Toyama College	Year	2022		Course Title	Instrumentation and Control

Course Information

Course Code	0009		Course Category	Specialized / Elective
Class Format	Lecture		Credits	Academic Credit: 2
Department	ECOdesign Engineering Course		Student Grade	Adv. 1st
Term	First Semester		Classes per Week	2
Textbook and/or Teaching Materials				
Instructor	Ishida Fumihiko			

Course Objectives

Through this course, understanding of the following will be facilitated
(1) signal types and the Fourier transform
(2) continuous time systems
(3) the sampling theory
(4) the discrete-time Fourier transform
(5) discrete time systems

Rubric

	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Clearly understands the type of signal and the Fourier transform and has the ability to calculate in detail	Understands the type of signal and the Fourier transform and has the ability to calculate in general	Unable to understand and calculate the type of signal and the Fourier transform in general
Evaluation 2	Clearly understands the continuous time system and has the ability to calculate the input and the output of the system in detail	Understands the continuous time system and has the ability to calculate the input and the output of the system in general	Unable to calculate the input and the output of the continuous time system in general
Evaluation 3	Clearly understands the sampling theory and has the ability to calculate the Nyquist frequency in detail	Understands the sampling theory and has the ability to calculate the Nyquist frequency in general	Unable to understand and calculate the sampling theory in general
Evaluation 4	Clearly understands the discrete-time Fourier transform and has the ability to calculate in detail	Understands the discrete-time Fourier transform and has the ability to calculate in general	Unable to understand and calculate the discrete-time Fourier transform in general
Evaluation 5	Clearly understands the discrete time system and has the ability to calculate the input and the output of the system in detail	Understands the discrete time system and has the ability to calculate the input and the output of the system in general	Unable to calculate the input and the output of the discrete time system in general

Assigned Department Objectives

学習・教育到達度目標 A-2
JABEE 1(2)(d)(1) JABEE 1(2)(d)(2) JABEE 2.1(1)

Teaching Method

Outline	In instrumentation and control of the system, various kinds of signal information processing is performed by digital signal processing using a computer. This course aims to understand the fundamentals of signal processing based on applied mathematics as the basis of instrumentation and control.
Style	Lectures and exercises
Notice	

Characteristics of Class / Division in Learning

☐ Active Learning	☑ Aided by ICT	☑ Applicable to Remote Class	☐ Instructor Professionally Experienced

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	The type and processing of the signal	Learn the type and processing of the signal
		2nd	Periodic signal and Fourier series expansion	Learn periodic signal and Fourier series expansion
		3rd	Aperiodic signal and the Fourier transform	Learn aperiodic signal and the Fourier transform
		4th	Continuous time systems (1)	Learn continuous time systems
		5th	Continuous time systems (2)	Exercise the calculation about the continuous time systems
		6th	The Laplace transform	Learn the Laplace transform
		7th	The sampling theory	Learn the sampling theory
		8th	Exercise	Exercise the current ability
	2nd Quarter	9th	Discrete-time signal and the discrete Fourier transform (1)	Learn the discrete-time signal and the discrete Fourier transform
		10th	Discrete-time signal and the discrete Fourier transform (2)	Exercise the calculation about the discrete Fourier transform
		11th	Discrete time systems	Learn discrete time systems
		12th	The z transform	Learn the z transform
		13th	Digital filters	Learn digital filters
		14th	Exercise	Exercise the current ability

		15th	Final examination	
		16th	Summary	Summarize the study content and confirm grades

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	70	30	0	0	0	0	100
Basic Ability	50	20	0	0	0	0	70
Technical Ability	20	10	0	0	0	0	30
Interdisciplinary Ability	0	0	0	0	0	0	0