Control Engineering 1

Basic Course Information			
Course Number	01005083	Subject Category	Compulsory (M)
Class Format	Lecture	Credit Type and Number of Credits	1.5
Department	Mechatronics	Student Category	Year 5
Period of Study	Semester 1	Classes per Week	1
Required Materials			
Instructor	Shinji Takeshita	Vorapong Sutthisaksri	

Course Objective

The course provides students with introduction and basic knowledge of Control engineering including mathematics, transfer function and block diagram to develop systems.

Evaluation (Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
System representation	Can draw Nyquist diagram	Can draw Bode diagram	Cannot solve transfer functions
Stable discrimination	Can explain the system stability using by Nyquist's stability criterion	Can use Routh's stability criterion	Cannot determine system stability
Control system design	Can design control systems using transfer functions	Can design control systems using the pole assignment method	Cannot design control system

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:	This subject is about so-called classical control theory. As an element of this
Class Format:	Lecture and Exercise
Please Note :	All materials will be posted on Google classroom.

Course Plan			Related MCC		
Semester 1	Contents and Method of Course	Goals			
1st week	Guidance, Equation of state	Can formulate equations of state for mechanical and circuit elements	V-C	4	
2nd week	Transfer functions	Can formulate transfer functions for mechanical and circuit elements.	V-C	7	92
3rd week	Frequency response 1	Can draw vector diagram			
4th week	Frequency response 2	Can draw Bode diagram	V-C	7	96
5th week	Holiday				
6th week	Feedforward and Feedback systems	Can explain various control systems, including feedback control, their structure and main names	V-C	7	93
7th week	Mock test for 1st-half and wrap-up of 1st-half	Review and summarize learning			
8th week	Midterm Exam				
9th week	Midterm Exam				
10th week	Nyquist's stability criterion, Routh's stability criterion	Can determine stability for the system using by Nyquist's stability criterion and Routh's stability criterion	V-C	7	97
11th week	Steady-state and transient characteristics 1	Can explain the steady-state characteristics of the system using the steady-state deviation. Can explain transient characteristics using the step response.	V-C V-C	7 7	94 95
12th week	Steady-state and transient characteristics 2	Can explain the steady-state characteristics of the system using the steady-state deviation. Can explain transient characteristics using the step response.	V-C V-C	7 7	94 95
13th week	System design	Can design control systems using the pole assignment method and the marginal sensitivity method			
14th week	PID control 1	Can simulate simple system with P, PI and PID controls			
15th week	Holiday				
16th week	PID control 2	Can examine the system with PID control			
17th week	PID control 3	Can examine the system with PID control			
18th week	Mock test for 2nd-half and wrap-up of 2nd-half	Review and summarize learning			
19th week	Final Exam				
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	80			20		
Technical Ability	10			20		
Interdisciplinary Ability				0		