Akashi College	Year	2022	Course Title	Applied Physics B

Course Information

Course Code	4416	Course Category	Specialized / Compulsory
Class Format	Lecture	Credits	School Credit: 1
Department	Mechanical Engineering	Student Grade	4th
Term	Second Semester	Classes per Week	2
Textbook and/or Teaching Materials			
Instructor	OGASAWARA Hiromichi		

Course Objectives

(1) Understand the concept of electromagnetic fields and the basic laws concerning them, and can deal with them using formulas.
(2) Understand the basic aspects of the behavior of substances in electromagnetic fields (electromagnetic properties).
(3) Can perform basic calculations on circuit elements by applying electromagnetics.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Fully understand the concepts and laws of electromagnetic fields, and can handle appropriately by formulas.	Understand the concepts and laws of electromagnetic fields and deal with them through formulas.	Do not understand the concepts and laws of electromagnetic fields or handle them by formulas.
Achievement 2	Can explain the basics of electromagnetic properties in detail.	Can explain the basics of electromagnetic properties.	Cannot explain the basic things about electromagnetic properties.
Achievement 3	Can explain basic calculations on circuit elements, including the connection with the law of electromagnetism.	Can perform basic calculations on circuit elements.	Cannot perform basic calculations on circuit elements.

Assigned Department Objectives

Teaching Method

Outline	In this course, the first steps in electromagnetism will be taught, including the necessary mathematical techniques (vector calculation and calculus). This is a study of electricity and magnetism as natural phenomena, and it also leads to the study of electrical and electronic engineering, which will be covered in later subjects.
Style	Classes will be taught in a lecture style, and there will also be exercises and quizzes.
Notice	Instead of learning each knowledge (the result of applying the law to a particular situation, how to solve the problem) by memorizing it individually, students should understand the laws that govern them (including being able to apply them to specific situations). Also, students should be aware of the relationships between the various laws, and try to understand concepts in physics systematically. 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
2nd Semester	3rd Quarter	1st	Charges and electric fields	Learn about the Coulomb's law.
		2nd	Charges and electric fields	Learn about the Gauss's law.
		3rd	Potential	Learn about works done by electrostatic forces and potentials.
		4th	Potential	Learn how to handle potentials in spaces.
		5th	Some topics about electricity	Learn the basics of conductors and capacitors.
		6th	Some topics about electricity	Learn about electrostatic energy.
		7th	Some topics about electricity	Learn the basics of dielectric substances.
		8th	Midterm exam	
	4th Quarter	9th	Magnetic poles and magnetic fields, and magnetism	Learn about the relationship between magnetic fields and magnetic moments and the magnetic properties of materials.
		10th	Currents	Learn about current and voltage and Ohm's law.
		11th	Magnetic field by current	Learn about the Ampere's law.
		12th	Magnetic field by current	Learn about the Biot-Savart law.
		13th	Electromagnetic induction and its applications	Learn about the electromagnetic induction.
		14th	Electromagnetic induction and its applications	Learn about the self and mutual induction.
		15th	Lorentz force	Learn about the Lorentz force, which works on electrical charges that move in an electromagnetic field, and the magnetic force, which works on electric currents.
		16th	Final exam	

Evaluation Method and Weight (%)

	Examination	Exercises / Little test	Total

Subtotal	60	40	100
Basic Proficiency	0	0	0
Specialized Proficiency	60	40	100
Cross Area Proficiency	0	0	0