

Akashi College		Year	2023		Course Title	Applied Mathematics A	
Course Information							
Course Code		5420		Course Category		Specialized / Compulsory	
Class Format		Lecture		Credits		School Credit: 2	
Department		Mechanical Engineering		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. The schedule of the midterm exam may be changed. Students who miss 1/3 or more of classes will not be eligible for evaluation.					
Characteristics of Class / Division in Learning							
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input checked="" type="checkbox"/> Applicable to Remote Class		<input type="checkbox"/> 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 Fourier transform		Can handle the formulae related to Fourier series. Can extend Fourier series expansion for non-periodic functions.		
		10th	Fourier transform		Can calculate and discuss based on the basic matters of the Fourier transform.		
		11th	Fourier transform Wave equation		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	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 (%)					
		Examinations	Exercises / Quizzes	Attendance / Behavior	Total
Subtotal		40	30	30	100
Basic Proficiency		40	30	30	100
Specialized Proficiency		0	0	0	0
Cross Area Proficiency		0	0	0	0