

Akashi College		Year	2022	Course Title	Mathematics II A
Course Information					
Course Code	4203		Course Category	General / Compulsory	
Class Format	Lecture		Credits	School Credit: 4	
Department	Architecture		Student Grade	2nd	
Term	Year-round		Classes per Week	4	
Textbook and/or Teaching Materials	Differential AND Integral I				
Instructor	MATSUMIYA Atusi				
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. 3. 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. 4. 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.					
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.
Achievement 3	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.
	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.
Assigned Department Objectives					
Teaching Method					
Outline	Students will learn the basic concepts of differentiation and integration and various computational methods developed from them, and acquire the necessary skills for analyzing various events when applying them in specialized fields.				
Style	Classes will assume the pre-study has been done, and follow the textbook accordingly. There will also be problem exercises. Students will be asked questions to check their understanding during classes. In the classes, focus on understanding, and ask questions about things do not understand in the pre-study or class, rather than doing nothing about them. Make an effort to always review the material on the same day, and solve the problems in the textbook and the workbook. Some of the classes will use ICT. Tests will sometimes be held without prior notice to confirm attainment. Consequently, please study properly on a daily basis.				

Notice		The overall evaluation will be based 50% on exams, 20% on submitted assignments, etc., and 30% on presentations and general effort toward classes. The minimum score for a pass will be 60 marks. However, evaluation scores based on these weightings will be calculated at the end of the school year. The cumulative evaluation up to the second semester midterm be based on interim weightings rather than the ones given above. Students who do well in assignments, presentations, etc. may get them evaluated with a higher weighting. CBT will be conducted in any week. Students who miss 1/3 or more of classes will not be eligible for a passing grade.			
Characteristics of Class / Division in Learning					
☒ Active Learning		☒ Aided by ICT		☒ Applicable to Remote Class	☐ Instructor Professionally Experienced
Course Plan					
			Theme	Goals	
1st Semester r	1st Quarter	1st	Limits and derivatives of functions	Can find graphs and formulas for functions.	
		2nd	Limits and derivatives of functions	Can calculate the limits of functions in simple cases.	
		3rd	Limits and derivatives of functions	Understand the meaning of a derivative at a point and the definition of the derivative, and can calculate derivatives.	
		4th	Limits and derivatives of functions	Can calculate derivatives using the product and quotient rules for derivatives. Can calculate the derivatives of composite functions.	
		5th	Limits and derivatives of functions	Can calculate the derivatives of trigonometric and exponential functions.	
		6th	Derivatives of various functions	Understand the derivatives of inverse functions, and can calculate the derivatives of logarithmic and inverse trigonometric functions.	
		7th	Derivatives of various functions	Understand the continuous of function, and can solve applied problems accordingly.	
		8th	Derivatives of various functions	Understand the intermediate value theorem, and can solve applied problems accordingly.	
	2nd Quarter	9th	Variation of functions	Can calculate the equations of tangents and normals to functions in simple cases.	
		10th	Variation of functions	Can write a derivative sign chart for a function, find its extrema, and sketch its graph.	
		11th	Variation of functions	Can use extrema to calculate functions' maximum and minimum values.	
		12th	Various applications	Can calculate higher-order derivatives. Can investigate the shapes of graphs using second derivatives.	
		13th	Various applications	Understand parametric representations of functions, and can use them to calculate their derivatives.	
		14th	Various applications	Understand speed and acceleration, and can solve applied problems accordingly.	
		15th	Various applications	Understand and can use the mean value theorem and L'Hôpital's rule.	
		16th	Final exam		
2nd Semester r	3rd Quarter	1st	Indefinite integration and definite integration	Understand the definition of indefinite integration, and can calculate simple indefinite integrals.	
		2nd	Indefinite integration and definite integration	Understand the definition of definite integration, and can calculate simple definite integrals based on it.	
		3rd	Indefinite integration and definite integration	Understand the fundament theorem of calculus, and can calculate simple definite integrals.	
		4th	Indefinite integration and definite integration	Can compute simple definite integrals. Can use various indefinite integration formulas.	
		5th	Computing integrals	Also, can calculate indefinite and definite integrals using integration by substitution and integration by parts.	
		6th	Computing integrals	Can calculate the indefinite and definite integrals of fractional and irrational functions	
		7th	Computing integrals	Can calculate the indefinite and definite integrals of trigonometric, exponential, and logarithmic functions.	
		8th	Areas, lengths of curves, and volumes	Can use definite integration to calculate the areas of shapes enclosed by curves in simple cases.	
	4th Quarter	9th	Areas, lengths of curves, and volumes	Can use definite integration to calculate the lengths of curves in simple cases. Can use definite integration to calculate the volumes of solids and solids of revolution in simple cases.	
		10th	Various applications	Understand parametric representations of shapes, and can calculate the areas of shapes and lengths of curves represented parametrically.	
		11th	Various applications	Understand polar coordinates, and can calculate the areas of shapes and lengths of curves represented in them.	

		12th	Various applications	Understand improper integrals, and can calculate them.
		13th	Various applications	Understand rates of change and integration, and can solve applied problems accordingly.
		14th	Differential equations	Understand the meaning of differential equations based on applied problems, and can solve simple differential equations with separable variables.
		15th	Differential equations	Simple simultaneous, first-order linear differential equations can be solved.
		16th	Final exam	

Evaluation Method and Weight (%)				
	Examination	Task	Presentation · Status of efforts	Total
Subtotal	50	20	30	100
Basic Proficiency	50	20	30	100
Specialized Proficiency	0	0	0	0
Cross Area Proficiency	0	0	0	0