Mathematics 6

Basic Course Information			
Course Number	01005014	**Subject Category**	Compulsory(G)
Class Format	Lecture	**Credit Type and Number of Credits**	1.5
Department	Mechatronics	**Student Category**	Year 3
Period of Study	Semester 2	**Classes per Week**	3
Required Materials	"Mathematics A" by M. Kobayashi, A. Shimizu, Y. Ichikawa, and M. Sekiguchi (primary 1), "Mathematics B" by A. Shimizu, Y. Ichikawa, M. Kobayashi, and M. Sekiguchi (primary 2), "Calculus Early Transcendentals" 10th ed. by H. Anton, I. Bivens, and S. Davis, and "Advance Engineering Mathematics" 10th ed. by E. KREYSZIG (optional)		
Instructor	Panitarn Sanmeta	Adisorn Doodee	

Course Objective

When successfully complete this course, students will be able to:
1. Understand the definition of double integral and find the volume, surface area for 3D objects by integration.
2. Perform various calculations of the vector calculus including gradient, divergence, rotation of scalar/vector field and line integral.

Evaluation(Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1: Double integral	Can explain the definition of double integral, and can calculate complicated double integral.	Can explain the definition of double integral, and can calculate basic double integral.	Cannot explain the definition of double integral, or cannot calculate basic double integral.
Evaluation 2: Vector calculus	Can calculate complicated vector calculus.	Can calculate basic vector calculus.	Can't calculate basic vector calculus.

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:	Repeat of Lecture - Drill - Presentation
Class Format:	
Please Note :	The class schedule will be changed based on student conditions and more

Course Plan

Semester 2	Contents and Method of Course	Goals	Related MCC
1st Week	Double Integrals over Rectangle Regions	Students are able to evaluate a double integral over a rectangular region by writing it as an iterated integrals	I 1 76
2nd Week	Double Integrals over Nonrectangle Regions	Students are able to compute an iterated integral over a region bounded by two functions and are able to simplify the calculation of an iterated integral by changing the order of integration	I 1 76
3rd Week	Double Integrals in Polar Coordinates	Students are able to recognize the format of a double integral over a polar rectangular region and evaluate a double integral in polar coordinates by using an iterated integral.	I 1 77
4th Week	Change of Variables: in Double Integrals: Jacobian	Students are able to compute the Jacobian of a given transformation and evaluate a double integral using a change of variables.	I 1 76 I 1 77
5th Week	Holiday		
6th Week	Applications of Double Integrals	Students are able to to calculate the area of a region, the volume under a surface, and the average value of a function of two variables over a rectangular region	I 1 78
7th Week	Improper Double Integrals	Students are able to identify when an improper double integral is finite, evaluate certain improper double integrals using limits of definite integrals.	
8th Week	Review Session	Week 1-7	
9th Week	Midterm Examination	Week 1-7	
10th Week	Midterm Examination	Week 1-7	
11th Week	Introduction to Vector-valued Functions and Calculus of Vector-valued function	Students are able to recognize vector-valued functions and determine the derivatives and integrals of vector-valued functions.	
12th Week	Introduction to Scalar and Vector Fields	Students are able to visualize and manipulate vector fields and scalar fields presented in graphical and symbolic form.	
13th Week	Vector Operators: Gradient, Divergence, and Curl	Students are able to find the gradient of a scalar field, a divergence of a vector field, and a curl of a vector field and understand the underlying physical meaning.	
14th Week	Line Integrals	Students are able to calculate a scalar line integral along a curve.	
15th Week	Line Integrals: Independence of Path	Students are able to describe what it means for a line integral to be independent of path.	
16th Week	Surface Integral	Students are able to find a surface integral and understand its meaning.	
17th Week	Applications of Surface Integral: Flux	Students understand applications of surface integrals to vector fields associated with fluid flow and electrostatic forces.	
18th Week	Review Session		
19th Week	Final Examination		
20th Week	Return Answer-Sheets Review Semester and Feedback		

Do not

	Examination	Class Participation	Drill Submission
Basic Ability	70	15	15
Technical Ability	0	0	0
Interdisciplinary Ability	0	0	0