Akashi College	Year	2022		Course Title	Engineering Design II

Course Information

Course Code	4425		Course Category	Specialized / Compulsory
Class Format	Lecture		Credits	School Credit: 1
Department	Mechanical Engineering		Student Grade	4th
Term	First Semester		Classes per Week	2
Textbook and/or Teaching Materials				
Instructor	SHI Fenghui			

Course Objectives

(1) Mechanical design is the forefront study in manufacturing (mechanical products). Perform theoretical analysis of basic studies, match theory to objects and phenomena, and learn how to design machinery. Acquire a design method for mechanical elements, as it is an essential technology for the production of machinery.
(2) Learn how to design and select components such as gears, bearings, seals, and belts, which are typical rotating machine elements, and confirm previously learned content through exercises.
(3) Explain and give full recognition to the importance of the mechanical elements that make up the machine, including design examples for various machine examples, and to bring out a willingness to learn more voluntarily through application problems and exercises that are directly connected to the machine.

Rubric

	Ideal Level	Standard Level	Unacceptable Level
Achievement 1	Can analyze basic studies theoretically, and can respond well to theories, things and phenomena.	Can analyze basic studies theoretically and deal with theories, things and phenomena.	Cannot analyze the basic study theoretically, and cannot deal with theories, things, or phenomena.
Achievement 2	Can perform design and selection methods such as gears, bearings, seals and belts sufficiently.	Can perform design and selection methods such as gears, bearings, seals and belts.	Cannot perform design and selection methods such as gears, bearings, seals and belts.
Achievement 3	Can perform application problems and exercises directly connected to the machine sufficiently.	Can perform application problems and exercises directly connected to the machine.	Cannot perform application problems and exercises directly connected to the machine.

Assigned Department Objectives

Teaching Method

Outline	Since machine design is an essential technology for producing machines made up of many mechanical elements, it is essential to obtain a method for designing machine elements. This course will offer how to design and select rotary machine components such as gears, bearings, and seals, which are typical mechanical components of rotating machinery such as gear reducers. As theories to objects and phenomena, and learn are mapped, learn the importance of the mechanical components that make up the machine by referring to the design examples of various machines. In this way, recognize the importance and necessity to reflect basic studies such as strength and lubrication in the design of mechanical elements. This course will be held in a lecture style, and taught by an instructor who is in charge of machine design in a company using his experience. It will deal with selecting mechanical elements such as gears, axles, sliding bearings, and sealing devices.
Style	Classes will be held in a lecture style. There will be assignments as appropriate.
Notice	(1) Always pay attention to how to respond to problems encountered in the real situations. (2) Understand the basic technologies such as of strength design and lubrication design for more application. Students who miss 1/4 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	Rotating machines and rotating machine elements	Explains the definition of machines, the process and the importance of mechanical elements to the completion of machine production. Can calculate the standard flat gear.
		2nd	Gear design technology (1)	Explains the design method of the gear tooth and the key points of the design of the gear such as interference.
		3rd	Gear design technology (2)	Explains the design technology of a gear that rotates smoothly, such as the rate of engagement, the rounding, etc.
		4th	Gear design technology (3)	Explains proper design techniques such as proper machining of shifted reinforcing gears and gears.
		5th	Gear strength design (1)	Explains stress calculation and lubrication film calculation methods and concepts of contact surfaces that determine the strength of the flat gear are explained.
		6th	Gear design technology (2)	Strength design exercise using various intensity formulas and Lewis formulas
		7th	Gear design technology (3)	Explains the precision, materials, heat treatment, and manufacturing technology of gears.
		8th	Explanation of the practice problem or short test	Explanation of the practice problem or short test

		9th	Design technology for bearings (1)	Explains the relationship between sliding bearings and rolling bearings and tribology technology.
	2nd Quarter	10th	Design technology for bearings (2)	Explains design technology for sliding bearings in various lubrication areas. Can calculate the minimum oil film etc.
		11th	Design of axial joints (1)	Types, shapes, and features of shaft joints. Design of deflection shaft joints
		12th	Design of axial joints (2)	Design of telescopic, all-dam and universal shaft joints
		13th	Mechanical elements for braking (1)	Explains brake design techniques. Understand the function and type of brakes.
		14th	Mechanical elements for braking (2)	Explains the latest technology in brake design.
		15th	Design technology for sealing equipment	Explains the types of sealing devices, design techniques, and technologies for designing and selecting sealing devices such as oil seals and O-rings.
		16th	Final exam	

Evaluation Method and Weight (%)

	Examination	Exercises	Total
Subtotal	50	50	100
Basic Proficiency	0	0	0
Specialized Proficiency	50	50	100
Cross Area Proficiency	0	0	0