Tsuyama College	Year	2020	Course Title	Advanced Controls Engineering

Course Information

Course Code	0149	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	5th
Term	Year-round	Classes per Week	1
Textbook and/or Teaching Materials	Textbooks : "Wakariyasui Gendai Seigyo Riron" Mori, (Morikita Syuppan)		
Instructor	YAGI Hideyuki		

Course Objectives

Learning purposes :
The purpose is to acquire applied concepts related to automatic control theory.

Course Objectives :
1. To understand PID control theory.
2. To understand modern control theory.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	The student can apply PID control theory to complex problems.	The student can understand the theory of PID control theory.	The student can understand the basic theory of PID control.	The student will not try to understand the basic theory of PID control.
Achievement 2	The student can apply modern control theory to complex problems.	The student can understand the theory of modern control theory.	The student can understand the basic theory of modern control.	The student will not try to understand the basic theory of modern control.

Assigned Department Objectives

Teaching Method

Outline	General or Specialized : Specialized Required, Elective, etc. : Elective subjects Foundational academic disciplines : Engineering / Electrical and electronic engineering / Control and system engineering Relationship with Educational Objectives : This class is equivalent to "(2) Acquire basic science and technical knowledge". Relationship with JABEE programs : The main goals of learning / education in this class are "(A) ..., A-2: ...". Course outline : Acquire practical control theory used in the field and understand the application fields of control engineering.
Style	Course method : Classes are offered in 2 credit hours (90 minutes) per week. The student will deepen their understanding by conducting exercise guidance, confirmation tests, and assignment reports according to the progress of learning. Grade evaluation method : Exams (60%) + Confirmation tests (40%). Evaluate the results of each of the two examinations equally. Items that can be brought in for the test will be instructed each time. Those with poor grades will be retested and added so that the result of the regular test will be a maximum of 60 points. Confirmation tests performed during class and learning outcomes outside class hours (exercises for assignments, reports, etc.) are evaluated equally, and up to 40% is considered. However, learning outcomes that have passed the submission deadline will be evaluated up to 30%.
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. Course advice : It requires knowledge about "control engineering", so review it. Foundational subjects : Basic Electrical Controls (2nd year), Electronic and Information Circuits (4th), Control Engineering (5th) Related subjects : Attendance advice : Confirm attendance at the beginning of class. Please note that you will be absent from school 3 times late. If you decide that it will interfere with other people's attendance, you may be asked to leave.

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st		
		2nd		
		3rd		
		4th		
		5th		
		6th		
		7th		
		8th		

	2nd Quarter	9th		
		10th		
		11th		
		12th		
		13th		
		14th		
		15th		
		16th		
2nd Semester	3rd Quarter	1st	Guidance	
		2nd	Basic form of PID control system	
		3rd	Digital PID control system	
		4th	I-PD control system, P-ID control system	
		5th	2 degrees of freedom PID control system	
		6th	PID parameter tuning (Ziegler-Nichols' Ultimate Gain method)	
		7th	PID parameter tuning (CHR method)	
		8th	2nd semester mid-term exam	
	4th Quarter	9th	Return and commentary of exam answers	
		10th	Dynamic system and state equation	
		11th	System model and linearization (1)	
		12th	System model and linearization (2)	
		13th	System coordinate transformation (1)	
		14th	System coordinate transformation (2)	
		15th	(2nd semester final exam)	
		16th	Return and commentary of exam answers	

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Assignment test	Total
Subtotal	60	0	0	0	0	40	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	60	0	0	0	0	40	100
Cross Area Proficiency	0	0	0	0	0	0	0