Akashi College	Year	2023		Course Title	Mathematics Ⅱ A-1

Course Information

Course Code	5205		Course Category	General / Compulsory
Class Format	Lecture		Credits	School Credit: 2
Department	Electrical and Computer Engineering		Student Grade	2nd
Term	First Semester		Classes per Week	4
Textbook and/or Teaching Materials	Differential and Integral I (Dai Nihon Tosho)			
Instructor	NAGAO Hidehito			

Course Objectives

1. Understand limits of functions, the meaning of a derivative at a point, the definition of the derivative, the product and quotient rules for derivatives, composite functions, and inverse trigonometric functions, and can calculate the derivatives of various functions.
2. Can write a derivative sign chart for a function, find its extrema, and sketch its graph. Can use extrema to calculate functions' maximum and minimum values. Also, can investigate the shapes of graphs using second derivatives. Understand parametric representations of functions, and can use them to calculate their derivatives.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Fully understand limits of functions, the meaning of a derivative at a point, the definition of the derivative, the product and quotient rules for derivatives, composite functions, and inverse trigonometric functions, and can fully calculate the derivatives of various functions.	Understand limits of functions, the meaning of a derivative at a point, the definition of the derivative, the product and quotient rules for derivatives, composite functions, and inverse trigonometric functions, and can calculate the derivatives of various functions.	Do not understand the limits of functions, the meaning of a derivative at a point, the definition of the derivative, the product and quotient rules for derivatives, composite functions, and inverse trigonometric functions, and cannot calculate the derivatives of various functions.
Achievement 2	Can write a derivative sign chart for a function, find its extrema, and sketch its graph. Can fully use extrema to calculate the function's maximum and minimum values. Also, can fully investigate the shapes of graphs using second derivatives. Fully understand parametric representations of functions, and can fully use them to calculate their derivatives.	Can write a derivative sign chart for a function, find its extrema, and sketch its graph. Can use extrema to calculate functions' maximum and minimum values. Also, can investigate the shapes of graphs using second derivatives. Understand parametric representations of functions, and can use them to calculate their derivatives.	Cannot write a derivative sign chart for a function, find its extrema, and sketch its graph. Cannot use extrema to calculate the function's maximum and minimum values. Also, cannot investigate the shapes of graphs using second derivatives. Do not understand parametric representations of functions, and cannot use them to calculate their derivatives.

Assigned Department Objectives

Teaching Method

Outline	Students will learn one-variable derivative as the basis of the calculus.
Style	Lessons by lecture and practice-type, timely assignments, quizzes, etc
Notice	CBT will be carried out in a certain week. Students can not obtain a passing grade if they miss 1/3 or more of classes.

Characteristics of Class / Division in Learning

☑ Active Learning	☑ Aided by ICT	☑ Applicable to Remote Class	☐ Instructor Professionally Experienced

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Limits and derivatives of functions	Can find the limit of a function.
		2nd	Limits and derivatives of functions	Can find the infinite limit of a function.
		3rd	Derivatives of functions	Can understand the definition of derivatives of functions and perform simple calculations.
		4th	Derivatives of functions	Can find derivatives of products and quotients of functions.
		5th	Derivatives of various functions	Can find derivatives of composite and trigonometric functions.
		6th	Derivatives of various functions	Can find derivatives of exponential and inverse functions.
		7th	Derivatives of various functions	Can find derivatives of inverse trigonometric functions and investigate continuity of functions.
		8th	Function Variation	Can find equations for tangent and normal lines and examine the increase or decrease of a function.
	2nd Quarter	9th	Function Variation	Can draw graphs of various functions and find the maximum and minimum values of functions.
		10th	Function Variation	Can find the limit of an indefinite form and use derivatives to prove inequalities.
		11th	Various applications of the derivative	Can find higher derivatives and examine the concavity and convexity of graphs.

		12th	Various applications of the derivative	Can find derivatives of functions by parameter representation and can find velocity and acceleration.
		13th	Various applications of the derivative	Can use derivatives to obtain approximate values.
		14th	Indefinite and definite integrals	Can find indefinite integrals.
		15th	Calculation of integrals	Can use the substitution integral method.
		16th	Exam	Confirmation of the studies.

Evaluation Method and Weight (%)

	Exam	Task・Attitude・Presentation・Attendance etc	Total
Subtotal	30	70	100
Basic Proficiency	30	70	100
Specialized Proficiency	0	0	0
Cross Area Proficiency	0	0	0