Tsuyama College	Year	2021	Course Title	Mechatronics Ⅱ

Course Information

Course Code	0096	Course Category	Specialized / Elective
Class Format	Lecture	Credits	Academic Credit: 2
Department	Department of Integrated Science and Technology Communication and Informations System Program	Student Grade	4th
Term	Second Semester	Classes per Week	2
Textbook and/or Teaching Materials	Textbooks : "Mekatoronikusu no Kiso" (Morikita syuppan)		
Instructor	NISHIKAWA Kotaro		

Course Objectives

Learning purposes :
The student acquire the knowledge of Basic Mechatronics and Application which are essential to mechanical engineers improving the sophistication of machine and factory automation technology.

Course Objectives :
1. To explain feature and function of consist of system.
2. To explain the operating principle and features of Sensors and Actuators.
3. To explain mechanical transmission mechanism..
4. To explain Electric Circuits, and Information Processing of Sensosr.
5. To explain Control Theory of Mechatronics.
6. To understand and explain specific examples of Mechatronics.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	The student can explain in detail features and function of mechatoronics.	The student can explain roughly features and function of mechatoronics.	The student can explain features and function of mechatoronics.	The student has not achieved the level described in the column on the left.
Achievement 2	The student can explain in detail drive principle and the features of sensors and actuators.	The student can explain roughly operating principle and feature of sensors and actuators.	The student can explain the operating principle and features of sensors and actuators.	The student has not achieved the level described in the column on the left.
Achievement 3	The student can explain in detail the mechanism of machines.	The student can explain roughly the mechanism of machines.	The student can explain the mechanism of machines.	The student has not achieved the level described in the column on the left.
Achievement 4	The student can explain in detail electric circuits, and information processing of sensors.	The student can explain roughly electric circuits, and information processing of sensors.	The student can explain electric circuits, and information processing of sensors.	The student has not achieved the level described in the column on the left.
Achievement 5	The student can explain in detail control theory of mechatronics.	The student can explain roughly control theory of mechatronics.	The student can explain control theory of mechatronics.	The student has not achieved the level described in the column on the left.
Achievement 6	The student can understand and explain in detail specific examples of mechatronics.	The student can understand and explain roughly specific examples of mechatronics.	The student can understand and explain specific examples of mechatronics.	The student has not achieved the level described in the column on the left.

Assigned Department Objectives

Teaching Method

Outline

※Relation to work experience : This subject provides students with the rudiments of mechatronics and specific application examples, which are based on the teacher's work experience as a developer of mechanical design at a manufacturer. The teacher is qualified as a professional engineer.
General or Specialized : Specialized
Field of learning : Energy・Measurement and Control

Foundational academic disciplines : Engineering / Mechanical Engineering / Mechanical Dynamics ・ Control

Relationship with Educational Objectives :
This class is equivalent to "(3) Acquire deep foundation knowledge of the major subject area".

Relationship with JABEE programs :
The main goal of learning / education in this class are "(A)" , A-2

Course outline :

The subject integrates a fresh technology field of Mechanical Engineering, Electrical Engineering and Information Engineering, which is essential to incrasing the sophistication of machines. In this subject Basic Technology and application which are essential to mechanical engineers will be explained.

Style	Course method : The subject explains the introduction to mechatoronics, actuators, mechanism,s sensors, information processing of analog sensors, application of electric circuit elements, controller and peripheral equipment, control engineering, software and specific example of mechatronics. Grade evaluation method : Exams (80%) + Report (20%). Regular exams is conducted 2 times and evaluated equally. Retaking exams will be carried out for the students who get under 60% in total score. The retaken exams are equivalent to the term exam. Studens can use writing materials and calculator as nesessary.
Notice	Precautions on the enrollment : This is a "class that requires study outside of class hours". Classes are offered for 15 hours per credit, but 30 credit hours are required in addition to this. Follow the instructions of your instructor for these studies. Students must take this class(no more than one-third of the required number of class hours may be missed) . Course advice : This subject is based on mechanical engineering and electrical engineering, and basic study of mechanics and electric circuits is very important. Foundational subjects : Electrical and Electric Circuit (2nd year), Integrated Science and Technology Practice (2nd year), Mechatronics I (3rd year) Related subjects : Introduction to Robotics (4th year), Control Engineering (4th)etc. Attendance advice : The students are advised to solve the problems of textbooks of mechatoronics. You should prepare and continually. Reports should be submitted by the deadline. If you are more than 25 minutes late for the start time, it will be regarded as 1 absence.

Characteristics of Class / Division in Learning

☐ Active Learning	☑ Aided by ICT	☑ Applicable to Remote Class	☑ Instructor Professionally Experienced

Elective must complete subjects

Course Plan

			Theme	Goals
2nd Semester	3rd Quarter	1st	Guidance, Information processing of analog sensor(1)	The students can explain signal amplification and arithmetic processing.
		2nd	Information processing of analog sensor(2)	The students can explain A/D conversion and D/A conversion.
		3rd	Information processing of analog sensor(3)	The students can explain analyze of frequency.
		4th	Element of electric circuit, The application(1)	The students can explain Elements of electric circuit.
		5th	Element of electric circuit, The application(2)	The students can explain transistor circuit, digital circuit and stabilized power supply.
		6th	Controller, Peripheral equipment(1)	The students can explain computer, cable and terminal block.
		7th	Controller, Peripheral equipment(2)	The students can explain amplifier and driver.
		8th	Mid-term exam	
	4th Quarter	9th	Return and commentary of exam answers	
		10th	Control engineering(1)	The students can explain kind of control and control theory.
		11th	Control engineering(2)	The students can explain response of system, stability and feedback control.
		12th	Software(1)	The students can explain OS, real-time and programming language.
		13th	Software(2)	The students can explain importance of real-time OS.
		14th	Specific example of mechatrosystem	The students can explain specific example of analog / digital servo system, open-loop system and measurement with sensor.
		15th	(Final exam)	
		16th	Return and commentary of exam answers	

Evaluation Method and Weight (%)

	Examination	Report	Total
Subtotal	80	20	100
Basic Proficiency	0	0	0
Specialized Proficiency	80	20	100
Cross Area Proficiency	0	0	0