Mathematics 2

Basic Course Information

Course Number	01005010	**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 2	**Classes per Week**	5
Required Materials	"Mathematics Volume 1 - Fundamental Mathematics", "Mathematcis Volume 2 - Linear Algebra", "Precalculus: Mathematics for Calculus 7th Edition", "Calculus Early Transcendental 10th Edition", and "Precalculus" by OPENSTAX, "Discrete Mathematics with Applications 4th Edition", and "Discrete Mathematics and Its Applications 7th Edition".		
Instructor	Jetjaroen Klangwang	Akinori Tanaka	Panitarn Sanmeta

Course Objective

When successfully complete this course, students will be able to:
1. Describe various types of conic sections and identify and recognize the main features of ellipsoids, paraboloids, and hyperboloids.
2. Perform the vector operations by aplying addition, scalar multiplication, dot product, and cross product.
3. Graph an inequality by hand and graph a system of inequalities.
4. Determine the arithmetic or geometric sequence given information about it.
5. Describe the fundamental counting principle and determine the number of possible permuations and/or combinations for a given situation.

Evaluation(Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Can recognize the main features of quadratic curves and quadric surfaces.	Can recognize some features of quadratic curves and quadric surfaces.	Can't recognize any features of quadratic curves and quadric surfaces.
Evaluation 2	Can perform 2D and 3D vector operations and write the equations for lines and planes.	Can perform basic 2D and 3D some vector operations and write the equations for lines or planes.	Can't perform any 2D and 3D vector operations and can't write the equations for lines and planes.
Evaluation 3	Can graph systems of linear, nonlinear and/or polar inequalities.	Can graph some of systems of linear, nonlinear and/or polar inequalities.	Can't graph systems of linear, nonlinear and/or polar inequalities.
Evaluation 4	Can identify the different kinds of sequences and describe the similarties and differences between arithmetic and geometric squences.	Can identify only some kinds of sequences and describe some of similarties and differences between arithmetic and geometric squences.	Can't identify the different kinds of sequences and describe the similarties and differences between arithmetic and geometric squences.
Evaluation 5	Can describe fundamental counting principles and solve counting problems using permutation and combination.	Can describe some of fundamental counting principles and solve some counting problems using permutation and combination.	Can't describe fundamental counting principles or solve counting problems using permutation and combination.

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 2	**Contents and Method of Course**	**Goals**	**Related MCC**
1st Week	Chapter 1 : Sequence and its Partial Sums	Can identify the nth term and compute it partial sums of given sequences. Can describe the similarities and differences of arithmetic and geometric sequences	1 36 1 37
2nd Week	Chapter 1 : Addition and Multiplication Principles	Can describe the fundamental addition and multiplication principles	1 34
3rd Week	Chapter 1 : Permutations and Combinations	Can solve counting problems using permutation and combination.	1 35
4th Week	1st Quarter Examination (15%)	1st Week - 3rd Week	
5th Week	Chapter 2 : 2D Coordinate Systems and Circles	Understand the 2-dimensional rectangular coordinate system and recognize features of circles	1 31
6th Week	Chapter 2 : Conic Sections	Can identify the main features of an ellipse, a hyperbola, a parabola and their translations	1 32
7th Week	Chapter 2 : 3D Coordinate Systems and Spheres	Understand the 3-dimensional rectangular coordinate system and recognize features of ellipsoids, paraboloids, and hyperboloids	
8th Week	Chapter 2 : Quadric Surfaces	Can identify the main features of an ellipse, a hyperbola, a parabola and their translations	
9th Week	Midterm Examination (20%)	5th Week - 8th Week	
10th Week	Chapter 3 : Sets and Set Operations	Can identify sets and understand set operations	
11th Week	Chapter 3 : Polar Coordinate System	Can convert points between rectangular and polar coordinates and sketch polar curves from given equations	
12th Week	Chapter 3 : Regions of Inequalities	Graph an inequality by hand and graph a system of linear, nonlinear and polar inequalities.	1 33
13th Week	3rd Quarter Examination (15%)	10th Week - 12th Week	
14th Week	Chapter 4 : Vectors in Two and Three Dimensions	Can recognize the features of 2D and 3D vectors and perform basic operations	1 40 1 41
15th Week	Chapter 4 : Dot Product and its Proterties	Can use the dot product to determine the projection of a vector in another direction and determine the angle between two vectors	1 42 1 43
16th Week	Chapter 4 : Cross Product and its Properties	Can use the cross product to determine the angle between two vectors and determine a vector normal to the plane	1 43
17th Week	Chapter 4 : Equations of Lines and Planes	Can find vector and parametric equations of a line and find vector and scalar equations of a plane	1 4
18th Week	Review Session	14th Week - 18th Week	
19th Week	Final Examination (25%)	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						