Akashi College	Year	2023	Course Title	Science Ⅱ A-1

Course Information

Course Code	5209	Course Category	General / Compulsory
Class Format	Lecture	Credits	School Credit: 1
Department	Electrical and Computer Engineering	Student Grade	2nd
Term	First Semester	Classes per Week	2
Textbook and/or Teaching Materials	國友正和ほか著 総合物理 1 -力と運動・熱- (数研出版)数研出版編集部編 リードα 物理基礎・物理 (数研出版)		
Instructor	TAKEUCHI Masahiro		

Course Objectives

1. Explain problems involving various physical quantities.
2. Present various physical quantities to others in a easy-to-understand manner.

Rubric

	Excellent	Good	Insufficient
Achievement 1	Explain problems involving various physical quantities.	Solve computational problems involving various physical quantities.	Inability to solve computational problems involving various physical quantities
Achievement 2	Present various physical quantities to others in an easy-to understand manner.	Present various physical quantities.	Inability to present various physical quantities

Assigned Department Objectives

Teaching Method

Outline	Learn physics dynamics which is the basis of engineering. The study of dynamics is divided into four topics. In the first year, the students will learn until constant velocity circular motion (middle of dynamics topic 4). The students are required to acquire a tremendous amount of knowledge out a difficult topic, to be perseverant and don't give up. Dynamics 1: To understand the vector concept. The contents used here are speed and acceleration, topics learned at junior high school. To explain the components of a vector is necessary to understand the trigonometric functions. Also, will be guided to handle significant figures and units. The students will learn how to study by themselves through daily tasks, such as self-learning, doing assignments (task preparation research notes), etc. Dynamics 2: to understand the relation between cause and consequence in physical phenomena. For example, acceleration (learned in dynamics 1) is the result, caused by the exercise of a force and influenced by mass. The students will learn more about movements equations in dynamics 4. Dynamics 3: to understand torque which is a quantitative concept of lever principle. Next, the students will study energy conservation law and momentum conservation law. Here, by conducting a total review of physical quantities learned so far, the students will be prepared to comprehend dynamics 4. The students must pay attention to the differences in power and energy, that are easily confused. Dynamics 4: To understand constant velocity circular motion through the study of two-dimensional. As an application, the students will use simple vibration as an instrument to learn about sound and light waves. Furthermore, through the study of the law of universal gravitational attraction by Newton, the students will become aware of all the dynamic phenomena, represented by the equation of motion. To make the students perceive that if they can write the equations, they can solve it.
Style	During each lesson (90 minutes) in the first half the teacher will explain the contents from in the textbook, and in the second half the students will participate in group-specific activities and solve problems together from the textbook. The students are required to read the textbooks in advance, to make team activities smooth and meaningful. Also, to acquire problem-solving and presentation style, we recommend the use of the support web page and videos. In the future, physical reversal classes will be abolished, so the students should focus on preparation for the classes from the beginning. Assignment: The students have to make and submit their "problem research note." The note contains explanations of the background and essence of each problem and not be used as a tool to show how much the student had studied. It also should include long-term vacations periods of study time. Test: The test problems are from high school physics book (the style of the problem is preserved, numbers and way of solving are changed), to avoid difference of interpretation between students and teacher, original questions elaborated by the teacher are not used. In resume, this course is centered on the problems from the textbook, in addition to other learning materials as the videos and the web page task, etc. The students should understand the textbook from corner to corner, as a third-party external evaluation system. In addition to the teachers' commentary, extra handouts may be distributed as a reference. I can solve Ichi's problems! This fact and feeling will give confidence to the students in other activities inside and outside the campus.
Notice	Evaluation points: For specific calculation methods: https://sites.google.com/s.akashi.ac.jp/physics/ Re-examination: No retesting 5 absences will be excused. In junior high school, students think about something from zero. Learners who do not stand on the shoulder of the giants, are not only inefficient but also blaspheme. In the learning of physics, images from comics and animation may lead to erroneous concepts (simple concept) and sometimes interfere with correct understanding of physical phenomena. By acquiring the "style" of thinking developed by predecessor physics, you will become a sophisticated technician who is not misled by misconceptions and pseudoscience!

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	Six formulas for single oscillation(p151-p154)	Can explain textbook's problems 170,172
		2nd	Spring pendulum(p155-p157)	Can explain textbook's problems 173,175,177
		3rd	Simple pendulum(p158-p159)	Can explain textbook's problems 179,180
		4th	Kepler's Law and Universal Gravitation(p160-p163)	Can explain textbook's problems 189,191
		5th	Gravity and Satellites(p164-p165)	Can explain textbook's problems 192,194,195
		6th	Potential evergy due to universal gravitation(p166-p170)	Can explain textbook's problems 196,197,198

		7th	Earth sciences1,2	Understand and can explain several topics related to earth science.
		8th	Mid term exams	Correctly answer more than 80 % of the test.
	2nd Quarter	9th	Temperature and Heat(p186-p195)	Can explain textbook's problems 207,211,214
		10th	Specific Heat Experiment	Can conduct experiments sagely and submit reports on time.
		11th	Gas law(p196-p201)	Can explain textbook's problems 228,229,230,231
		12th	Kinetic theory of gaseous molecules(p202-206)	Can explain textbook's problems 238
		13th	First law of thermodynamisc(p207-p212)	Can explain textbook's problems 241-242
		14th	P-V graph and molar specific heat	Can explain textbook's problems 243,144,249
		15th	Thermomotor(p218-p225)	Can solve basic themodynamic problems
		16th	End term exams	Correctly answer more than 80 % of the test.

Evaluation Method and Weight (%)

	Examination	Others	Total
Subtotal	40	60	100
Basic Proficiency	40	60	100
Specialized Proficiency	0	0	0
Cross Area Proficiency	0	0	0