Appended Form 1

Specifications for Major Program

Name of School (Program) [School of Engineering Cluster 2(Electrical, Electronic and Systems Engineering)]

Program (Japanese)	name	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 :

### 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 produced not only by deepening expert knowledge in a specific area, but by combining expert knowledge from multiple fields. As the impact of such technology on society is getting greater, it is always necessary to keep in mind the relationship between humankind, society, and nature.

On the basis of these social trends, Cluster 2 in the School of Engineering (electricity, electronics, systems, and information) has prepared the following programs with the aim of developing professionals who have a wide range of perspectives and insights, a sense of responsibility, and an ethical outlook, as well as specialized technological, problem-analyzing, and problem-solving abilities.

The Program of Electrical, Systems and Information Engineering

The Program of Electronic Devices and Systems

Except for in exceptional circumstances, students who are enrolled in Cluster 2 in the School of Engineering (Electrical, Electronic and Systems Engineering) can choose one of the above two options for this program at the start of the second year, after going through liberal arts education and specialized education for one year after enrollment.

TheProgram of Electrical,Systems and Information Engineering develops professionals who have acquired a broad basic knowledge and the technical expertise related to electrical and electronic circuits, electric energy, measurement control, system planning management, and information processing required for system construction, as well as the ability to solve complicated problems in a highly informatized society, and to take the lead in future technological innovation on their own initiative.

To that end, this program offers a curriculum in which students can learn, comprehensively and systematically, the specialized subjects related to electricity, systems, and information, from the basics to practical application. In concrete terms, students study mathematics, electric circuits, technical English, programming that is commonly used in all fields related to electricity, systems and information, experimentation, practicum, and introductory nd enable

students to acquire a broad range of knowledge and a wide field of vision. From the second year to the fourth year, students can systematically acquire the knowledge and applied skills required in each field by taking combined

control, system planning management, computing, and mathematical information. Specialized basic subjects and specialized subjects are designed for students to be able to acquire specialization and a broad range of knowledge. Consideration is given to ensuring that students have a degree of freedom in choosing their future career path.

This program has prepared a curriculum through which students can acquire the qualifications below.

If students complete the designated subjects, they are exempted, wholly or in part, from the applicable national examination for the acquisition of these qualifications.

• Type-1 High School Teaching License (Industry) (mastery of teaching related subjects is required)

Technical Radio Operator (partially exempted from taking examination subject)

Chief Telecommunications Engineer( partially exempted from taking examination subject)

- On-the-Ground Services I Category Special Radio Operator
- Maritime Category II Special Radio Operator, and Maritime Category II Special Radio Operator
- Engineer for Architectural Equipment (Qualification of candidacy for an exam is given to those who gain two or

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

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 relaas 05 reW4(ore, )g ( (f)-22(y)18(i).

• The mathematical methodology required by experts in the field of electrical, systems and information (Goal B).

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

the period from the first or second term of the second year through the third year.

adjustments and resolve problems and challenges by using basic and specialized knowledge and methods ( Goal

OComprehensive 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-

fourth year.

• The teamwork, leadership, and communication abilities needed to work in a group ( Goal E ) These are obtained

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

• The ability to read, write, converse, and retrieve information in the English language, necessary for conducting research ( Goal E ) This is ob

### 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), Land-Based Services Category I Special Radio Operator, Maritime Category II Special Radio Operator, and Maritime Category III Special Radio Operator. Besides that, by mastering the predetermined class subjects, students are exempted from the examination subjects of the national exams for electrical chief engineers, chief telecommunications engineers and technical radio operators.

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

At the end of each semester, the evaluation criteria are applied to each evaluation item of academic achievement to

calculated by adding the weighted values to the numerically-converted values of their academic achievements (S = 4, A = 3, B = 2, and C= 1) in each subject being evaluated.

Academic	Evaluation
achievement	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.

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.

#### Cluster 2 (Electrical, Electronic and Systems Engineering)

 $\odot$  Required subject (period of registration specified)

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

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

					Require		N6	Type of	Yea	rin	which	the	subjec	t is t	aker	ı(*Th	e low	er fig	ure n	neans	s sem	ester)	(Not	:e 1)
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	Ba Cours Unive Educ	Int: for	roducto First-Y	ory Seminar Tear	2	Introductory Seminar for First-Year Students	2	Required	$\odot$															
		Arc	a Cour	***	4	Courses in Arts and Humanities/Social Sciences	2	Compuls	$^{\circ}$		$\bigcirc$													
		1110	.a 00u		4	Courses in Natural Sciences	2	elective		0		0												
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cts	Jomm	Fore		tion II	2	Communication IIB	1	Required			$^{\odot}$	0												
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ation 3			German, Russian, and Aral	French, Spanish, Chinese, Korean bic)	2	1 subjects from Basic	1	ory elective																
rts Educe		Infe Scie	ormati ence C	on and Data ourses	2	(Note 4) Elements of Information Literacy or Exercise in Information Literacy	2	Compuls ory elective		0														
eral A		Hea	alth an	d Sports Cou	2		1or2	Compuls ory elective	0	0	0	0												
Libe						CalculusI	2			0														
						CalculusII	2					0												
						Linear AlgebraI	2		$\odot$															
						Linear AlgebraII	2				$\odot$													
		Bas	ic Sub	iects	16	Seminar in Basic Mathematics I	1 Requ	Required	-	0														
					10	Seminar in Basic Mathematics II	1					0												
						General Mechanics I	2		$\odot$															
						General Mechanics II	2				$\odot$												L	
						Experimental Methods and Laboratory Work in Physics I (Note 5)	1				$\odot$												 	
						Experimental Methods and Laboratory Work in Physics II (Note 5)	1					0											 	
	Fre	e ele	ective s	subjects	6	From all Subject Type (Note 6)		Free elective	$\bigtriangleup$	$\triangle$	$\bigtriangleup$	$\triangle$												
	No. of	cre gi	dits aduatio	required for on	48																			

Note 1: When students fail to acquire the credit during the term or semester marked with  $\odot$ ,  $\bigcirc$ ,  $\triangle$  in the boxes for the year in which the course is taken, they can take the course in subsequent terms or semesters. Depending on class subject, courses may be offered in semesters or terms different from those scheduled. Please be sure to check the time schedule for Liberal Arts Education subjects

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 I or II 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 "Elements of Information Literacy" provided in the first semester. You can take the "Exercise in Information Literacy" provided in the second semester only if you fail to obtain credit for "Information Utilization Basics."

Note 5: Students must take both  $\lceil$  Experimental Methods and Laboratory WorkI(1credit)  $\rfloor$  and  $\lceil$  Experimental Methods and Laboratory WorkII(1credit)  $\rfloor$ .

Note 6: 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 ○Compulsory elective subject △Free elective subject

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Applied Mathematics I	2	0	$\bigcirc$			4														
Applied Mathematics II	2	0	$\bigcirc$					4												
Applied Mathematics III	2	$\bigcirc$	$\bigcirc$						4											
Discrete Mathematics I	2	0							4											(School of Informatics and Data Science)
Synthesis of Applied Mathematics	2	0	0							4										
Engineering Mathematics A	2	$\triangle$										4								
Engineering Mathematics C	2	$\triangle$	0								4									
Probability and Statistics	2	0	$\triangle$					4												
Technical English	1	$\bigcirc$	$\bigcirc$											4						
Introduction to Energy and Information Systems	2	0	0				4													
Electric Circuit Theory I	2	0	$\bigcirc$			4														
Programming I	2	$\bigcirc$	$\bigcirc$						4											
Programming II	2	$\bigcirc$	0							4										
Programming III	2	$\triangle$										4								
Basic Experiments in Electrical Engineering I	2	$\bigcirc$	$\bigcirc$					10	10											take classes at one of the terms
Basic Experiments in Electrical Engineering II	2	$\bigcirc$	$\bigcirc$							10	10									take classes at one of the terms
Experiments in Electrical Engineering Electronics and System Engineering I	2	$\bigcirc$	$\bigcirc$									10	10							take classes at one of the terms
Experiments in Electrical Engineering Electronics and System Engineering II	2	$\bigcirc$	$\odot$											10	10					take classes at one of the terms

# **Cluster 2 Specialized Subjects**

(Program of Electrical,Systems and Information Engineering) ◎ Required subject ○Compulsory elective subject △Free elective subject

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Exercise of Electromagnetism I	1	$\triangle$					4												
Exercise of Electromagnetism II	1	$\triangle$							2										
High-voltage Engineering	1	$\triangle$			-								2						
Introduction to Semiconductor Devices and Circuits	2	$\triangle$						(4)				4							
Electric and Electronic Measurements	2	$\triangle$			-						4		-						
Electric Transient Phenomena	2	$\bigcirc$							4										
Circuit Theory II	2	$\bigcirc$						4											
Electronic Circuits	2	$\bigcirc$								4									
Exercise of Electric Circuit	1	$\bigcirc$						2											
Electric Energy Generation and Conversion	2	$\bigcirc$								4									
Fundamentals of Power Systems	2	$\bigcirc$									4								
Power System Engineering	2	$\bigcirc$												4					
Power Electronics and Motor Control Application	2	$\triangle$												4					
Nuclear Engineering	2	$\triangle$												4					
Electronic Appliances	2	$\triangle$														4			
Regulations for Electrical Facilities	1	$\triangle$															2		
Control Systems Engineering I	2	$\bigcirc$						4											
Control Systems Engineering I	2	$\bigcirc$						-		4									
Signal Processing Engineering	2	0			-					-	4		-						
Exercises in Measurement and Control Engineering	1	0							2		-								
Bioelectrical Engineering	2	$\bigcirc$							-			4							
Robotics	2	$\bigcirc$										1	4						
Communication Engineering	2	$\wedge$											т Л						
Regulations Concerning Telecommunication	2	$\wedge$											т		1				
Mathematical Programming	2	$\square$					1								4				
Fundamentals of Drahability Theorem	2	0					4			4									(School of Informatics
Sincelation Engine aning	2	$\odot$							4	4									and Data Science)
Simulation Engineering	1	0			-				4			0	-						
Exercises in Systems Planning and Control	1	0										2		4					
Decision Making	2	$\bigcirc$											4	4					
Production Control	2	$\bigcirc$									_		4						
Social System Engineering	2	$\triangle$							( .)		4								(0.11.01.0
Digital Circuit Design	2	$\triangle$						( .)	(4)				4						(School of Informatics and Data Science)
Software Engineering	2	$\triangle$						(4)				4							(School of Informatics and Data Science)
Artificial Intelligence and Machine Learning	2	$\triangle$				<u> </u>							4						(School of Informatics and Data Science)
Computer Network	2	$\triangle$												4					(School of Informatics and Data Science)
Algorithms and Data Structures	2	$\triangle$							(4)				4						(School of Informatics and Data Science)
Human Computer Interaction	2	$\triangle$											4						(School of Informatics and Data Science)
Theory of Computing	2	$\triangle$									4								(School of Informatics and Data Science)
Stochastic Modeling		$\triangle$								(4)				4					(School of Informatics and Data Science)
Graduation Thesis	5	$\bigcirc$																	
*)Students can register 2nd grade	~~ <sup>(</sup>	bac	ano	4.		•				•		•			-				

\*)Students can register 2nd grade or 3rd grade.

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Liberal Arts Education	Introduction to University Education	2	Reduin	1semsester-1T																			50	1	50	1						$\square$	100
Liberal Arts Education	Peace Science Courses	2	Electiv	e 1semsester-2T	-																		50	1	50				100	1		$\vdash$	100
Liberal Arts Education	Area Courses (Courses in Arts and Humanities/Social Sc)	4	Electiv	e 1semsester-1T, 2semsester-2	вт																								100	1			100
Liberal Arts Education	Area Courses (Courses in Natural Sciences) Basic Epolish Lisagel	4	Electiv	e 1semsester-2T, 2semsester-	IT .																								100	1	100	1	100
Liberal Arts Education	Basic English Usagel	1	Redui	2semsester (Intensive course 2semsester (Intensive course	:)																										100	1	100
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Liberal Arts Education	Basic language I	1	Electiv	e 1semsester-1T	_								-								-								100	1		$\square$	100
Liberal Arts Education	Information Courses	2	Electiv	e 1semsester-2T	100	1																							100				100
Liberal Arts Education	Health and Sports Courses	2	Electiv	e 1•2semsester																									100	1			100
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Liberal Arts Education	Seminar in Basic Mathematics I Seminar in Basic Mathematics II	1	Requir	2semsester-4T	+		100	1											-														100
Liberal Arts Education	General Mechanics I	2	Reduin	e 1semsester-1T					100	1																							100
Liberal Arts Education	General Mechanics II	2	Requir	2semsester-3T	_		-		100	1							-						-		-							$\square$	100
Specialized Education	Experimental Methods and Laboratory Work in Physics I • II Introduction to Energy and Information Systems	2	Regun	2semsester 2semsester-4T	50	1			100		50	1																				$\vdash$	100
Specialized Education	Applied Mathematics I	2	Requir	2semsester-3T									100	1																			100
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Specialized Education	Discrete Mathematics I	2	Electiv	e 3semsester-2T									100	1																			100
Specialized Education	Synthesis of Applied Mathematics	2	Electiv	e 4semsester-3T									100	1																			100
Specialized Education	Engineering Mathematics A Engineering Mathematics C	2	Electiv	e 5semsester-11 e 4semsester-4T	-								100	1																		$\vdash$	100
Specialized Education	Probability and Statistics	2	Requir	asemsester-1T									100	1																			100
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Specialized Education	Programming III Basic Experiments in Electrical Engineering I	2	Electiv	e 5semsester-1T 3semsester	-								-		50	1			50	1							50	1				$\vdash$	100
Specialized Education	Basic Experiments in Electrical Engineering II	2	Regun	4semsester															50	1							50	1					100
Specialized Education	Experiments in Electrical Engineering Electronics and System Engineering I	2	Requir	5semsester	_														50	1							50	1				$\square$	100
Specialized Education	Electromagnetism I	2	Electiv	e 3semsester-1T	-										100	1			50								50					$\vdash$	100
Specialized Education	Electromagnetism II	2	Electiv	e 4semsester-3T											50	1	50	1															100
Specialized Education	Exercise of Electromagnetism I	1	Electiv	e 3semsester-1T											50	1	50	1														$\vdash$	100
Specialized Education	High-voltage Engineering	1	Electiv	e 6semsester-3T											50		100	1															100
Specialized Education	Devices and Circuits	2	Electiv	e 3semsester-2T, (5semsester-2	T)										100	1	100																100
Specialized Education	Electric and Electronic Measurements Electric Transient Phenomena	2	Electiv	e 3semsester-21 e 4semsester-3T	-										50	1	50	1													-		100
Specialized Education	Circuit Theory II	2	Requir	3semsester-2T											50	1	50	1															100
Specialized Education	Electronic Circuits	2	Reduir	4semsester-4T	_								-		50	1	50	1			-											$\square$	100
Specialized Education	Electric Energy Generation and Conversion	2	Electiv	e 4semsester-4T													100	1															100
Specialized Education	Fundamentals of Power Systems	2	Electiv	e 5semsester-1T													100	1															100
Specialized Education	Power System Engineering Power Electronics and Motor Control Application	2	Electiv	e 6semsester-4T e 6semsester-3T	+		-		-								100	1															100
Specialized Education	Nuclear Engineering	2	Electiv	e 6semsester-3T									L				100	1			L												100
Specialized Education	Electronic Appliances	2	Electiv	e 7semsester-2T	+			-			_		<u> </u>	-			100	1	-				_	-		-	_	-	_		┣—		100
specialized Education	Control Systems Engineering I	2	Requir	<ul> <li>asemsester-31</li> <li>3semsester-2T</li> </ul>	-		-		-				-		50	1	50	1	-		-		-		-						<u> </u>		100
Specialized Education	Control Systems Engineering II	2	Electiv	e 4semsester-4T											50	1	50	1															100
Specialized Education	Signal Processing Engineering	2	Reduir	5semsester-1T	_								-		50	1	50	1			-											$\square$	100
Specialized Education	Bioelectrical Engineering	2	Electiv	e 5semsester-2T													100	1															100
Specialized Education	Robotics	2	Electiv	e 6semsester-3T											100	1																	100
Specialized Education	Communication Engineering Regulations Concerning Telecommunication	2	Electiv	e 7semsester.1T	:)		-		-								100	1															100
Specialized Education	Mathematical Programming	2	Require	3semsester-1T											50	1	50	1															100
Specialized Education	Fundamentals of Probability Theory	2	Require	4 4semsester-4T	+						<u> </u>				50	1	50	1									<u> </u>		<u> </u>		<u> </u>	ГЦ	100
Specialized Education	Exercises in Systems Planning and Control	1	Requir	5semsester-2T	+						-						100	1			-						-		-		<u> </u>		100
Specialized Education	Decision Making	2	Electiv	e 6semsester-4T											100	1																	100
Specialized Education	Production Control	2	Electiv	e 6semsester-3T	+								-		100	1	100	1	-		-										──		100
Specialized Education	Digital Circuit Design	2	Electiv	e 4semsester-3T, (6semsester-3	T)		-	-	-				-	-	50	1	50	1	1		-		-	-	-								100
Specialized Education	Software Engineering	2	Electiv	e (3semsester-2T), 5semsester-2	т												100	1															100
specialized Education	Computer Network	2	Electiv	e 6semsester-3T e 6semsester-4T	+												100	1	-														100
Specialized Education	Algorithms and Data Structures	2	Electiv	e 4semsester-3T, (6semsester-3	T)										50	1	50	1															100
Specialized Education	Human Computer Interaction	2	Electiv	e 6semsester-3T	_		-		-						50	1	100	1			-		-		-								100
Specialized Education	Stochastic Modeling	2	Electiv	e DSetHSeSter-11 e (4semsester-4T), ésemsester-4	т		-		-				-		50	1	50	1	-		-		-		-						<u> </u>		100
Specialized Education	Graduation Thesis	5	Requir	7 • 8semsester			1		1			1			1						25	1	25	1	25	1					25	1	100

Curriculum Map of Electrical, Electronic and Systems Engineering

