Trigonometric Function	554
	31	13-1	Exponential Functions	367
	32	13-2	Logarithmic Functions	369
<b>9</b>	33	13-3	Properties of Logarithms	373
	34	13-4	Logarithms of the Base 10	378
		13-5	Natural Logarithms	381
	35	13-6	Exponential and Logarithmic Equations	384
<b>10</b>	36	13-6	Exponential and Logarithmic Equations (continued)	384
	37	<b>Review</b>		
	38	<b>TEST 3</b>		
	39	12-1	Basic Definitions	338
<b>11</b>	40	12-2	Basic Operations with complex Numbers	341
	41	12-3	Graphical Representation of Complex Numbers	344
	42	12-4	Polar Form of a Complex Number	346
	43	21-3	The Circle	575
<b>12</b>	44	21-3	The Circle (continued)	575
	45	21-4	The Parabola	580
	46	21-5	The Ellipse	584
	47	21-6	The Hyperbola	589
	48	<b>Review</b>		
			<b>FINAL EXAM (CUMULATIVE)</b>	