Akashi College	Year	2022	Course Title	Science Ⅲ A

Course Information

Course Code	4305	Course Category	General / Compulsory
Class Format	Lecture	Credits	School Credit: 2
Department	Electrical and Computer Engineering	Student Grade	3rd
Term	Year-round	Classes per Week	2
Textbook and/or Teaching Materials			
Instructor	SAKURAI Nobuyuki,SAKURAI Yasuhiro		

Course Objectives

(1) Understand capacitors and DC circuits.
(2) Can solve computational problems related to AC circuits and electromagnetic waves.
(3) Can handle force and motion based on the basic laws of mechanics, including handling by calculus.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Can solve applied computational problems related to capacitors, circuits, and electromagnetic waves.	Can solve basic computational problems related to capacitors, circuits and electromagnetic waves.	Cannot solve computational problems related to capacitors, circuits and electromagnetic waves.
Achievement 2	Can handle forces and motions accurately based on the basic laws of mechanics.	Can handle forces and motions based on the basic laws of mechanics.	Cannot handle forces and motions based on the basic laws of mechanics.

Assigned Department Objectives

Teaching Method

Outline	In the first semester, we will mainly study the field of electromagnetic (taught by Y. Sakurai). In the second semester, we will learn about mechanics using calculus (taught by N. Sakurai, liaison: Ogasawara).
Style	Classes will be taught in a lecture style, and there will also be exercises and quizzes.
Notice	Students must pre-study, review, and solve exercise questions for each class. 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	Capacitor's electrical capacity, capacitors, and dielectric (pp. 129-135)	Can explain 332, 334, and 335 from the workbook.
		2nd	Capacitor connections and energy stored in capacitors (pp. 136-140)	Can explain 336, 337, and 342 from the workbook.
		3rd	Ohm's law (pp. 142-147)	Can explain 357(1) to (4) from the workbook.
		4th	Joule heat, electrical energy, power, and DC circuits (pp. 148-153)	Can explain 351, 354, and 356 from the workbook.
		5th	Kirchhoff's circuit laws, batteries, and Wheatstone bridges (pp. 156-159)	Can explain 360, 363, and 365 from the workbook.
		6th	Measurement of electromotive force, non-linear resistance, and DC circuits including capacitators (pp. 160-163)	Can explain 364, 368, and 369 from the workbook.
		7th	Semiconductors and transistors (pp. 164-167)	Can explain 370 and 371 from the workbook.
		8th	Midterm exam	Can answer 80% of the questions correctly.
	2nd Quarter	9th	Current and magnetic field (pp. 172-179)	Can explain 377, 379, and 380 from the workbook.
		10th	The force the current receives from the magnetic field (pp. 180-190)	Can explain 381, 384, and 385 from the workbook.
		11th	Electromagnetic induction and Lorentz force (pp. 192-199)	Can explain 393, 395, and 398 from the workbook.
		12th	Swirl current, self-inductance, and mutual inductance (pp. 200-205)	Can explain 399, 400, and 402 from the workbook.
		13th	Occurrence of alternating current (pp. 206-210)	Can explain 409, 410, and 412 from the workbook.
		14th	AC circuits (pp. 211-224)	Can explain 413, 414, and 415 from the workbook.
		15th	Resonance and electromagnetic waves (pp. 225-232)	Can explain 416, 417, and 418 from the workbook.
		16th	Final exam	Can answer 80% of the questions correctly.
2nd Semester	3rd Quarter	1st	Position, velocity, and acceleration	Can describe motions of a point mass based on calculus.
		2nd	Position, velocity, and acceleration	Can describe motions of a point mass based on calculus.

		3rd	Laws of motion	Can explain the laws of motion and apply them to specific problems.
		4th	Laws of motion	Can explain the laws of motion and apply them to specific problems.
		5th	Work and mechanical energy	Can explain work, and mechanical energy and the law of its conservation, and apply them to specific problems.
		6th	Work and mechanical energy	Can explain work, and mechanical energy and the law of its conservation, and apply them to specific problems.
		7th	Work and mechanical energy	Can explain work, and mechanical energy and the law of its conservation, and apply them to specific problems.
		8th	Midterm exam	
	4th Quarter	9th	Impulse and momentum	Can explain the relationship between impulse and momentum, and the law of momentum conservation, and apply them to specific problems.
		10th	Impulse and momentum	Can explain the relationship between impulse and momentum, and the law of momentum conservation, and apply them to specific problems.
		11th	Vibration	Understand the typical techniques for handling vibrations and apply them to specific problems.
		12th	Vibration	Understand the typical techniques for handling vibrations and apply them to specific problems.
		13th	Vibration	Understand the typical techniques for handling vibrations and apply them to specific problems.
		14th	Fluid dynamics	Can apply the content learned in the Q3 of this course to fluids.
		15th	Fluid dynamics	Can apply the content learned in the Q3 of this course to fluids.
		16th	Final exam	

Evaluation Method and Weight (%)

	Examination	Practice problem, Little test	Total
Subtotal	60	40	100
Basic Proficiency	60	40	100
Specialized Proficiency	0	0	0
Cross Area Proficiency	0	0	0