Akashi College	Year	2022	Course Title	Experiments of Mechanical Engineering I A

Course Information

Course Code	4317	Course Category	Specialized / Compulsory
Class Format	Experiment	Credits	School Credit: 1
Department	Mechanical Engineering	Student Grade	3rd
Term	First Semester	Classes per Week	2
Textbook and/or Teaching Materials			
Instructor	KATOH Takahiro,KUNIMINE Kanji,TANAKA Seiichi,FUJIWARA Seiji		

Course Objectives

(1) Understand the principles and procedures of each experiment, and can carry out experiments based on tutorials and instructions.
(2) Can operate equipment and devices correctly and safely to obtain data based on tutorials and instructions.
(3) Can logically examine the validity of experimental data, and compile, analyze, and examine experimental data.
(4) Can report in writing, orally, etc.
(5) Can work together as a group and actively contribute to experiments and exercises to fulfill their responsibilities.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Can explain the principles and procedures of each experiment, and carry out experiments based on tutorials and instructions.	Understand the principles and procedures of each experiment, and can carry out experiments based on tutorials and instructions.	Do not understand the principles and procedures of each experiment, and cannot carry out experiments.
Achievement 2	Can operate equipment and devices correctly and safely to obtain data based on tutorials and instructions.	Can operate equipment and devices correctly and safely with instructions to obtain data based on tutorials and instructions.	Cannot operate equipment and devices correctly and safely to obtain data.
Achievement 3	Can logically examine the validity of experimental data, and compile, analyze, and examine experimental data.	Can logically examine the validity of experimental data, and compile experimental data.	Cannot logically examine the validity of experimental data. Also, cannot compile, analyze, or examine experimental data.
	Can report in writing, orally, etc. in an easy-to-understand way.	Can report in writing, orally, etc.	Cannot report in writing, orally, etc.
	Can work together as a group and actively contribute to fulfill their responsibilities. Can lead the group by encouraging others to cooperate appropriately.	Can work together as a group and actively contribute to experiments and exercises to fulfill their responsibilities.	Cannot work together as a group and actively contribute. Also, cannot fulfill their responsibilities for the roles assigned to them.

Assigned Department Objectives

Teaching Method

Outline	Students will experiential learn the fundamentals of physics and their applications to engineering. In addition, through experiments, students will learn how to quantify phenomena using measuring instruments, analyze and examine phenomena theoretically, and communicate them through writing (experimental reports).
Style	Classes consist of the general guidance and four themed experiments carried out by multiple groups in turn. The order of practice content shown in the Course Plan is a typical example. The course involves lessons and experiments taught by four instructors. Kunimine will teach eight experiments; Kato two guidance sessions and eight experiments; Iwano: two guidance sessions; and Tanaka two guidance sessions.
Notice	(1) As this course uses the study content of dynamics (Science I to III) and mathematics (Mathematics I to III), it's recommended to review them accordingly. (2) Read the experimental tutorials thoroughly in advance, to fully understand the content of the experiment before working on an experiment. (3) As it's an experiment subject learned empirically, it's prerequisite that students attend classes. In order to earn the credit, students must conduct all experiments and submit reports. 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	Guidance / Safety education (Kato and Tanaka)	Understand the outline of this course and can explain the important things to ensure safe implementation.
		2nd	Guidance / How to write reports (Kato and Tanaka)	Understand specific methods such as the style of scientific and technological documents including description of graphs, diagrams, tables and formulas, composition of text, analysis and consideration of data, and can create experimental reports.
		3rd	Guidance / Measurement techniques in experiments (Iwano)	Understand and can explain the definition and type of measurement, the units, how to measure a typical physical quantity and the measuring equipment.

		4th	Guidance / Measurement techniques in experiments (Iwano)	Understand and can explain the definition and type of measurement, the units, how to measure a typical physical quantity and the measuring equipment. Understand the contents of the guidance and can prepare to conduct the experiment.
		5th	Stochastic handling by the eye-estimation series (Ohnishi)	Understand the basic knowledge and procedures of the stochastic handling by the eye-estimation series, and can jointly measure the necessary data while taking safety into consideration.
		6th	Stochastic handling by the eye-estimation series (Ohnishi)	Can carry out analysis of experimental data, and compile reports using appropriate charts, including logical considerations, and complete and submit them on time.
		7th	Report writing Examine and compile the results of the experiment into a report.	Understand and consider corrections and additional instructions and can compile them into a more effective and easy-to-understand report.
		8th	No midterm exam	
	2nd Quarter	9th	Collision experiment (Kunimine)	Understand the basic principles and procedures of collision experiments, and can jointly measure the necessary data while taking safety into consideration.
		10th	Collision experiment (Kunimine)	Can carry out analysis of experimental data, and compile reports using appropriate charts, including logical considerations, and complete and submit them on time.
		11th	Measurement of the sound speed by resonance method (Ohnishi)	Understand the basic principles and procedures of measuring the sound speed by resonance, and can jointly measure the necessary data with consideration for safety and other factors.
		12th	Measurement of the sound speed by resonance method (Ohnishi)	Can carry out analysis of experimental data, and compile reports using appropriate charts, including logical considerations, and complete and submit them on time.
		13th	Measurement of moment of Inertia by bifilar suspension (Kunimine)	Understand the basic principles and procedures for measuring the moment of inertia by bifilar suspension, and can jointly measure the necessary data while taking safety into consideration.
		14th	Measurement of moment of Inertia by bifilar suspension (Kunimine)	Can carry out analysis of experimental data, and compile reports using appropriate charts, including logical considerations, and complete and submit them on time.
		15th	Report writing Examine and compile the results of the experiment into a report.	Understand and consider corrections and additional instructions and can compile them into a more effective and easy-to-understand report.
		16th	No final exam	

Evaluation Method and Weight (%)

	Efforts・Behavior	Analysis・Consideration	Report	Total
Subtotal	20	40	40	100
Basic Proficiency	0	0	0	0
Specialized Proficiency	10	40	40	90
Cross Area Proficiency	10	0	0	10