Akashi College	Year	2022	Course Title	Applied Mathematics A

Course Information

Course Code	4416	Course Category	Specialized / Compulsory
Class Format	Lecture	Credits	School Credit: 2
Department	Electrical and Computer Engineering Electrical Engineering Course	Student Grade	4th
Term	First Semester	Classes per Week	4
Textbook and/or Teaching Materials			
Instructor	OGASAWARA Hiromichi		

Course Objectives

(1) Can make a deductive inference based on basic matters, including reading and writing logical sentences containing mathematical formulae.
(2) Can perform basic calculations in Fourier analysis, and apply them to engineering and physics on a basic level.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Can accurately make a deductive inference based on basic matters.	Can make a deductive inference based on basic matters.	Cannot make a deductive inference based on basic matters.
Achievement 2	Can fully perform basic calculations in Fourier analysis, and fully apply them to engineering and physics on a basic level.	Can perform basic calculations in Fourier analysis, and apply them to engineering and physics on a basic level.	Cannot perform basic calculations in Fourier analysis, and apply them to engineering and physics on a basic level.

Assigned Department Objectives

Teaching Method

Outline	In this course, we will learn the basics of Fourier analysis (including topics on the Laplace transform) based on the calculus and linear algebra learned so far. This is also applied to engineering and physics, so this class will also cover them, including basic applications.
Style	Classes will be taught in a lecture style, and there will also be exercises and quizzes.
Notice	Instead of memorizing theorems and formulae individually, carefully follow the development of discussions and the proof of theorems given in each lecture, so that you can understand it yourself. In problem exercises, do not try to remember the steps to solve a problem, but rather try to solve it yourself based on definitions and basic theorem and ideas. Also, if necessary, review the content learned during the previous years. Students can earn extra points by submitting voluntary assignments, and lose their points depending on their attitude, etc. in the class. 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	1st Quarter	1st	Review and supplementary lesson on calculus	Can handle the basic matters of calculus that's necessary for future learning.
		2nd	Organize data	Can organize data.
		3rd	Laplace transform	Can calculate and discuss based on the basic matters of the Laplace transform.
		4th	Laplace transform	Can perform calculations and discussions related to the inverse Laplace transform.
		5th	Application to vibration phenomena	Can apply the Laplace transform to mechanical vibration phenomena.
		6th	Application to vibration phenomena Fourier series	Can apply the Laplace transform to AC circuits. Can calculate and discuss based on the basic matters of the Fourier series.
		7th	Fourier series	Can calculate and discuss based on the basic matters of the Fourier sine / cosine series.
		8th	Midterm exam Fourier series	Can calculate and discuss based on the basic matters of the complex Fourier series.
	2nd Quarter	9th	Fourier series	Can handle the formulae related to Fourier series.
		10th	Fourier transform	Can calculate and discuss based on the basic matters of the Fourier transform.
		11th	Fourier transform	Can handle the formulae related to Fourier transform.
		12th	Wave equation	Can handle wave phenomena based on the laws of motion and the methods of Fourier analysis.
		13th	Wave equation Heat equation	Can handle standing waves based on Fourier series. Can derive the heat equation.
		14th	Heat equation	Can handle heat conduction phenomena based on the methods of Fourier analysis.

		15th	Supplementary lesson on the Laplace transform	Can calculate and discuss matters related to delta function and convolution.
		16th	Final exam	

Evaluation Method and Weight (%)

	Examination	Exercises / Short test	Total
Subtotal	60	40	100
Basic Proficiency	60	40	100
Specialized Proficiency	0	0	0
Cross Area Proficiency	0	0	0