Tsuyama College	Year	2022	Course Title	Communication Engineering

Course Information

Course Code	0077	Course Category	Specialized / Compulsory
Class Format	Lecture	Credits	School Credit: 2
Department	Department of Computer and Information Engineering	Student Grade	5th
Term	Year-round	Classes per Week	2
Textbook and/or Teaching Materials	Textbooks : <1st semester> Fujio Yamashita, Takakiyo Nakagami and Katsumi Nakatuhara, "Introduction to communication engineering " written in Japanese (Morikita Publishing) and <2nd semester> Masafumi Hagihara, "Digital Signal Processing" written in Japanese (Morikita Publishing)		
Instructor	MIYASHITA Takuya		

Course Objectives

Learning purposes :
Acquire basic knowledge about information communication important for computer networks, such as analog and digital, modulation / demodulation, and communication protocols.

Course Objectives :
1. To explain the conceput of information handled in communication.
2. To explain the conceput of signal transmission technology including modulation and demodulation.
3. To explain the conceput of the communication system.
4. Understand the basic theorems of signal processing.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	Explain the information handled in communication concretely.	Explain the concept of the information handled in communication.	Examples of the information handled in communication can be illustrated.	It has not reached the left.
Achievement 2	Explain the signal transmission technology including modulation and demodulation concretely.	Explain the conceput of the signal transmission technology including modulation and demodulation.	Examples of the signal transmission technology including modulation and demodulation can bi illustrated.	It has not reached the left.
Achievement 3	Explain the communication system concretely.	Explain the conceput of the communication system.	Examples of the communication system. can be illustrated.	It has not reached the left.
Achievement 4	Understand the basic theorems of signal processing concretely.	Understand the concept of the signal processing.	Examples of the singnal processing can be illustrated.	It has not reached the left.

Assigned Department Objectives

Teaching Method

Outline	General or Specialized : Specialized Field of learning : Information system, programming and network Foundational academic disciplines : Engineering / Electrical and Electronic Engineering and Related Fields / Communication Engineering and Related fields. Relationship with Educational Objectives : This class is equivalent to "(3) Acquire deep foundation knowledge of the major subject area". Course outline : Give comprehensive lectures on information and communications such as networks and modulation / demodulation.
Style	Course method : Classes will be conducted using textbooks, centered on board writing. In addition, related technologies will be supplementarily explained as necessary. Also, impose exercises to deepen understanding. Grade evaluation method : The results of the four regular tests are weighted and evaluated (80%, front middle: front end: back middle: back end = 5: 5: 3: 3). ・Each exam does not allow notebooks to be brought in. ・For those who have less than 60 points in each Regular Exams, the points may be changed if their understanding can be confirmed by supplementary lessons and re-exams. However, the evaluation after the change shall not exceed 60 points. Evaluate by exercises and reports assignment (20%).
Notice	Precautions on the enrollment : Students who chose this subject must take this class (no more than one-third of the required number of class hours missed) in order to complete the 4th year course. This is a "class that requires study outside of class hours". Classes are offered for 15 hours per credit, but 15 credit hours are required in addition to this. Course advice : Make sure to check the contents of the basic subjects listed as preparatory learning in advance. Carefully check and understand the meanings and definitions of terms that appear in textbooks. Also, solve the examples and the exercises prepared at the end of each chapter one by one and check the contents carefully. Foundational subjects : Information Literacy (1st year), Basic Information Networks (2nd), Introduction to Computers (3rd), etc. Related subjects : Digital Signal Processing (4th year), Communications Protocol (5th), etc. Attendance advice : In addition to basic knowledge, you will also learn about communication equipment and wireless equipment used in modern society, so learn with interest, keeping in mind that it is also related to daily life. Late arrivals are handled in 1/4 (= 0.5 hour) of class time (= 2 hour).

Characteristics of Class / Division in Learning

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

Elective must complete subjects

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Guidance	Understand the purpose of education, learning content, evaluation method, etc.
		2nd	Basic configuration of telecommunications system	Understand the basics of analog and digital and communication.
		3rd	Information handled by telecommunications	Understand the types of information.
		4th	Basics of how to handle signal waves	Understand the amount of signal information and the spectrum.
		5th	Modulation of analog signals	Understand the basics of analog modulation.
		6th	Digital modulation of the signal	Understand the basics of digital modulation.
		7th	Signal multiplexing	Understand the outline of various multiplexings.
		8th	(1st semester mid-term exam)	Check what you have learned so far.
	2nd Quarter	9th	Return and commentary of exam answers	Check and repair areas where learning is insufficient.
		10th	Various disturbances in communication	Understand the outline of various noises.
		11th	Channel	Understand various transmission lines.
		12th	Exchange system	Understand the basics of communication networks and exchanges.
		13th	Relay transmission system	Understand the relay transmission of analog or digital signals.
		14th	Various communication systems	Understand the outline of various communication systems.
		15th	(1st semester final exam)	Check what you have learned so far.
		16th	Return and commentary of exam answers	Check and repair areas where learning is insufficient.
2nd Semester	3rd Quarter	1st	Guidance	Understand the purpose of education, learning content, evaluation method, etc.
		2nd	What is signal processing?	Get an overview of the relationship between signal processing and mathematics
		3rd	Fourier series (trigonometric function)	Understand the principle and application of Fourier series expansion using trigonometric functions
		4th	Fourier series (complex function)	Understand the relationship between trigonometric and complex functions for Fourier series expansion
		5th	Fourier transform	Understanding the Fourier Transform by extending a periodic waveform to an aperiodic waveform
		6th	Features and properties of Fourier transform	Characteristics and properties of Fourier transform
		7th	(2nd semester mid-term exam)	Check what you have learned so far.
		8th	Return and commentary of exam answers	Check and repair areas where learning is insufficient.
	4th Quarter	9th	From Fourier transform to Laplace transform	Learn about the relationship between two transformations
		10th	Features and properties of Laplace transform	Learn the basic knowledge to perform analysis with Laplace transform
		11th	Laplace transform and z-transform	Learn about the relationship between two transformations
		12th	Features and properties of z-transform	Learn the basic knowledge to perform analysis with z-transform
		13th	Fourier Transform and Discrete Fourier Transform	Learn about the relationship between two transformations
		14th	Features and properties of the discrete Fourier transform	Learn the basic knowledge for performing analysis with DFT
		15th	(2nd semester final exam)	Check what you have learned so far.
		16th	Return and commentary of exam answers	Check and repair areas where learning is insufficient.

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	80	0	0	0	20	0	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	80	0	0	0	20	0	100
Cross Area Proficiency	0	0	0	0	0	0	0