Mathematics 3

Basic Course Information

Course Number	01005011	**Subject Category**	Compulsory(G)
Class Format	Lecture	**Credit Type and Number of Credits**	2.5
Department	Mechatronics	**Student Category**	Year 2
Period of Study	Semester 1	**Classes per Week**	5
Required Materials			
Instructor	Dr.Natthawut Bunlue	Dr.Dawan Chumpunsam	

Course Objective

When successfully complete this course, students will be able to:
1. Understand the concept of limits, can calculate the limit of functions and can explore the behavior of functions by using the idea of limits.
2. Understand the meaning of derivative, can compute the derivative of functions and can apply the differentiation to its applications such as graphing or finding extreme/inflection points, etc.
3. Understand the integral of elementary functions, can compute and apply the integration to its applications such as finding area of regions, volume of 3D objects, surface area of 3D objects, length of curves embeded in a 3D space, etc.

Evaluation (Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Understand and can compute the limit of functions. Can explore the behavior of functions by using the idea of limits.	Understand and can compute the limit of functions. Can explore the behavior of simple functions by using the idea of limits.	Can't compute the limit of functions. Can't explore the behavior of functions by using the idea of limits.
Evaluation 2	Understand and can compute the derivative of functions. Can apply the differentiation to its applications.	Understand and can compute the derivative of functions. Can apply the differentiation to simple applications.	Can't compute the derivative of functions. Can't apply the differentiation to its applications.
Evaluation 3	Understand and can use the integration techniques to compute the integral of functions.	Understand and can use the integration techniques to compute the integral of simple functions.	Can't compute the integral of functions.
Evaluation 4	Can apply the integration to its applications.	Can apply the integration to simple applications.	Can't apply the integration to its applications.

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 subjectd to change depending on students' prior knowledge and preparation

Course Plan

Semester 1	**Contents and Method of Course**	**Goals**	**Related MOC**
1st week	Chapter 0: Review basic and Introduction to Calculus Chapter 1: Limits & Continuity	The reasons that why we have to learn calculus. The concept of limits. Calculating the limit of functions	1 51
2nd week	Chapter 1: Limits & Continuity	Infinite limits. Limits at infinity. Limits and Continuity	1 51
3rd week	Chapter 2: Differentiation: - Tangent lines, Slope and Rates of change. - Define the derivative function formally using limit notation.	The concept of the derivative as a slope-producing function. Describing why some function can or can not differentiable.	1 52 1 59
During the 4th week	First Quarter Examination (15%)	Week 1-3 (90 minutes)	
4th week	Chapter 2: Differentiation - Differentiation Techniques	The fundamental formulas. The product and quotient rules. Higher order derivative. The chain rule	1 53 1 54
5th week	Chapter 2: Differentiation - Differentiation Techniques - Topics in Differentiation	Derivatives of trigonometric functions. The derivative formulas for exponential, logarithmic and inverse trigonometric functions	1 55 1 56
6th week	Chapter 2: Differentiation - Topics in Differentiation	Implicit differentiation. Indeterminate forms and L'Hôpital's rule.	1 51 1 59
7th week	Chapter 2: Differentiation - Applications of Differentiation	Relative and Absolute maximum, minimum. Graphing polynomail and rational functions.	1 57 1 60
8th week	Chapter 2: Differentiation - Applications of Differentiation	Min-max problems Derivative of Parametric equation.	1 58 1 61
9th week	Midterm Examination (20%)	Week 4-8 (90 minutes)	
10th week	Chapter 3: Integration - Indefinite Integrals	Introduce basic antidifferentiation and formulas. Define the definite integral in terms of a limit of Riemann sums. Fundamental Theorem of Calculus.	1 62 1 64
11th week	Chapter 3: Integration - Definite Integrals	Properties of definite integral	1 64
12th week	Chapter 3: Integration - Integration Techniques	U-Substitution. Improper Integrals	1 63 1 64
13th week	Chapter 3: Integration - Integration Techniques	Integration by Parts	1 63
14th week	Chapter 3: Integration - Integration Techniques	Partial fractions. Integrating trigonometric functions	1 65
15th week	Chapter 3: Integration - Integration Techniques	Trigonometric Substitution	1 65
During the 15th week	Third Quarter Examination (20%)	Week 10-15 (90 minutes)	
16th week	Chapter 4: Applications of Integration	Area Between Two Curves. Area of region represented with polar coordinate	1 66
17th week	Chapter 4: Applications of Integration	Volume by Slicing - Disks and Washers. Volume of revolution	1 68
18th week	Chapter 4: Applications of Integration	Length of Plane Curves. Area of Surface of Revolution	1 67 1 68
19th week	Chapter 4: Review	Review before final examination	1 66 1 67 1 68
20th week	Final Examination (20%)	Week 16-19 (90 minutes)	
21st week	Return answer-sheets, review semester and give feedbacks	Summary	

Do not

	Examination	**Drill Submission**	**Class Participation/Behavior**			
Basic Ability	75	10	15			
Technical Ability	0	0	0			
Interdisciplinary Ability	0	0	0			