For entrants in AY 2023

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 Electronic Devices and Systems

1.Academic Degree to be Acquired　Bachelor's degree in engineering

2. Overview

(1) Overview of "English-based Bachelor's Degree Program"

This program aims to foster and produce future members of a global society who have the knowledge to be innovative, creative, take leadership, and possess language abilities that will help them play an important role in the international world.

This program focuses specifically on producing individuals who are capable of addressing various global issues from an engineering perspective and contribute to the creation of new and valuable solutions that are significant to both the industrial and academic societies.

Students enrolled in the program will begin the curriculum from the first semester of their first year.
In the second year, students will set off on their major programs and take the designated courses which are offered at each cluster. Major program overview is as (2).

(2) Program overview of "Program of Electronic Devices and Systems".

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 innovative technology, 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 (Electrical, Electronic and Systems Engineering) 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 Electronic Devices and Systems

The Program of Electrical Systems and Information Engineering

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

In the Program of Electronic Devices and Systems, students study electronic engineering centering on semiconductor devices such as integrated circuits.

Semiconductor device technology is one of the central technologies that supports modern society, in which computerization and informatization have been advancing. Today we use a number of devices and types of equipment in daily life and at work, such as audio and video equipment (TVs, video players, etc.) information processing and communication equipment (computers, the internet, mobile phones, etc.), transportation equipment (automobiles), electric home appliances (cooking devices, etc.), medical equipment, manufacturing equipment used in factories, etc., most of which is capable of complicated processing through simple operations using semiconductor devices. In medical and nursing care equipment, and in robots working at disaster sites, which are expected to become increasingly important in the years to come, operability that can achieve complex movement is more necessary than ever. Therefore, the ability to detect the situation using high performance and high functioning sensors, together with complex information processing using integrated circuits, is indispensable. Furthermore, the

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	Year in which these subjects are to be taken															
											Fall		Spring		Fall		Spring				Spring		Fall	
									1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
Liberal Arts Education 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																
		Advanced Seminar			0		1	Free elective																
	Common Subjects	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																	
				Communication	2	CommunicationI	1	Required																
						Communication I	1																	
				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																			

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 Foreign Language 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 the Area courses in Natural Sciences and Basic subjects.

Cluster 2 Basic Specialized Subjects

Required subject
Compulsory elective subje
Free elective subject

Class Subjects	Credits	Type of course registration		Class Hours/Week																Note
		Electrical, Systems and Information Engineering	Electronic Devices and Systems	1st grade				2nd grade				3rd grade				4th grade				
				Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		
				1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
Applied Mathematics I	2					4														
Applied Mathematics II	2	○						4												
Applied Mathematics III	2								4											
Discrete Mathematics I	2	○							4											(School of Informatics and Data Science)
Synthesis of Applied Mathematics	2	○	○							4										
Engineering Mathematics A	2											4								
Engineering Mathematics C	2		○								4									
Probability and Statistics	2							4												
Technical English	1													4						
Introduction to Energy and Information Systems	2						4													
Electric Circuit Theory I	2					4														
Programming I	2								4											
Programming II	2									4										
Programming III	2											4								
Basic Experiments in Electrical Engineering I	2							5	5											
Basic Experiments in Electrical Engineering II	2									5	5									
Experiments in Electrical Engineering Electronics and System Engineering I	2											5	5							
Experiments in Electrical Engineering Electronics and System Engineering II	2													5	5					

Cluster 2 Specialized Subjects

Program of Electronic Devices and Systems

Required subject
Compulsory elective subject
Free elective subject

Class Subjects	Credits	Type of course	Class Hours/Week																Note
			1st grade				2nd grade				3rd grade				4th grade				
			Spring		Fall		Spring		Fall		Spring		Fall		Spring		Fall		
			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										
Electromagnetic Wave Propagation	2											4							
Introduction to Physical Electronics	2							4											
Quantum Mechanics	2									4									
Thermodynamics and Statistical Mechanics	2											4							
Solid State Physics	2										4								
Surface Science and Nanotechnology	2													4					
Introduction to Semiconductor Devices and Circuits	2							4											
Solid State Physics	2									4									
Semiconductor Device Engineering	2											4							
Optoelectronic Semiconductor Devices	2												4						
[redacted]c Material Engineering	2													4					
[redacted]d Electronic Measurements	2										4								
[redacted]Transient Phenomena	2								4										
[redacted]stem Design	2						4												
[redacted]ogic Circuit Design	2											4							
Semiconductor Process Engineering	2												4						
CMOS Integrated Design	2													4					
Circuit Theory II	2							4											
Electronic Circuits	2									4									
Electric Energy Generation and Conversion	2									4									
Fundamentals of Power Systems	2										4								
Control Systems Engineering I	2							4											
Control Systems Engineering II	2									4									
Signal Processing Engineering	2											4							
Bioelectrical Engineering	2											4							
Robotics	2												4						
Communication Engineering	2											4							
Digital Circuit Design	2								4										(School of Informatics and Data Science)
Mechanism how programs run on computers	2									4									(School of Informatics and Data Science)
Databases	2									4									(School of Informatics and Data Science)
Computer Network	2													4					(School of Informatics and Data Science)
Algorithms and Data Structures	2								4										(School of Informatics and Data Science)
Human Computer Interaction	2												4						(School of Informatics and Data Science)
Graduation Thesis	5																		

[redacted]

Academic Achievements			Evaluation Criteria		
Evaluation Items					
Knowledge/Understanding					
Abilities/Skills					

Liberal Arts Education in this program assumes the role of establishing the academic foundation on which the specialized education for Cluster 2 in the School of Engineering is built. It fosters a willing, self-reliant attitude and cultivates scientific thinking based on data gathering ability, analytical ability, and critical thinking ability. It establishes an outlook that makes it possible to provide insight on the inner nature of things and their background from a broad perspective, and enhances linguistic ability to a level appropriate for living as a world citizen, and also strengthens interest in peace and the ability integrates a broad range of knowledge into a body of knowledge that will be truly useful in solving problems. It cultivates the ability to explore and promote cross-disciplinary and comprehensive research that goes beyond the established frameworks.

Relationships between the evaluation items and class subjects

Subject type	Class subjects	credits	Period	Evaluation items																												Total weighted values of evaluation items in the subject
				Knowledge/Understanding								Abilities/Skills										Comprehensive Abilities										
				(1)		(2)		(3)		(4)		(1)		(2)		(3)		(4)		(5)		(1)		(2)		(3)		(4)		(5)		
				Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	**Weighted values of evaluation items** in the subject										Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Liberal Arts Education	Introduction to University Education	2	1semester	50	1																							50	1			100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	1semester																			50	1	50	1							100
Liberal Arts Education	Peace Science Courses	2	1semester																									100	1			100
Liberal Arts Education	Area Courses	8	1semester																									100	1			100
Liberal Arts Education	Basic English Usage I	1	1semester																											100	1	100
Liberal Arts Education	Basic English Usage II	1	2semester																											100	1	100
Liberal Arts Education	Communication I	1	1semester																											100	1	100
Liberal Arts Education	Communication I	1	1semester																											100	1	100
Liberal Arts Education	Communication II	1	2semester																											100	1	100
Liberal Arts Education	Communication II	1	2semester																											100	1	100
Liberal Arts Education	Basic language I	1	1semester																									100	1			100
Liberal Arts Education	Basic language II	1	1semester																									100	1			100
Liberal Arts Education	Introduction to Information and Data Sciences	2	1semester	100	1																											100
Liberal Arts Education	Health and Sports Courses	2	1semester																									100	1			100
Liberal Arts Education	Calculus I	2	1semester			100	1																									100
Liberal Arts Education	Calculus II	2	2semester			100	1																									100
Liberal Arts Education	Linear Algebra I	2	1semester			100	1																									100
Liberal Arts Education	Linear Algebra II	2	2semester			100	1																									100
Liberal Arts Education	Seminar in Basic Mathematics I	1	1semester			100	1																									100
Liberal Arts Education	Seminar in Basic Mathematics II	1	2semester			100	1																									100
Liberal Arts Education	General Mechanics I	2	1semester					100	1																							100
Liberal Arts Education	General Mechanics II	2	2semester					100	1																							100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	2	2semester					100	1																							100
Specialized Education	Applied Mathematics I	2	2semester									100	1																			100
Specialized Education	Applied Mathematics II	2	3semester									100	1																			100
Specialized Education	Applied Mathematics III	2	3semester									100	1																			100
Specialized Education	Synthesis of Applied Mathematics	2	3semester									100	1																			100
Specialized Education	Engineering Mathematics C	2	4semester									100	1																			100
Specialized Education	Probability and Statistics	2	3semester									100	1																			100
Specialized Education	Technical English	1	1semester																											100	1	100
Specialized Education	Introduction to Energy and Information Systems	2	2semester	50	1					50	1																					100
Specialized Education	Electric Circuit Theory I	2	2semester							100	1																					100
Specialized Education	Programming I	2	1semester											50	1			50	1													100
Specialized Education	Programming II	2	4semester											50	1			50	1													100
Specialized Education	Basic Experiments in Electrical Engineering I	2	3semester															50	1							50	1					100
Specialized Education	Basic Experiments in Electrical Engineering II	2	4semester															50	1							50	1					100
Specialized Education	Experiments in Electrical Engineering Electronics and System Engineering I	2	5semester															50	1							50	1					100
Specialized Education	Experiments in Electrical Engineering Electronics and System Engineering II	2	6semester															50	1							50	1					100
Specialized Education	Electromagnetism I	2	3semester											100	1																	100
Specialized Education	Electromagnetism II	2	4semester											50	1	50	1															100
Specialized Education	Exercise of Electromagnetism I	1	3semester											50	1	50	1															100
Specialized Education	Exercise of Electromagnetism II	1	4semester											50	1	50	1															100
Specialized Education	Electromagnetic Wave Propagation	2	5semester													100	1															100
Specialized Education	Introduction to Physical Electronics	2	3semester											100	1																	100
Specialized Education	Quantum Mechanics	2	4semester											100	1																	100
Specialized Education	Thermodynamics and Statistical Mechanics	2	5semester											100	1																	100
Specialized Education	Solid State Physics	2	5semester											100	1																	100
Specialized Education	Surface Science and Nanotechnology	2	4semester													100	1															100
Specialized Education	Introduction to Semiconductor Devices and Circuits	2	3semester											100	1																	100
Specialized Education	Solid State Physics	2	4semester											100	1																	100
Specialized Education	Semiconductor Device Engineering	2	5semester													100	1															100
Specialized Education	Optoelectronic Semiconductor Devices	2	6semester													100	1															100
Specialized Education	Electronic Material Engineering	2	6semester													100	1															100
Specialized Education	Electric and Electronic Measurements	2	5semester													100	1															100
Specialized Education	Electric Transient Phenomena	2	4semester											50	1	50	1															100
Specialized Education	Logic System Design	2	3semester											50	1	50	1															100
Specialized Education	CMOS Logic Circuit Design	2	5semester													100	1															100
Specialized Education	Semiconductor Process Engineering	2	6semester													100	1															100
Specialized Education	CMOS Integrated Design	2	6semester													100	1															100
Specialized Education	Circuit Theory II	2	3semester											50	1	50	1															100
Specialized Education	Electronic Circuits	2	4semester											50	1	50	1															100
Specialized Education	Electric Energy Generation and Conversion	2	4semester													100	1															100
Specialized Education	Fundamentals of Power Systems	2	5semester													100	1															100
Specialized Education	Control Systems Engineering I	2	5semester											50	1	50	1															100
Specialized Education	Control Systems Engineering II	2	6semester											50	1	50	1															100
Specialized Education	Signal Processing Engineering	2	5semester											50	1	50	1															100
Specialized Education	Bioelectrical Engineering	2	5semester													100	1															100
Specialized Education	Robotics	2	6semester											100	1																	100
Specialized Education	Communication Engineering	2	6semester													100	1															100
Specialized Education	Digital Circuit Design	2	4semester											50	1	50	1															100
Specialized Education	Mechanism how programs run on computers	2	4semester													100	1															100
Specialized Education	Databases	2	4semester													100	1															100
Specialized Education	Computer Network	2	5semester													100	1															100
Specialized Education	Algorithms and Data Structures	2	4semester											50	1	50	1															100
Specialized Education	Human Computer Interaction	2	6semester													100	1															100
Specialized Education	Graduation Thesis	5	7 - 8semester																	25	1	25	1	25	1					25	1	100

Sheet

Curriculum Map of Electronic Devices and Systems