Mathematics 1

Basic Course Information

Course Number	01005009	Subject Category	Compulsory (M)
Class Format	Lecture	Credit Type and Number of Credits	2.5
Department	Mechatronics	Student Category	Year 1
Period of Study	Semester 1	Classes per Week	5
Required Materials	"Precalculus, mathematics for calculus" 7th edition by and Stewart, Redlin, and Watson and "Precalculus", "College Algebra" 2nd edition by OpenStax		
Instructor	Jetjaroen Klangwang	Akinori Tanaka	Panitam Sammeta

Course Objective

When completing this course, students will be able to:
1. Apply basic algebra skills without requiring a review.
2. Recall the definition of a function, the basics of functions and their graphs, function operations, and function transformations.
3. Recognize various types of functions including polynomial, rational, exponential, logarithmic, and trigonometric functions) and use the properties of these functions to solve equations and application problems.
4. Define trigonometric functions: understand the right triangle trigonometry and unit circle, and know and apply identities involving the trigonometric functions

Evaluation(Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Can draw graphs of any quadratic, power, rational and radical functions and find the domain, range and inverse.	Can draw graphs of basic quadratic, power, rational and radical functions and find the domain, range and inverse.	Can't draw graphs of quadratic, power, rational and radical functions or can't find the domain, range or inverse.
Evaluation 2	Can solve complicated polynomial and rational equations and inequalities by both algebraic and graphic approach.	Can solve basic polynomial and rational equations and inequalities by algebraic or graphic approach.	Can't solve basic polynomial or rational equations or inequalities.
Evaluation 3	Can draw graphs of complicated exponential, logarithmic and trigonometric functions using their properties.	Can draw graphs of basic exponential, logarithmic and trigonometric functions using their properties.	Can't draw basic exponential, logarithmic or trigonometric functions.
Evaluation 4	Can solve complicated equations and inequalities with exponential, logarithmic and trigonometric expressions.	Can solve basic equations and inequalities with exponential, logarithmic and trigonometric expressions.	Can't solve basic equations or inequalities with exponential, logarithmic or trigonometric expressions.

Relationship with Learning Outcomes

G(1) Wide knowledge on Science and Engineering and practical ability to apply them to solve problems in the society.

G(4) Creativity to make a new value with fusing the knowledge from various fields.

Please change

Teaching Method

Outline:	
Class Format:	Lecture, Drill, Group Work, and Presentation
Please Note :	Class format is subject to change depending on students' prior knowledge and preparation

Course Plan

Semester 1	Contents and Method of Course	Goals	Related MCC	
1st Week	Chapter 1 : Fundamentals	Can explain the definitions of intervals, absolute value, square root, and complex number.	1	4
			1	16
2nd Week	Chapter 2 : Functions	Can define a function and draw graphs of basic functions. Can draw graphs by applying translation, reflection, and magnification.	1	1
			1	3
3rd Week	Chapter 2 : Linear Functions	Can define linear functions and draw their graphs. Can solve linear equations and inequalities.	1	11
			1	30
4th Week	1st Quarter Examination (15%)	1st Week - 3rd Week		
5th Week	Chapter 2 : Absolute Value Functions	Can explain and calculate absolute value. Can define absolute value functions and draw their graphs. Can solve absolute value equations and inequalities.	1	4
6th Week	Chapter 3 : Quadratic Functions	Can define quadratic functions and draw their graphs. Can solve quadratic, higher-order equations and inequalities.	1	7
			1	8
			1	11
			1	13
7th Week	Chapter 3 : Polynomial Functions	Can define polynomial functions and draw their graphs. Can apply long division on polynomials and use the factor theorem for factorization.	1	1
			1	2
8th Week	Chapter 3 : Rational Functions	Can define rational functions and draw their graphs. Can solve rational equations and inequalities.	1	3
			1	10
			1	14
9th Week	Midterm Examination (20%)	5th Week - 8th Week		
10th Week	Chapter 3 : Radical Functions	Can calculate radicals. Can define radical functions using definition of inverse functions. Can draw the graphs of inverse functions. Can solve radical equations and inequalities.	1	5
			1	10
			1	14
			1	15
11th Week	Chapter 4 : Exponential Functions	Can explain and calculate exponents. Can define exponential functions and draw their graphs. Can solve exponential equations and inequalities.	1	17
			1	18
12th Week	Chapter 4 : Logarithmic Functions	Can explain and calculate logarithms. Can define logarithmic functions and draw their graphs. Can solve logarithmic equations and inequalities.	1	19
			1	20
			1	21
13th Week	3rd Quarter Examination (20%)	10th Week - 12th Week		
14th Week	Chapter 5 : Trigonometric Ratios	Can calculate the value of the six trigonometric ratios and use them to find lengths and angles of a given triangle.	1	24
			1	26
15th Week	Chapter 5 : Trigonometric Functions	Can understand how trigonometric functions relate to right triangles and extend the definitions of the trigonometric functions beyond right triangles using the unit circle.	1	25
16th Week	Chapter 5 : Graph of Trigonometric Functions	Can draw graphs of the three trigonometric functions and determine the amplitude, period, and transformations.	1	27
17th Week	Chapter 5 : Trigonometric Equations	Can solve trigonometric equations using properties of the unit circle and graphs of trigonometric functions.	1	12
			1	23
18th Week	Chapter 5 : Inverse Trigonometric Functions and Law of Sines and Cosines	Can define the three inverse trigonometric functions and find the exact value of expressions involving the inverse trigonometric functions.	1	22
19th Week	Final Examination (20%)	14th Week - 18th Week		
20th Week	Return asnwer-sheets,review semester and give feedbacks	Summary		

Do not

	Examination	Class Participation	Drill Submission	Report	Portfolio	Other
Basic Ability	75	10	15	0	0	0
Technical Ability						
Interdisciplinary Ability						