

# For entrants in AY 2021

Appended Form 1

## Specifications for Major Program

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

Program name (Japanese)	
(English)	Program of Electrical, Systems and Information Engineering

1 Academic degree to be acquired: Bachelor's degree in engineering

2. Overview

(1)

Systems and Information Engineering  
Services 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.

The Program 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 subjects such as "specialized basic subjects". These are studied mainly in the first and second years, and 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 "specialized subjects" classified into the six fields of physical engineering, electric circuits and energy, measurement

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)

Electrical Chief Engineer (some years' work experience after graduation is required)

Engineer for Architectural Equipment (Qualification of candidacy for an exam is given to those who gain two or more years' experience after graduation.)

### 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

The English-based Bachelor’s Degree programs begin in the first semester of the first year. Enrollment in Program of Electrical, Systems and Information Engineering occurs in 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),—



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 on 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

Position on giving feedback to students and how it is approached

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-examination are given on the website.





		1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Electromagnetism I	2				4													
Electromagnetism II	2							4										
Exercise of Electromagnetism I	1				4													
Exercise of Electromagnetism II	1							2										
High-voltage Engineering	1																2	
Introduction to Semiconductor Devices and Circuits	2						(4)						4					
Electric and Electronic Measurements	2												4					
Electric Transient Phenomena	2								4									
Circuit Theory II	2						4											
Electronic Circuits	2												4					
Exercise of Electric Circuit	1							2										
Electric Energy Generation and Conversion	2												4					
Fundamentals of Power Systems	2												4					
Power System Engineering	2																	4
Power Electronics and Motor Control Application	2																	4
Nuclear Engineering	2																	4
Electronic Appliances	2																	4
Regulations for Electrical Facilities	1																	2
Control Systems Engineering I	2							4										
Control Systems Engineering II	2												4					
Signal Processing Engineering	2																	4
Exercises in Measurement and Control Engineering	1												2					
Bioelectrical Engineering	2																	4
Robotics	2																	4
Communication Engineering	2																	4



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 mathematics such as calculus and linear algebra.	



