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	化学プログラム

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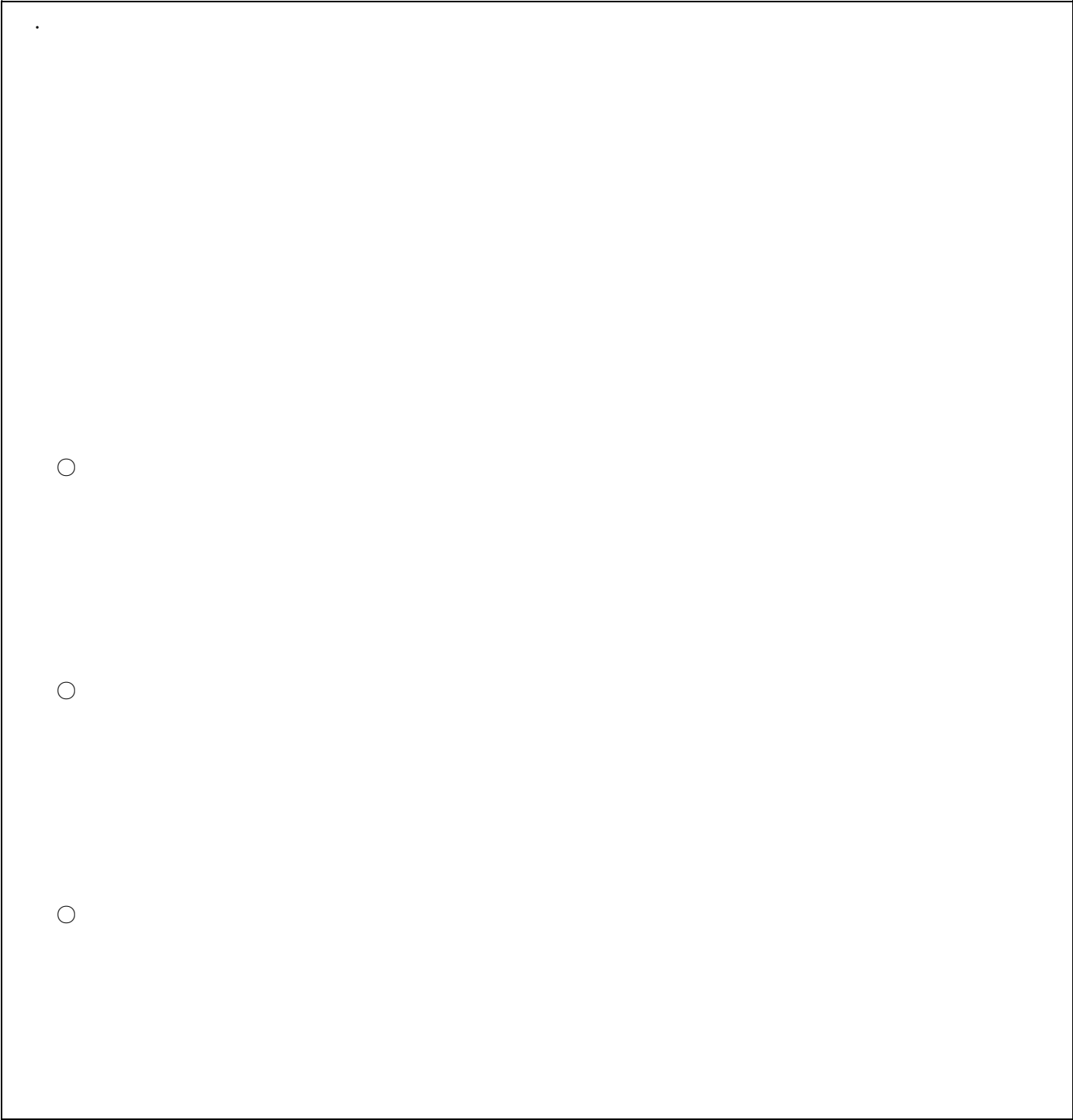
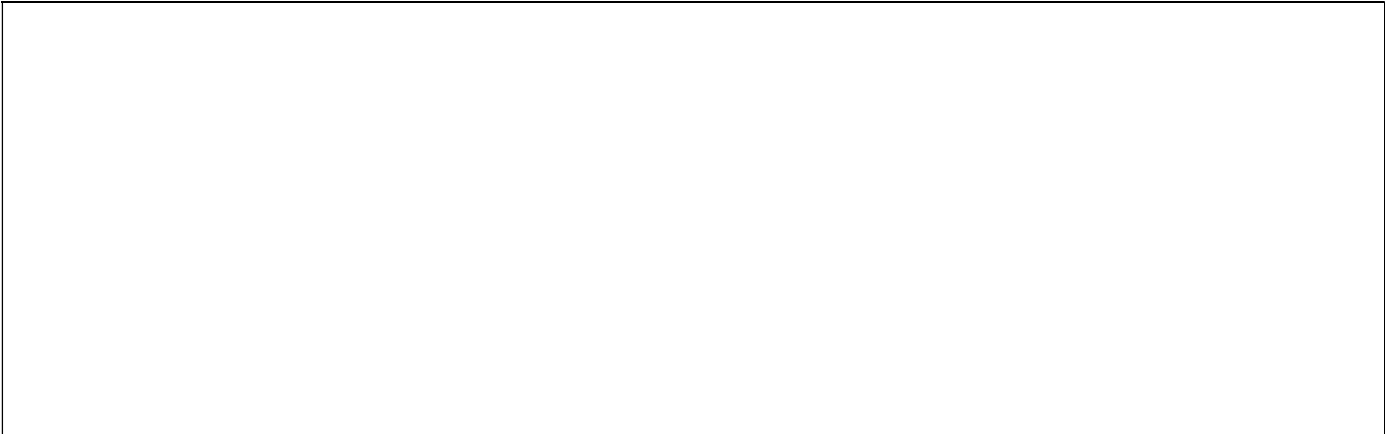


Table of Registration Standards for Chemistry Program(Entrants of 2022)

Refer to Study Guidance for the Chemistry Program for requirements for attending the course.

Students are allowed to take class subjects provided in other programs and schools, and in other universities, in addition to the class subjects listed in this table, and the credit for those subjects that the faculty committee of the Chemistry Program certifies is accepted as the required credit for graduation.

* Students who have earned required credits (refer to the Student Handbook for the details) can acquire the type 1 license for junior high school teachers (science), the type 1 license for senior high school teachers (science), the poisonous and deleterious substances business operator license, and the curator license.

In addition to this, students who graduate from this program acquire eligibility for the examination for Class A hazardous materials engineer.

(Liberal Arts Education)

Type	Subject type		Required No. of credits	Class subjects, etc.		No. of credits	Type of course registration	Year in which the subject is taken (*The lower figure means semester)(Note 1)											
								1st grade		2nd grade		3rd grade		4th grade					
								Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall				
								1	2	3	4	5	6	7	8				
Liberal Arts Education Subjects	Basic Courses in University	Peace Science Courses		2	From "Peace Science Courses"	Each 2	Elective/required	○											
		Introduction to University Education		2	Introduction to University Education	2	Required	②											
		Introductory Seminar for First-Year Students		2	Introductory Seminar for First-Year Students	2	Required	②											
	Common Subjects	Area Courses		8	From "Area Courses" (Note 2)	1 or 2	Elective/required	○	○	○	○								
		Foreign Languages English (Note 3)	Basic English Usage	2	Basic English Usage I	1	Required	①											
					Basic English Usage II	1			①										
			Communication I	2	Communication IA	1	Required	①											
					Communication IB	1		①											
			Communication II	2	Communication IIA	1	Required		①										
					Communication IIB	1			①										
			Non-English Foreign Languages (Select one language from German, French, Spanish, Russian, Chinese and Korean)	4	Foreign Languages: Basic Studies I	1	Elective/required	○											
					Foreign Languages: Basic Studies II	1		○											
					Foreign Languages: Basic Studies III	1			○										
					Foreign Languages: Basic Studies IV	1			○										
		I, II, III and IV must be the same language																	
		Information and Data Science Courses			4	2		Introduction to Information and Data Sciences	2	Required	②								
				2		Ground zero programming Fundamental Date Science	2 2	Elective/required		○ ○									
		Health and Sports Courses (Note 4)		(0)	From "Health and Sports Courses"	1 or 2	Free elective	○	○										
		Social Cooperation Courses (Note 5)		(0)	From "Social Cooperation Courses"	1 or 2	Free elective	○	○										
		Foundation Courses		14	12	Calculus I	2	Required	②										
						Calculus II	2			②									
						Linear Algebra I	2		②										
						Linear Algebra II	2			②									
						Experimental Methods and Laboratory Work in Physics I	1			①									
						Experimental Methods and Laboratory Work in Physics II	1			①									
						Experimental Methods and Laboratory Work in Chemistry I	1					①							
	Experimental Methods and Laboratory Work in Chemistry II					1					①								
	2				Experimental Methods and Laboratory Work in Biology I	1	Elective/required	○											
					Experimental Methods and Laboratory Work in Biology II	1		○											
					Experimental Methods and Laboratory Work in Earth Sciences I	1				○									
					Experimental Methods and Laboratory Work in Earth Sciences II	1				○									
	I and II of the same subject (2 credits) from the 4 subjects above																		
	Total(Liberal Arts Education Subjects)		42																

(Note 1) The indicated semester represents that in which students typically take the subject. It is permitted to take the subject in the same (first or second) semester in the following year, however, it is required to confirm the details in syllabus for that academic year, because the subject might be provided in a different semester or term.

(Note 2) It is required to earn 4 credits in "Human & Social Science Subjects" and 4 credits in "Natural Science Subjects". Students who want to acquire an educational personnel certification must take the subject "Japanese Constitution" in the "Human & Social Science Subjects".

Credits earned through the subject "Advanced English for Communication", "Foreign Languages: Intensive Studies" and "Overseas Language Seminar (German, French, Spanish, Russian, Chinese, and Korean)" in "Foreign Languages" are accepted as the credits required for "Human & Social Science Subjects".

(Note 3) The credit for "Field Research in the English-speaking World" that is earned through such activities as a short-term study abroad, and that for "Online English Seminar A" and "Online English Seminar B", that is earned through self-study, are accepted as the credit for the subject "Communication I and II".

Achievement in a foreign language skill test might also be accepted as credit. For the details, refer to the description of English subjects in Liberal Arts Education and the item "Credit based on Achievement in Foreign Language Skill Tests" in the Student Handbook.

* Note for the "Specialized Education Subjects" listed in the next page and after

(Note 6) To achieve the 43 credits required for the "Specialized Subjects", it is required to earn 8 or more credits for elective required subjects and free elective subjects, as well as 18 credits for required subjects and 17 credits for elective required subjects.

(Note 7) "Special Lectures in Chemistry" shall be offered intensively in a certain period (in or after the fifth semester). For taking the subject, refer to the Study Guidance for the Chemistry Program.

(Note 8) This includes the subjects that the faculty committee of Chemistry Program accept. cepted as the required credit for graduation. For the details of educational personnel certification, refer to the list of required credits in "Acquisition of Educational Personnel Certification" in the Student Handbook.

• Any credit for subjects only related to educational personnel certification

• Credits for "Experiments in General Physics A", "Laboratory Work in Biology A", "Experiments in General Geology A", and "Experiments in Chemistry A"

• "Basic Specialized Subjects" and "Specialized Subjects" provided in other programs in other schools (except those admitted by the faculty committee of Chemistry Program)

Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
1	2	3	4	5	6	7	8

Academic achievements of Chemistry Program

Relationships between the evaluation items and evaluation criteria

Academic achievements		Evaluation criteria		
Evaluation items		Excellent	Very Good	Good
Knowledge and Understanding	(1) To thoroughly understand and learn knowledge of physical chemistry, inorganic chemistry and organic chemistry.	Being able to fully understand basic information on chemistry and make it bases to understand advanced contents.	Being able to fully understand basic information on chemistry.	Being able to understand basic information on chemistry.
	(2)	Being able to fully understand chemical expertise and make it bases to conduct the latest research.	Being able to fully understand chemical expertise.	Being able to understand chemical expertise.
	(3)	To understand the basics of physical science perfectly; also, to make the knowledge a foundation for learning cutting-edge information.	To be able to understand the basics of physical science perfectly.	To be able to understand the basics of physical science.
	(4)	By understanding problems that human and society are facing from multiple viewpoints, to consider specific solutions and express one's idea	To be able to understand problems that human and society are facing from multiple perspectives.	To be able to understand problems that human and society are facing from multiple perspectives.
	(5)	Being able to fully understand the construction and development process of each studying and explain the relationship between the necessity and modern learning.	Being able to fully understand the construction and development process of each studying.	Being able to understand the construction and development process of each studying.
	(6) To learn skills to explain certain academic and comprehensive topics from various perspectives.	Being able to fully understand interdisciplinary and general topics on chemistry and other areas and explain them.	Being able to fully understand interdisciplinary and general topics on chemistry and other areas.	Being able to understand interdisciplinary and general topics on chemistry and other areas.
Attitudes and Values	(1) To acquire ability to apply chemical knowledge, witch is already acquired, into chemical issues.	To be able to apply chemical knowledge, which is already acquired, into chemical problems, and solve them.	To be able to apply learned chemical basic knowledge into chemical problems.	To be able to understand relations between basic chemical knowledge, which is already acquired, and chemical issues.
	(2) To learn basic knowledge, skills, and attitudes related to information, also to acquire skills to process, output and input information appropriately.	Being able to fully understand information on closely related to chemistry and appropriately deal, send and receive them.	Being able to understand information on closely related to chemistry and deal, send and receive them.	Being able to use chemistry related information.
	(3) To acquire the ability to explain the importance of fitness and health promotion from scientific perspectives.	To appropriately understand explain relations among human body, health and science.	To appropriately understand relations among human body, health and science.	To understand explain relations among human body, health and science.
	(4) To obtain skills to conduct experiments based on basic knowledge, which is learned.	Based on basic knowledge of natural science, to be able to handle experiments in accordance with appropriate steps, also to understand the results deeply.	Based on basic knowledge about natural science, to be able to conduce research and understand research results.	Based on acquired basic knowledge about natural science, to be able to conduct research.

Academic achievements			Evaluation criteria		
Evaluation items			Excellent	Very Good	Good
Comprehensive Abilities	(1)	Acquiring the ability of research planning.	Being able to completely understand the current research issues and consider the ways of solution and specific measures by themselves.	Being able to completely understand the current research issues and consider the ways of solution.	Being able to understand the research plan made by research instructors.
	(2)	Acquiring the ability of research exercising・analyzing.	Being able to carry out research, treat appropriately the results and appropriately interpret and understand them.	Being able to carry out research, treat appropriately the results and understand them.	Being able to carry out research, treat appropriately the results.
	(3)	Acquiring communication ability	To be able to have discussions with researchers based in Japan about research contents. Also, to be able to improve research based on the discussions.	To be able to have discussions about research contents with researchers based in Japan	To be able to understand research conducted by researchers based in Japan
	(4)	Personal capability	Being able to tackle with research voluntarily, solve the issues by themselves with patient efforts and proceed it.	Being able to tackle with research voluntarily and proceed it.	To accomplish one's own research.
	(5)	Acquiring communication ability using foreign languages.	Being able to freely make communication in foreign languages with foreigners and make discussion on various issues.	Being able to make communication in foreign languages with foreigners.	Being able to collect foreign information using foreign languages.

Placement of Liberal Arts Education in the Major Program

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Relationships between the evaluation items and class subjects

[illegible]

[illegible]

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																								Total weighted values of evaluation items in						
					Knowledge and Understanding												Abilities and Skills																		
					(1)		(2)		(3)		(4)		(5)		(6)		(1)		(2)		(3)		(4)		(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	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	
Specialized Education	Radiochemistry	2	Elective/required	6			100	1																										100	
Specialized Education	Biological Chemistry	2	Elective/required	6			100	1																										100	
Specialized Education	Bioinformatics	2	Elective/required	6			100	1																										100	
Specialized Education	Practical Computational Chemistry	2	Elective/required	6														100	1															100	
Specialized Education	Exercises in Chemistry	1	Elective/required	7														100	1															100	
Specialized Education	Chemistry Internship	1	Elective/required	5																					100	1								100	
Specialized Education	Chemical Experiments I	5	Required	5																					100	1								100	
Specialized Education	Chemical Experiments II	5	Required	6																						100	1							100	
Specialized Education	Special Study for Graduation	Each 4	Required	7-8																						25	1	25	1	25	1	25	1		100

Curriculum Map of Chemistry

Academic achievements Evaluation items	1st grade		2nd grade					
	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
<p>•(1)To thoroughly understand and learn knowledge of physical chemistry, inorganic chemistry and organic chemistry.</p> <p>•(3)Understanding and acquiring logical frameworks and structure of basic studying and knowledge and skills no s based on basic knowledge, which is learned.</p>	Calculus I(◎)	Calculus II(◎)	Physical Chemistry IA(◎)	Physical Chemistry IIA(◎)	English Seminar on Chemistry(◎)	English Seminar on Chemistry(◎)		
	Linear Algebra I(◎)	Linear Algebra II(◎)	Physical Chemistry IB(◎)	Physical Chemistry IIB(◎)				
	Introduction to Mathematics(O)	Introduction to Information Mathematics(O)	Inorganic Chemistry I(◎)	Inorganic Chemistry III(◎)				
	Introduction to Physics A(O)	Introduction to Physics B(O)	Inorganic Chemistry II(◎)	Organic Chemistry III(◎)				
	Introduction to Biological Sciences A(O)	Introduction to Biological Sciences B(O)	Organic Chemistry I(◎)					
	Introduction to Earth and Planetary Sciences A(O)	Introduction to Earth and Planetary Sciences B(O)	Organic Chemistry II(◎)					
	Basic Chemistry A(◎)	Basic Physical Chemistry A(◎)						
	Basic Chemistry B(◎)	Basic Physical Chemistry B(◎)						
		Fundamental Inorganic Chemistry(◎)						
		Fundamental Organic Chemistry(◎)						
<p>(4)To learn abilities to express oneself by considering problems that human and society are facing from multiple perspectives.</p> <p>(5)Getting ability to explain the process of construction and development in each academic discipline.</p> <p>(1)To acquire ability to apply chemical knowledge, witch is already acquired, into chemical issues.</p> <p>(2)To learn basic knowledge, skills, and attitudes related to information, also to acquire skills to process, output and input information appropriately.</p> <p>(3)To acquire the ability to explain the importance of fitness and health promotion from scientific perspectives.</p>	Peace Science Courses(O)	Social Cooperation Courses(Δ)						
	Social Cooperation Courses(Δ)							
	Area Courses(O)	Area Courses(O)	Area Courses(O)	Area Courses(O)				
<p>Experimental Methods and Laboratory Work in Biology I(O)</p> <p>Experimental Methods and Laboratory Work in Biology II(O)</p>	Introduction to Information and Data Sciences(O)	Ground zero programming(O)						
		Fundamental Date Science(O)						
	Health and Sports Courses(Δ)	Health and Sports Courses(Δ)						
<p>Experimental Methods and Laboratory Work in Chemistry I(◎)</p> <p>Experimental Methods and Laboratory Work in Chemistry II(◎)</p>	Experimental Methods and Laboratory Work in Physics I(◎)	Experimental Methods and Laboratory Work in Physics II(◎)	Experimental Methods and Laboratory Work in Earth Sciences I(O)	Experimental Methods and Laboratory Work in Chemistry I(◎)	Chemical Experiments I(◎)	Chemical Experiments II(◎)		
	Experimental Methods and Laboratory Work in Earth Sciences II(O)	Experimental Methods and Laboratory Work in Chemistry II(◎)			Chemistry Internship(O)			

Knowledge and Understanding

Academic achievements Evaluation items		1st grade		2nd grade		3rd grade		4th grade	
		Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
Comprehensive Abilities	(1)Acquiring the ability of research planning.							Special Study for Graduation (◎)	Special Study for Graduation (◎)
	(2)Acquiring the ability of research exercising・analyzing.							Special Study for Graduation (◎)	Special Study for Graduation (◎)
	(3)Acquiring communication ability	Introductory Seminar for First-Year Students (◎)						Special Study for Graduation (◎)	Special Study for Graduation (◎)
		Introduction to University Education (◎)							
	(5)Acquiring communication ability using foreign languages.	Communication I A (◎)	Communication II A (◎)						
		Communication I B (◎)	Communication II B (◎)						
		Basic English Usage I (◎)	Basic English Usage II (◎)						
		Foreign Languages: Basic Studies I (○)	Foreign Languages: Basic Studies III (○)						
		Foreign Languages: Basic Studies II (○)	Foreign Languages: Basic Studies IV (○)						
	(4)Personal capability							Special Study for Graduation (◎)	Special Study for Graduation (◎)

(例) Liberal Arts Education Subjects Basic Specialized Subjects Specialized Education Subjects Graduation Thesis (◎) Required (○) Elective/required (△) Free elective