

Tsuyama College		Year	2020		Course Title	Control Engineering
Course Information						
Course Code	0137		Course Category	Specialized / Elective		
Class Format	Lecture		Credits	Academic Credit: 2		
Department	Department of Integrated Science and Technology Advanced Science Program		Student Grade	5th		
Term	Year-round		Classes per Week	1		
Textbook and/or Teaching Materials	Textbooks:"Koukousuugakude Masutasuru Seigyokougaku", M.Kosaka, (koronasya)					
Instructor	YAGI Hideyuki					
Course Objectives						
Learning purposes: The purpose is to learn the basic concepts of automatic control theory.						
Course Objectives : 1. To understand the transfer function of the control system and explain it with a block diagram. 2. To understand the transient response characteristics and steady-state characteristics of the control system. 3. To understand the stability criterion of a control system.						
Rubric						
	Excellent	Good	Acceptable	Not acceptable		
Achievement 1	The student can analyze the behavior of the system by applying transfer functions and block diagrams.	The student can express the behavior of the system using transfer functions and block diagrams.	The student understand transfer functions and block diagrams.	The student will not try to understand transfer functions and block diagrams.		
Achievement 2	The student can apply and analyze the transient and stationary characteristics of control systems.	The student understand the transient and steady-state characteristics of common control systems.	The student understand the basic transient and steady-state characteristics of control systems.	The student will not try to understand the basic transient and steady-state characteristics of control systems.		
Achievement 3	The student can analyze using the stability criterion of the feedback system.	The student can explain the stability criterion of the feedback system.	The student understand the basic stability criterion of the feedback system.	The student will not try to understand the basic stability criterion of the feedback system.		
Assigned Department Objectives						
Teaching Method						
Outline	General or Specialized : Specialized  Field of learning :  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 "(3) Acquire deep foundation knowledge of the major subject area".  Relationship with JABEE programs : The main goals of learning / education in this class are "(A)".  Course outline : With the progress of automation technology in various industries, control engineering has become a basic discipline in all fields such as electricity, machinery, chemistry, and aviation. Deepen your understanding of the outline of control engineering with simple examples and exercises.					
Style	Course method : Classes will be started by constructing a mathematical model of the control system and expressing the input / output characteristics with a transfer function. We will also study how to investigate the stability of a system by knowing the transient characteristics and frequency characteristics of a typical system. Handwork such as plotting the frequency characteristics of the target system is also required to investigate the stability of the system.  Grade evaluation method : Exams (70%) + Mini tests (30%). Examinations will be conducted a total of 4 times, and the evaluation ratios will be the same. Retaking exams may be conducted after the regular exams, but the score of the regular exams will be re-evaluated up to 60 points. Confirmation exams conducted during class and learning outcomes outside class hours (exercises for assignments, reports, etc.) are evaluated equally (30%). However, learning outcomes that have passed the submission deadline will be evaluated up to 20%.					

Notice	Precautions on the enrollment : Students must take this class (no more than one-third of the required number of class hours missed) in order to complete the year course.		
	Course advice : It is necessary to have knowledge of mathematics and physics that you have learned so far, so review it. In addition, since it is important to deepen understanding by solving many exercises, it is necessary to take an attitude of voluntarily tackling the tasks so that they will be understood during the lecture.		
	Foundational subjects : Basic Electrical Controls (2nd year), Electronic and Information Circuits (4th)		
	Related subjects : Applied Electronics (5th year), Advanced Controls Engineering (5th)		
	Attendance advice : If you are late for the start time, you will be treated as absent. Note that you will be absent from school twice if you are late. If you decide that it will interfere with other people's attendance, you may be asked to leave. I would like you to learn the theory of automatic control while relating it to familiar devices.		

### Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Guidance	
		2nd	Transfer function of automatic control system (1)	
		3rd	Transfer function of automatic control system (2)	
		4th	Block diagram	
		5th	Transient response	
		6th	Frequency response (1)	
		7th	Frequency response (2)	
		8th	1st semester mid-term exam	
	2nd Quarter	9th	Return and commentary of exam answers	
		10th	Bode plot	
		11th	Vector locus	
		12th	Stability criterion of control system (Routh method (1))	
		13th	Stability criterion of control system (Routh method (1))	
		14th	Stability criterion of control system (Nyquist method)	
		15th	(1st semester final exam)	
		16th	Return and commentary of exam answers	
2nd Semester	3rd Quarter	1st		
		2nd		
		3rd		
		4th		
		5th		
		6th		
		7th		
		8th		
	4th Quarter	9th		
		10th		
		11th		
		12th		
		13th		
		14th		
		15th		
		16th		

### Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Assignment test	Total
Subtotal	70	0	0	0	0	30	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	70	0	0	0	0	30	100
Cross Area Proficiency	0	0	0	0	0	0	0