Mathematics 5

Basic Course Information

Course Number	01005013	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 1	Classes per Week	3
Required Materials	"Mathematics A" by M. Kobayashi, A. Shimizu, Y. Ichikawa, and M. Sekiguchi (primary) and "Calculus: Early Transcendentals" 10th ed. by H. Anton, I. Bivens, and S. Davis (optional).		
Instructor	Panitarn Sammeta	Adisorn Doodee	

Course Objective

When successfully complete this course, students will be able to:
1. Understand and give approximate expressions for functions using series expressions
2. Understand and calculate partial derivatives for multivariable functions and apply them to extreme values of two variables, derivative of implicit functions, tangent line and tangent plane, extreme values under particular conditions, and envelope lines.

Evaluation (Rubric)

Evaluation (Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1: Approximate expression	Can calculate complicated approximate expressions using the higher order derivatives, Taylor expansion, Maclaurin expansion and series expansion.	Can calculate basic approximate expressions using the higher order derivatives, Taylor expansion, Maclaurin expansion and series expansion.	Can't calculate basic approximate expressions using the higher order derivatives, Taylor expansion, Maclaurin expansion and series expansion.
Evaluation 2: Partial differentiation	Can calculate complicated partial derivatives of multivariable functions applying to extreme values, drivative of implicit functions, tangent line and tangent plane and envelope lines.	Can calculate basic partial derivatives of multivariable functions applying to extreme values, drivative of implicit functions, tangent line and tangent plane and envelope lines.	Can't calculate basic partial derivatives of multivariable functions applying to extreme values, drivative of implicit functions, tangent line and tangent plane and envelope lines.

Relationship with Learning Outcomes

G(1) Wide knowledges 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 knowledges from various fields.

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 1	Contents and Method of Course	Goals	Related MCC
1st Week	Introduction to Math 5 and Review	Students review contents of Math 3 which will be used in Math 5.	
2nd Week	HOLIDAY		
3rd Week	Series	Students can understand series.	
4th Week	Convergence Tests	Students can explain various tests of convergences.	
5th Week	Power Series	Students can explain power series and radius of convergence.	
6th Week	Taylor Series	Students can explain and calculate Taylor series for some basic functions and calculate n-th approximations.	I 1 70
7th Week	Maclaurin Series	Students can explain and calculate Maclaurin series for some basic functions.	I 1 71
8th Week	Review		I 1 70 I 1 71
9th Week	Midterm examination	Week 1~8	
10th Week	Functions of Two Variables	Students can understand functions of two variables and draw the graphs for some two variables.	I 1 72
11th Week	Functions of Two Variables (Cont.) and Partial Derivatives	Students can understand and calculate partial derivatives.	I 1 74
12th Week	Partical Derivatives (Cont.)	Students can understand and calculate the increment and total differential.	I 1 69 I 1 74
13th Week	HOLIDAY		
14th Week	Chain Rule	Students can explain and calculate chain rule for partial derivatives.	I 1 73 I 1 74
15th Week	Gradients	Students can explain and calculate gradients.	I 1 75
16th Week	Maxima and Minima	Students can explain the second partial derivative test and use it correctly.	I 1 75
17th Week	Maxima and Minima: Method of Lagrange Multipliers	Students can explain and use the method of Lagrange multipliers.	I 1 75
18th Week	Review		I 1 69 I 1 72 I 1 73 I 1 74 I 1 75
19th Week	Final Examination	Week 10-18	
20th Week	Return answer-sheets. Review semester and feedback	Summary	

Do not c

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