Appended Form 1

Specifications for Major Program

Name of School (Program)〔School of Engineering Cluster 2(Electrical, Electronic and Systems Engineering)〕

Program name (Japanese)	電気システム情報プログラム
(English)	Program of Electrical, Systems and Information Engineering

1. Academic degree to be acquired：Bachelor’s degree in engineering

2. Overview

In the fields of electricity, electronics, systems, information, and in other related fields, technological innovation has been advancing rapidly. We are now in a situation where technological innovation, ideas, and theories are being

3. Academic Awards Policy (Goals of the Program and Policy for Awarding Degrees)

The Program of Electrical, Systems and Information Engineering develops professionals who have a broad perspective, insight, a sense of responsibility, and an ethical outlook, as well as expertise, technical knowledge, and the ability to analyze and solve problems.

To that end, this program covers the fields of electricity, systems, and information, and offers an education that deals with “electricity” in a comprehensive way, from the two perspectives of electricity as a thing in itself, and of the abstract concept of electricity, systems, and information. By providing everything, from the basic concepts to cutting-edge knowledge, in each field and, furthermore, identifying the mutual relationships between the fields in a systematic manner, this program aims at developing professionals who can take the lead in engineering development in these fields, and who have the ability to develop innovative technology by synthesizing the different fields, which is of growing importance for the future.

This program awards a bachelor’s degree in engineering to students who, in addition to the number of credits necessary to meet the standard of the course, have acquired the following knowledge and abilities:

【Goal A】Acquisition of the ability to recognize the relationship between science and technology, and humankind, society, and the natural environment, from various perspectives, and the ability to understand the responsibilities engineers have for society.

【Goal B】Acquisition of the basic knowledge commonly required in the field of electronic systems and information, and the abilities applicable to the field.

【Goal C】Acquisition of the ability to analyze given challenges by using expertise, and draw solutions that meet the requirements of society.

【Goal D】Acquisition of the ability to draw up plans and measures to resolve challenges, and the will to carry these measures out.

【Goal E】Acquisition of the ability to gather information and to communicate in Japanese and English. Acquisition of the ability to sum up one's thoughts and accomplishments, to write logically, and to give a presentation.

4.Curriculum Policy （Policy for Preparing & Implementing Curriculum)

The Program of Electrical, Systems and Information Engineering prepares and implements a curriculum that provides the following knowledge and abilities so that students are able to achieve the goals of the program.

○Knowledge/Understandings

・ Cultivation of the understanding of society-technology relations and the ethical outlook necessary for an engineer (Goal A). This is obtained through mastery of liberal arts education subjects such as “Introduction to University Education”, and “Courses in Arts and Humanities/Social Sciences”, and basic specialized subjects such as “Introduction to Energy and Information Systems” to be offered in the first year.

・Basic knowledge of mathematics, such as differential and integral calculus, and linear algebra, required by scientists and engineers (Goal B). This is obtained through mastery of such fundamental subjects as “Calculus” to be offered in the first year.

・Basic knowledge of physical theory and experimental methods required by scientists and engineers (Goal B). This is obtained through mastery of fundamental subjects such as “General Mechanics”, “Experimental Methods and Laboratory Work in Physics” to be offered in the first year.

・ General understanding and acquisition of knowledge about technologies in the field of electronic systems, and acquisition of the basic knowledge common to this field (Goal B). This is obtained through mastery of “Introduction to Energy and Information Systems” and “Electric Circuit Theory I” to be offered in the first year.

○Abilities/Skills

・ The mathematical methodology required by experts in the field of electrical, systems and information (Goal B). This is obtained through mastery of basic specialized subjects such as “Applied Mathematics” to be offered during the period from the third or fourth term of the first year through the second year.

・The concepts, knowledge, and methodology that form the foundation of the field of electrical, systems and information (Goal B). This is obtained through mastery of specialized subjects to be offered during the period from

the third or fourth term of the first year through the third year.

・ The ability to apply basic concepts, knowledge, and methodology in the field of electrical, systems and information to concrete, professional issues (Goal B). This is obtained through mastery of specialized subjects to be offered during the period from the third or fourth term of the first year through the third year.

・The ability to resolve problems and challenges by using experiments to solve practical problems, by using methods of numerical calculation, and by gathering relevant data (Goal D). This is obtained through mastery of basic specialized subjects such as “Basic Experiments in Electrical Engineering” and “Programming” to be offered during the period from the first or second term of the second year through the third year.

・The ability to make action plans on one’s own initiative in relation to practical issues and challenges, make adjustments and resolve problems and challenges by using basic and specialized knowledge and methods (Goal C, D). This is obtained through mastery of “Graduation Thesis” to be offered in the fourth year.

○Comprehensive Abilities

・ Creative and logical thinking to analyze practical problems and challenges, and to reach rational solutions that meet the requirements of society, as well as the engineering development abilities to physically realize such solutions (Goal C, D)

・The ability to organize research results and write logically, including regarding the significance and validity of the obtained outcomes, and to present these research outcomes and discuss them verbally and in an easy-to-understand manner (Goal E). This is obtained through mastery of “Graduation Thesis” to be offered in the fourth year.

・ The teamwork, leadership, and communication abilities needed to work in a group (Goal E) These are obtained through mastery of Basic specialized subjects such as “Basic Experiments in Electrical Engineering” to be offered during the period from the second year through the third year.

・The ability to take an approach to solving various problems after understanding that such problems that exist in humankind, society, and among individuals can be interpreted in various ways depending on social conditions, cultures, etc. This is obtained through mastery of liberal arts education subjects such as “Basic language I” and “Area Courses”.

・The ability to read, write, converse, and retrieve information in the English language, necessary for conducting research (Goal E) This is obtained through mastery of “Technical English” to be offered in the third year and “Graduation Thesis“ to be offered in the fourth year.

5. Program Timing/Acceptance Conditions

At the beginning of the second year, students are assigned to this program based on consideration of their request and academic results. In order to be assigned to this program, students must acquire a total of 34 or more credits in liberal arts education subjects and specialized education subjects by the end of the first year.

6.Qualifications to be Acquired

By mastering the predetermined courses, students can obtain Type-1 High School Teaching License (Industry), Students qualify as electrical chief engineers and engineers for architectural equipment after having hands-on experience for some years after graduation. The details are given in student handbook.

7. Class subjects and course content

* For class subjects, see the course list table on the attached sheet.
* For course content, see the syllabus for each academic year.

8. Academic Achievements

Evaluation of academic achievement	Converted values
S(Excellent: 90 points or higher)	4
A(Superior:80-89 points)	3
B(Good: 70-79 points)	2
C(Fair: 60-69 points)	1

Academic achievement	Evaluation criteria
Excellent	3.00～4.00
Very Good	2.00～2.99
Good	1.00～1.99

* See the relationship between evaluation items and evaluation criteria in the attached sheet 2.
* See the relationship between evaluation items and class subjects in the attached sheet 3.
* See the curriculum map in the attached sheet 4.

9. Graduation Thesis (Graduation Research) (Positioning, When and how to be assigned, etc.)

Graduation work aims at imparting general research skills by conducting research in line with the research agenda established for each student. The following are more concrete goals:

1. The acquisition of the ability to make a research plan based on the research agenda and execute the research in accordance with the plan
2. The acquisition of the ability to collect materials related to the research agenda, demonstrate a deep understanding of the research agenda, and identify problems
3. The acquisition of the ability to analyze the problems in the research agenda and reach solutions in accordance with the requirements of society
4. The acquisition of the ability to read, write, converse, and retrieve information in the English language necessary for conducting research
5. The acquisition of the ability to organize research results and write in coherent sentences the significance and validity of the obtained outcomes
6. The acquisition of the ability to present the research outcomes and discuss them verbally in an easy-to-understand manner

The requirements for embarking on a graduation thesis are as described in student handbook.
Students in the fourth year or over, who satisfy the requirements for embarking on a graduation thesis, are to be assigned as requested. How adjustments are made in relation to assignment is explained to the applicable students at a briefing held in advance. A briefing session about research topics or an open laboratory is held around the time from February to April for students who are to be assigned to the research laboratory and to the program.

10. Responsibility System

(1) PDCA Responsibility-taking System (“Plan,” “Do,” “Check,” and “Act”)

This Program is operated by teachers who support the Program of Electrical, Systems and Information Engineering, however, the program targets students who belong to Cluster 2 and, therefore, the person responsible for executing the program is the Cluster 2 leader. Planning, implementing, evaluation, and handling are discussed mainly in the Cluster 2 Education Program committee and in the Cluster 2 committee (held, in principle, on the first Wednesday of every month) in an appropriate manner. Depending on the situation or content, a working group is established at the instruction of the Cluster leader to focus in the issues at hand.

When there is a need to consider the response on a program basis, research laboratory groups responsible for the applicable program take the necessary measures. In that case, the responsible person is appointed by the Cluster leader.

(2) Program assessment

・Whether or not each class subject is properly allocated in light of the goals of the program, and whether course content is appropriate
・Whether or not students taking the course have one average achieved the goal or above
・Whether or not the system runs in proper cycles that enable the program to continually improve in an upward spiral

・Conducting self-assessment for each subject based on the results of class evaluations carried out by students who have taken the course, and also based on grade calculation results
・Regarding the upward spiral of the program, obtaining the questionnaire from graduates in suitable cycles and also collecting the needs from business corporations

・For individual courses, the teacher in charge gives comments on course evaluation results and academic achievement results.
・For re-examining the program structure, the reasons for and the purposes of re-examinationare given on the website.

Cluster 2　Electrical, Electronic and Systems Engineering

Required subject (period of registration specified)

Compulsory elective subject (any of these subjects shall be registered)

Free elective subject (any of these subjects shall be registered)

Subject Type				Required No. of credits	Class subjects, etc.	No. of credits	Type of course registration	H□															
												Spring		Fall		Spring		Fall		Spring		Fall	
								1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
Common Subjects	Peace science curse			2		2	Compulsory elective																
	Basic Courses in University Education	Introduction to University Education		2	Introduction to University Education	2	Required																
		Introductory Seminar for First-Year		2	Introductory Seminar for First-Year Students	2	Required																
		Area Courses		4	Courses in Arts and Humanities/Social Sciences	2	Compulsory elective																
				4	Courses in Natural Sciences	2																	
		Foreign Languages	English (Note2 3) Basic English Usage	2	Basic English UsageI	1	Required																
					Basic English UsageII	1																	
			English (Note2 3) Communication	2	CommunicationI	1	Required																
					Communication I	1																	
			English (Note2 3) Communication	2	Communication II	1	Required																
					Communication II	1																	
			Initial Foreign Languages (Select one language from German, French, Spanish, Russian, Chinese, Korean and Arabic)	2	1 subjects from Basic language I	1	Compulsory elective																
					1 subjects from Basic language II	1			○															
		Information and Data Science Courses		2	Introduction to Information and Data Sciencies	2	Required																
		Health and Sports Cou		2		1or2	Compulsory elective																
	Basic Subjects			16	CalculusI	2	Required																
					CalculusII	2																	
					Linear AlgebraI	2																	
					Linear AlgebraII	2																	
					Seminar in Basic Mathematics I	1																	
					Seminar in Basic Mathematics II	1																	
					General Mechanics I	2																	
					General Mechanics II	2																	
					Experimental Methods and Laboratory Work in Physics I Note 4	1																	
					Experimental Methods and Laboratory Work in Physics II Note 4	1																	
	Free elective subjects			6	From all Subject Type Note 5		Free elective																
	No. of credits required for graduation			48																			

Note 2　The credit obtained by mastery of "English-speaking Countries Field Research" or self-directed study of "Online Seminar in English A B" cannot be counted towards the credit necessary for graduation. The credit obtained by Overseas Language Training can be recognized as Communication　or　if application is made in advance. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

Note 3　We have a recognition of credit system for foreign language proficiency tests. For more details, please refer to the article on English in Liberal Arts Education in the student handbook.

Note 4　Students must take both Experimental Methods and Laboratory Work　1credit　and　Experimental Methods and Laboratory Work　1credit　.

Note 5　You should take subjects from fields other than the Natural Science field. Credits that have been obtained by taking Communication Basics can be included in this subject type.

Cluster 2 Basic Specialized Subjects

◎ Required subject
〇Compulsory elective subje
△Free elective subject

[illegible]	[illegible]	[illegible]		[illegible]																[illegible]
		[illegible]	[illegible]	[illegible]				[illegible]				[illegible]				[illegible]				
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◎ Required subject
○Compulsory elective subject
△Free elective subject

Academic Achievements in Electrical　Systems and Information Engineering Program

The Relationship between Evaluation Items and Evaluation Criteria

		Excellent	Very Good	Good
(1)	The ethics and understanding about the relations between society and technology considered basically necessary for engineers.	Sufficiently understand relations between society and technology, and be able to behave with a sufficient sense of ethics.	Understand relations between society and technology at the standard level, and be able to behave with a standard sense of ethics.	Marginally understand relations between society and technology, and be able to behave with a minimum sense of ethics.
(2)	Basic knowledge of mathematics such as calculus and linear algebra, which is required for scientists/engineers.	Acquire and be able to utilize sufficient basic knowledge of mathematics such as calculus and linear algebra.	Acquire and be able to utilize standard basic knowledge of mathema to utilize standard basic	

Relationships between the evaluation items and class subjects

					Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	Weighted values of evaluation items in the	Weighted values of evaluation items	
Liberal Arts Education	Introduction to University Education	2	require	1semsester-1T																										100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	require	1semsester																	50	1	50	1						100
Liberal Arts Education	Peace Science Courses	2	Elective	1semsester-2T																							100	1		100
Liberal Arts Education	Area Courses Courses in Arts and Humanities/Social Sc	4	Elective	1semsester-1T 2semsester-3T																							100	1		100
Liberal Arts Education	Area Courses Courses in Natural Sciences	4	Elective	1semsester-2T 2semsester-4T																							100	1		100
Liberal Arts Education	Basic English UsageI	1	require	1semsester Intensive course																									100	1	100
Liberal Arts Education	Basic English UsageII	1	require	2semsester Intensive course																									100	1	100
Liberal Arts Education	CommunicationI	1	require	1semsester																									100	1	100
Liberal Arts Education	Communication I	1	require	1semsester																									100	1	100
Liberal Arts Education	Communication II	1	require	2semsester																									100	1	100
Liberal Arts Education	Communication II	1	require	2semsester																									100	1	100
Liberal Arts Education	Basic language I	1	Elective	1semsester-1T																							100	1		100
Liberal Arts Education	Basic language II	1	Elective	1semsester-2T																							100	1		100
Liberal Arts Education	Information and Data Science Courses	2	require	1semsester-2T	100	1																								100
Liberal Arts Education	Health and Sports Courses	2	Elective	1 2semsester																							100	1		100
Liberal Arts Education	CalculusI	2	require	1semsester-2T			100	1																						100
Liberal Arts Education	CalculusII	2	require	2semsester-4T			100	1																						100
Liberal Arts Education	Linear AlgebraI	2	require	1semsester-1T			100	1																						100
Liberal Arts Education	Linear AlgebraII	2	require	2semsester-3T			100	1																						100
Liberal Arts Education	Seminar in Basic Mathematics I	1	require	1semsester-2T			100	1																						100
Liberal Arts Education	Seminar in Basic Mathematics II	1	require	2semsester-4T			100	1																						100
Liberal Arts Education	General Mechanics I	2	require	1semsester-1T					100	1																				100
Liberal Arts Education	General Mechanics II	2	require	2semsester-3T					100	1																				100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	2	require	2semsester					100	1																				100
Specialized Education	Introduction to Energy and Information Systems	2	require	2semsester-4T	50	1					50	1																		100
Specialized Education	Applied Mathematics I	2	require	2semsester-3T									100	1																100
Specialized Education	Applied Mathematics II	2	Elective	3semsester-1T									100	1																100
Specialized Education	Applied Mathematics III	2	require	3semsester-2T																										

Curriculum Map of Electrical, Electronic and Systems Engineering

	Academic Achievement	1st grade		2nd grade		3rd grade		4th grade	
	Evaluation Items	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Knowledge /Understanding	(1) The ethics and understanding about the relations between society and technology considered basically necessary for engineers.	(2T)Introduction to Information and Data Sciencies ◎ ×							
			(1T)Introduction to Energy and Information Systems						
	(2) Basic knowledge of mathematics such as calculus and linear algebra, which is required for scientists/engineers.	(2T)CalculusI ◎	(4T)CalculusII						
		(1T)Linear AlgebraI	(3T)Linear AlgebraII						
		(2T)Seminar in Basic Mathematics I	(4T)Seminar in Basic Mathematics II						
	Basic knowledge of theories and experimental methods of physics, which is required for scientists/engineers.	(1T)General Mechanics I	(3T)General Mechanics II						
			Experimental Methods and Laboratory Work in Physics I ( )						
	Comprehensive understanding and knowledge of technologies in electrical, electronics, systems, and information engineering. Also, basic knowledge which is common in these fields.		(3T)Electric Circuit Theory I						
			(1T)Introduction to Energy and Information Systems						
Abilities/Skills	Mathematical methods required for professionals in electrical, electronics, systems, and information engineering.		(3T)Applied Mathematics I	(1T)Applied Mathematics II	(2T)Synthesis of Applied Mathematics	(1T)Engineering Mathematics A			
				(2T)Applied Mathematics III	(4T)Engineering Mathematics C				
				(2T)Discrete Mathematics I					
				(1T)Probability and Statistics					
	Concepts, knowledge and methods which are the basis for studies related to electrical, electronics, systems, and information engineering.			Programming I	Programming II	Programming III			
				(1T)Electromagnetism I	(3T)Electromagnetism II	(1T)Signal Processing Engineering	(3T)Robotics		
				(1T)Exercise of Electromagnetism I	(3T)Exercise of Electromagnetism II	(1T)Social System Engineering	(4T)Decision Making		
				(2T)Introduction to Semiconductor Devices and Circuits	(3T)Electric Transient Phenomena	(2T)Introduction to Semiconductor Devices and Circuits	((3T)Digital Circuit Design)		
				(2T)Circuit Theory II	(4T)Electronic Circuits	(1T)Theory of Computing	((3T)Algorithms and Data Structures)		
				(2T)Control Systems Engineering I	(3T)Electric Transient Phenomena		(4T)Stochastic Modeling		
				(1T)Mathematical Programming	(4T)Control Systems Engineering II				
					(3T)Digital Circuit Design				
	Ability to apply basic concepts, knowledge, and methods of electrical, electronics, systems, and information engineering to concrete/technical problems.								
							(3T)Production Control		
				(2T)Electric and Electronic Measurements	(3T)Exercises in Measurement and Control Engineering		((3T)Digital Circuit Design)		
					(3T)Simulation Engineering		((3T)Algorithms and Data Structures)		
					(3T)Digital Circuit Design		(3T)Artificial Intelligence and Machine Learning		
					(3T)Algorithms and Data Structures		(4T)Computer Network		
					(4T)Fundamentals of Probability Theory		(4T)Stochastic Modeling		
					(4T)Stochastic Modeling		(3T)Human Computer Interaction		
	Ability to solve practical issues and problems by conducting experiments, using numerical computation methods, and collecting			Basic Experiments in Electrical Engineering I	Basic Experiments in Electrical Engineering II	Experiments in Electrical Engineering Electronics and System Engineering I	Experiments in Electrical Engineering Electronics and System Engineering II		
				Programming I	Programming II	Programming III			
	(5)Ability to solve pracitical issues and problems by voluntarily making a plan, revising it, and utilizing basic and technical knowledge and								
Comprehensive Abilities	Creative thinking ability and logical thinking skills to analyze practical problems and tasks, and to lead to rational solutions satisfying social needs, as well as technical development skills to physically realize the solutions.	Introductory Seminar for First-Year Students( )							
		(1T)Introduction to University Education							
	Skills to organize research results and to describe them logically including the significance and the effectiveness of the obtained outcomes as well as to make easy-to-understand oral presentations and discussions.	Introductory Seminar for First-Year Students( )							
		(1T)Introduction to University Education							
	Teamwork, leadership and communication skills in group works.			Basic Experiments in Electrical Engineering I	Basic Experiments in Electrical Engineering II	Experiments in Electrical Engineering Electronics and System Engineering I	Experiments in Electrical Engineering Electronics and System Engineering II		
	Ability to understand that various problems, which humanity, society, and individuals are facing, can be interpreted variously depending on social status, culture and so on, as well as to deal with those problems to solve	(2T)Peace Science Courses							
		(1T)Area Courses(Courses in Arts and Humanities/Social Sc)	(1T)Area Courses(Courses in Arts and Humanities/Social Sc)						
		(2T)Area Courses(Courses in Natural Sciences)	(4T)Area Courses(Courses in Natural Sciences)						
		Health and Sports Courses	Health and Sports Courses						
		Basic language I							
		Basic language II							
	Ability of English conversation, reading and writing skills necessary for research accomplishment.	Basic English UsageI	Basic English UsageII				(4T)Technical English		
		CommunicationI	Communication II						
		Communication I	Communication II						

Liberal Arts Education | Basic Specialized Subjects | Specialized Subjects | Graduation Thesis | Required subject