Mechatronics 3

Basic Course information

Course Number	01005112	**Subject Category**	Compulsory (M)
Class Format	Lecture	**Credit Type and Number of Credits**	2
Department	Mechatronics	**Student Category**	Year 4
Period of Study	Semester 1	**Classes per Week**	4
Required Materials			
Instructor	Sompod Wongkhead	Kashine Takeshi	

Course Objective

The course provides students with introduction and basic knowledge of mechatronics. Topics covered in this course: actuators including DC and AC motors, the applications of these materials are also taught.The exercise and homework are assigned to help and develop student's understanding.

Evaluation(Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Understanding definition of actuator, can explain to realize designable motion	Ability to solve not only basic problems but also applied problems on midterm and/or final exams about this category.	You can solve assignments correctly about this category and submit them by the deadline.	Cannot understand definition of actuator, cannot explain to realize designable motion
Can explain principle and property for AC/DC motors	Ability to solve not only basic problems but also applied problems on midterm and/or final exams about this category.	You can solve assignments correctly about this category and submit them by the deadline.	Cannot explain principle and property for AC/DC motors
Can explain how to control AC/DC motors	Ability to solve not only basic problems but also applied problems on midterm and/or final exams about this category.	You can solve assignments correctly about this category and submit them bythe deadline.	Cannot explain how to control AC/DC motors

Relationship with Learning Outcomes
M(2) Ability to design, propose and develop electrical and electronic systems for robotics/ mechatronic systems
Please change
Please change

Teaching Method

Outline:	Power source for mechatronics, and we learn them principle and property. In addition, it is provided learning selection of suitable motors, machine element, sensor and control method for the sytem
Class Format:	Lecture and Exercise
Please Note :	All materials will be posted on the Google classroom

Course Plan

Semester 1	**Contents and Method of Course**	**Goals**	**Related MCC**
1st week	Guidance, Definition of actuator, Example of combination of sensor and actuator, Basic concept of DC motor, Function of brush and commutator	Understanding definition of actuator, can explain to realize designable motion	V-C 5 66
2nd week	Scipies of DC motor and its properties Ⅰ: Separately excited motor, Shunt motor, Series motor, Cumulative compound motor, Differential compound motor	Can explain advantages of various DC motor	V-C 5 67
3rd week	Scipies of DC motor and its properties Ⅱ: No load property, Load property, Speed control, Relationship of current and torque, Armature reaction and its counterplan	Can explain advantages of various DC motor	V-C 5 66
4th week	Control methods of DC motor: Current control and its technique, PWM control	Can explain how to control DC motor	V-C 5 66
5th week	Brushless DC motor: Difference with brush DC motor, function of sensor in brushless DC motor, Advantages and disadvantages	Can explain about advantage and configuration of brushless DC motorn	V-C 5 66
6th week	Integrated study for actuators Ⅱ	Can design an actuator to satisfy the specification	V-C 5 69
7th week	Perform calculation of properties for DC motor	Trial examination	V-C 5 66
8th week	Wrap-up of 1st half of semester (Review)	Review and summarize learning	
9th week	Midterm Examination		
10th week	Return Midterm Exam Papers and Feedback	Review learning	
11th week	Basic concept of AC motor (Induction motor and synchronous motor): Rotating magnetic field, construction	Can explain the difference induction motor with synchronous motor	V-C 5 67
12th week	Properties of 3-phase Induction motor: Load property, Slip and speed, Torque property etc	Can explain feature of 3-phase induction motor and its property	V-C 5 68
13th week	Properties of synchronous motor: Load property, Torque property, Application etc.	Can explain feature of synchronous motor and its property	V-C 5 68
14th week	Concept of PID control and application	Can explain PID control	V-C 7 92 V-A 8 174
15th week	Surbo motor and Stepping motor: Control method, encoder for servo motor, Applicatons	Can explain action and principle for surbo motor and stepping motor	V-C 7 93
16th week	Integrated study for actuators Ⅲ	Can design an actuator with sensor to satisfy the specification	V-C 5 69
17th week	Perform calculation of properties for AC motor	Trial examination	V-C 5 67
18th week	Review before the final examination	Explaining the past work	
19th week	Final Examination		
20th week	Return Exam Papers and Feedback, and special sessions	Review and summarize learning	

Do not

	Examination	**Quiz**	**Mutual Evaluations between students**	**Report**	**Portfolio**	**Other**
Basic Ability	70	30				
Technical Ability						
Interdisciplinary Ability						