Tsuyama College	Year	2020		Course Title	Applied Electronics

Course Information

Course Code	0130		Course Category	Specialized / Elective
Class Format	Lecture		Credits	Academic Credit: 2
Department	Department of Integrated Science and Technology Electrical and Electronic Systems Program		Student Grade	5th
Term	First Semester		Classes per Week	2
Textbook and/or Teaching Materials	Textbooks : Kosaka Manabu"Koukou Sugaku de Master suru Control Engineering"(Corona Publishing), Reference books : Mori Yasuchika"Ensyu de manabu basic Control Engineering"			
Instructor	MINATOHARA Tetsuya			

Course Objectives

Learning purposes :
Learn the basic of Feedback-control treating single-input single-output systems.
Course Objectives :
1. To be able to explain regarding basic control theory such as transfer functions, response of systems, stability criterions with respect to feedback systems and so on.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	A student definitely understands a basic theory regarding a transfer function.The score should be over 80 points.	A student mostly understands a basic theory regarding a transfer function. The score should be over 70 points.	A student partly understands a basic theory regarding a transfer function. The score should be over 60 points.	A student does not understand a basic theory regarding a transfer function. The score less than 60 points.
Achievement 2	A student definitely understands a basic theory regarding a response of systems. The score should be over 80 points.	A student mostly understands a basic theory regarding a response of systems. The score should be over 70 points.	A student partly understands a basic theory regarding a response of systems. The score should be over 60 points.	A student does not understand a basic theory regarding a response of systems. The score less than 60 points.
Achievement 3	A student definitely understands a basic theory regarding a stability criterion with respect to feedback systems. The score should be over 80 points.	A student mostly understands a basic theory regarding a stability criterion with respect to feedback systems. The score should be over 70 points.	A student partly understands a basic theory regarding a stability criterion with respect to feedback systems. The score should be over 60 points.	A student does not understand a basic theory regarding a stability criterion with respect to feedback systems. The score less than 60 points.

Assigned Department Objectives

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Teaching Method

Outline	General or Specialized : Specialized Field of learning : Information and measure / control Required, Elective, etc. : Elective must complete subjects Foundational academic disciplines : Engineering / Electrical and Electronics Engineering / Control Engineering 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 is "(A)". Course outline : The basic of traditional control theory is lectured. In the theory, thre relationship between input and output is represented with a transfer function which is subjected Laplace transformation the subject of the linearlized differential equation. By examining such transfer functions, control characteristics can be known.
Style	Course method : Mainly, board-writing is used. Sometimes, practices with a computer simulation are used. Grade evaluation method : Regular exams (70%) + Practices (30%). Examinations will be conducted a total of 2 times, and the evaluation ratios will be the same. A re-test will be conducted as necessary. Any materials involving textbook and reference books cannot be permitted to take in the examination.
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 : Laplace tfansformation which is a main analysis method of the traditional control theory needs basic mathematic techniques. Thus, a students is necesarry to establish the basic of mathematics. Foundational subjects : Basic Control (2nd year) Related subjects : Control Engineering (5th year), Advanced Control Engineering (5th) Attendance advice : If you are late for the start time, you will be treated as one absent after 20 minutes and as two absents after 65 minutes.

Course Plan

			Theme		Goals

1st Semester	1st Quarter	1st	Guidance	
		2nd	What is the Control? [feedback systems around us]	Deepen understanding of the feedback systems around us
		3rd	Static and Dynamic systems [Practice of system expressions]	Deepen understanding of static and dynamic systems.
		4th	Block diagram [Practice of block diagrams]	To be able to express control systems with block diagram.
		5th	Laplace transformation regarding transfer function [Practice of regular and inverse Laplace transformations]	To be able to calculate a Laplace transformation.
		6th	Laplace transformation regarding differential equations [Practice of regular and inverse Laplace transformations]	To be able to calculate a Laplace transformation of a differential equation.
		7th	Inverse Laplace transformation [Practice of regular and inverse Laplace transformations]	To be able to calculate an inverse Laplace transformation. To be able to solve a differential equation using regular and inverse Laplace transformations.
		8th	1st semester mid-term exam	
	2nd Quarter	9th	Return and commentary of exam answers	
		10th	Stability criteria using pole [Practice of stability criteria using pole]	Deepen understanding of stability criteria using pole.
		11th	Fast response using pole [Practice of fast response using pole]	Deepen understanding of fast response using pole.
		12th	System analysis using frequency characteristics (1st week) [Practice of system analysis using bode diagram]	To be able to explain frequency characteristics of systems.
		13th	System analysis using frequency characteristics (2nd week) [Practice of system analysis using nyquist diagram]	To be able to explain frequency characteristics of systems.
		14th	Analysis of stability(Routh–Hurwitz, Nyquist) [Practice of stability analysis]	To be able to discriminate stability or instability of control systems.
		15th	(1st semester final exam)	
		16th	Return and commentary of exam answers	

Evaluation Method and Weight (%)

	Examination	Practice	Total
Subtotal	70	30	100
Basic Proficiency	0	0	0
Specialized Proficiency	70	30	100
Cross Area Proficiency	0	0	0