Akashi College	Year	2023	Course Title	Mathematics Ⅱ A-2

Course Information

Course Code	5206	Course Category	General / Compulsory
Class Format	Lecture	Credits	School Credit: 2
Department	Mechanical Engineering	Student Grade	2nd
Term	Second Semester	Classes per Week	4
Textbook and/or Teaching Materials	Differential and Integral I (Dai Nihon Tosho) Differential and Integral II (Dai Nihon Tosho)		
Instructor	NAGAO Hidehito		

Course Objectives

1. Understand the definition of definite integration and the fundament theorem of calculus, and can calculate simple definite integrals. Understand the definition of indefinite integration, and can calculate simple indefinite integrals. Also, can calculate indefinite and definite integrals using integration by substitution and integration by parts.
2. Can calculate indefinite and definite integrals of fractional, irrational, trigonometric, exponential, and logarithmic functions. Can use definite integration to calculate the areas of shapes enclosed by curves, the lengths of curves, and the volumes of solids in simple cases.
3. Understand the meaning of differential equations and learn the primary solution of first order differential equations.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Fully understand the definition of definite integration and the fundament theorem of calculus, and can fully calculate simple definite integrals. Fully understand the definition of an indefinite integral, and can fully calculate simple indefinite integrals. Also, can fully calculate indefinite and definite integrals using integration by substitution and integration by parts.	Understand the definition of definite integration and the fundament theorem of calculus, and can calculate simple definite integrals. Understand the definition of indefinite integration, and can calculate simple indefinite integrals. Also, can calculate indefinite and definite integrals using integration by substitution and integration by parts.	Do not understand the definition of definite integrals and the fundament theorem of calculus, and cannot calculate simple definite integrals. Do not understand the definition of indefinite integrals, and cannot calculate simple indefinite integrals. Also, cannot calculate indefinite and definite integrals using integration by substitution and integration by parts.
Achievement 2	Can fully calculate indefinite and definite integrals of fractional, irrational, trigonometric, exponential, and logarithmic functions. Can fully use definite integration to calculate the areas of shapes enclosed by curve, the lengths of curves, and the volumes of solids in simple cases.	Can calculate indefinite and definite integrals of fractional, irrational, trigonometric, exponential, and logarithmic functions. Can use definite integration to calculate the areas of shapes enclosed by curves, the lengths of curves, and the volumes of solids in simple cases.	Cannot calculate indefinite and definite integrals of fractional, irrational, trigonometric, exponential, and logarithmic functions. Cannot use definite integration to calculate the areas of shapes enclosed by curves, the lengths of curves, and the volumes of solids in simple cases.
Achievement 3	Learn and can use methods for solving elementary differential equations.	Understand the solution of the elementary differential equations.	Do not understand the solution method of elementary differential equations.

Assigned Department Objectives

Teaching Method

Outline	As a foundation of differential and integral calculus, students learn integration of one variable and first-order differential equations.
Style	Students are asked to prepare for the class with video clips according to the syllabus. Students will be asked to study in groups during class to check their level of understanding. Bilingual classes may be offered.
Notice	Review your work before class. Do not leave anything you do not understand unanswered, but ask questions. Study independently by using problem collections. CBT will be given in one of the weeks. Students who miss 1/3 or more of classes will not be eligible for evaluation.

Characteristics of Class / Division in Learning

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

Course Plan

			Theme	Goals
2nd Semester	3rd Quarter	1st	Calculation of integrals	Can use the partial integral method.
		2nd	Calculation of integrals	Can apply the method of integration by parts.
		3rd	Calculation of integrals	Can integrate using a variant of the quadratic formula.
		4th	Calculation of integrals	Can integrate fractional and irrational functions.
		5th	Calculation of integrals	Can integrate trigonometric and exponential functions.
		6th	Area, curve length, volume	Can find the area of a figure.
		7th	Area, curve length, volume	Can find the length of a curve and the volume of a solid.
		8th	Various applications of integrals	Can determine the volume and surface area of the rotating body.
	4th Quarter	9th	Various applications of integrals	Can find the area of a figure and the length of a curve according to polar coordinates.

		10th	Various applications of integrals	Can calculate broad integrals and rates of change.
		11th	First-order differential equation	Can understand the meaning of solutions to differential equations.
		12th	First-order differential equation	Can find solutions in variable separation form.
		13th	First-order differential equation	Can find solutions to homogeneous forms and linear differential equations.
		14th	First-order differential equation	Can find solutions to complete differential equations.
		15th	CBT test and summary	Review of the total.
		16th	Examination	Confirmation of the studies.

Evaluation Method and Weight (%)

	Examination	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