For entrants in AY 2021

Appended Form 1

Specifications for Major Program

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○ Criteria for

○ How to assess the program

○ Feedbac

Cluster 3 (Applied Chemistry, Biotechnology and Chemical 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	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	
								1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
Liberal Arts Education Subjects	Peace Science Courses			2		2	Compulsory elective		○														
Liberal Arts Education Subjects	Basic Courses in University Education	Introduction to University Education		2	Introduction to University Education	2	Required																
Liberal Arts Education Subjects	Basic Courses in University Education	Introductory Seminar for First-Year Students		2	Introductory Seminar for First-Year Students	2	Required																
Liberal Arts Education Subjects	Common Subjects	Area Courses		4	Courses in Arts and Humanities/Social Sc	2	Compulsory elective	○		○													
Liberal Arts Education Subjects	Common Subjects	Area Courses		4	Courses in Natural Sciences	2			○		○												
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	English (Note2 3) Basic English Usage	2	Basic English Usage I	1	Required																
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	English (Note2 3) Basic English Usage		Basic English Usage II	1																	
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	English (Note2 3) Communication I	2	Communication IA	1	Required																
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	English (Note2 3) Communication I		Communication IB	1																	
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	English (Note2 3) Communication	2	Communication IIA	1	Required																
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	English (Note2 3) Communication		Communication IIB	1																	
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	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	○															
Liberal Arts Education Subjects	Common Subjects	Foreign Languages	Initial Foreign Languages (Select one language from German, French, Spanish, Russian, Chinese, Korean and Arabic)		1 subjects from Basic language II	1			○														
Liberal Arts Education Subjects	Common Subjects	Information and Data Science Courses		2	Note 4 Elements of Information Literacy or Exercise in Information Literacy	2	Compulsory elective		○														
Liberal Arts Education Subjects	Common Subjects	Health and Sports Courses		2		1or2	Compulsory elective	○	○	○	○												
Liberal Arts Education Subjects	Basic Subjects			15	Calculus I	2	Required																
Liberal Arts Education Subjects	Basic Subjects				Calculus II	2																	
Liberal Arts Education Subjects	Basic Subjects				Linear Algebra I	2																	
Liberal Arts Education Subjects	Basic Subjects				Linear Algebra II	2																	
Liberal Arts Education Subjects	Basic Subjects				General Mechanics I	2																	
Liberal Arts Education Subjects	Basic Subjects				General Mechanics II	2																	
Liberal Arts Education Subjects	Basic Subjects				Experimental Methods and Laboratory Work in Physics I	1																	
Liberal Arts Education Subjects	Basic Subjects				Experimental Methods and Laboratory Work in Physics II	1																	
Liberal Arts Education Subjects	Basic Subjects				Seminar in Basic Mathematics I	1																	
Liberal Arts Education Subjects	Basic Subjects			1	Seminar in Basic Mathematics II	1	Compulsory elective				○												
Liberal Arts Education Subjects	Basic Subjects				Experimental Methods and Laboratory Work in Biology I Note 5	1				○													
Liberal Arts Education Subjects	Basic Subjects				Experimental Methods and Laboratory Work in Biology II	1					○												
Liberal Arts Education Subjects	Basic Subjects				Basic Electromagnetism	2					○												
Liberal Arts Education Subjects	Free elective subjects			2	From all Subject Type		Free elective																
Liberal Arts Education Subjects	No. of credits required for graduation			44																			

Note 1 When students fail to acquire the credit during the term or semester marked with ○ 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 to be issued every school year.

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

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 Experimental Methods and Laboratory Work 1credit and Experimental Methods and Laboratory Work

Required subjects
○ Compulsory Elective subjects

			1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
Experimental Chemical Engineering	3												9	9				
Chemical Equipment Design and Practice	2										4	4						
Fluids Engineering	2										4							
Heat Transfer	2												4					
Mass Transfer	2										2	2						
Chemical Engineering Thermodynamics	2										2	2						
Chemical Reaction Engineering	2												4					
Powder Technology	2										4							
Chemical Process Design	3														6	6		
Chemical Engineering Fundamentals	2								2	2								
Mechanics of Materials	2	○										4						
Chemical Engineering Exercise I	2	○							4	4								
Chemical Engineering Exercise II	2	○									4	4						
Chemical Engineering Exercise III	2	○											4	4				
Exercise of Chemical Engineering Thermodynamics	1	○									2	2						
Mathematics for Chemical Engineers	2	○							4									
Materials Science	2	○								4								
Process Control Eng.	2	○										4						
Numerical Calculation Method	2										4							
Chemical Process and Engineering Ethics	2														6			
Chemical Industrial Process	2														6			
Corrosion and Protection of Materials	2												4					
Green Technology	2													4				
Recycling engineering	2													4				
Inorganic Chemistry	2										4							
Physical Chemistry II	2								4									
Chemical Kinetics	2											4						

Sheet

Academic Achievements in Chemical Engineering

The Relationship between Evaluation Items and Evaluation Criteria

Academic Achievements			Evaluation Criteria		
Evaluation Items			Excellent	Very Good	Good
Knowledge and Understanding	(A)	To improve multiple thinking ability and understanding of relations among human, society, nature, and engineering.	Sufficient understanding of relations among human, society, nature, and engineering. Acquiring sufficient thinking ability with multiple perspectives.	Good understanding relations among human, society, nature, and engineering deeply. Acquiring thinking ability with multiple perspectives.	Understanding relations among human, society, nature, and engineering.
	(B)	Development of logical thinking ability	Acquiring an excellent logical thinking ability.	Acquiring a good logical thinking ability .	Acquiring a logical thinking ability.
Abilities and Skills	(C1)	Definite learning of basic chemistry and chemical engineering and cultivation of engineering basis.	Sufficiently learned basic chemistry and chemical engineering and the applied skills.	Learned basic chemistry and chemical engineering.	Well learned basic chemistry and chemical engineering and the applied skills.
	(C2)	chemical engineering basis			
	(C3)	chemical basis.			
	(C4)	chemical engineering field			
	(C5)	chemical engineering application			
Overall Abilities	(D)	Developing the flexible adapting ability and creativity and cultivating motivation for self-development and self-improvement	Acquiring excellent flexibility and creativity; also to have a willingness for self-improvement and self-enlightenment.	Acquiring good flexibility and creativity; also to have a willingness for self-improvement and self-enlightenment.	Acquiring flexibility and creativity; also to have a willingness for self-improvement and self-enlightenment.
	(E)	Improvement of presentation and communication ability and cultivation of application ability to high informatization.	Developed presentation and communication ability very well. Acquired application ability to high informatization very well.	Developed presentation and communication ability well. Acquired application ability to high informatization well.	Developed presentation and communication ability. Acquired application ability to high informatization.

Placement of the Liberal Arts Education in the Major Program

Liberal Arts Education in this program assumes the role of establishing the academic foundation on which the specialized education will be built. It respects a voluntary, self-reliant attitude and cultivates scientific thinking based on information gathering abilities, analytical abilities, and critical thinking abilities. It establishes perspectives that make it possible to provide insight on the inner nature of things and their background from a wide broad viewpoint, and enhances linguistic abilities to the level appropriate for living as a global citizen. It also strengthens interest in peace, and 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 /comprehensive research that goes beyond the established frameworks.

Relationships between the evaluation items and class subjects

					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	Required	1semsester-1T	40	4													40	4	20	2	100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	Required	1semsester-1T	40	4													40	4	20	2	100
Liberal Arts Education	Peace Science Courses	2	Elective	1semsester- T	100	10																	100
Liberal Arts Education	Area Courses	8	Elective	1semsester	100	10																	100
Liberal Arts Education	Basic English Usage I	1	Required	1semsester-1T																	100	10	100
Liberal Arts Education	Basic English Usage II	1	Required	1semsester- T																	100	10	100
Liberal Arts Education	Communication IA	1	Required	1semsester																	100	10	100
Liberal Arts Education	Communication IB	1	Required	1semsester																	100	10	100
Liberal Arts Education	Communication IIA	1	Required	2semsester																	100	10	100
Liberal Arts Education	Communication IIB	1	Required	2semsester																	100	10	100
Liberal Arts Education	Basic language I	1	Elective	1semsester-1T																	100	10	100
Liberal Arts Education	Basic language II	1	Elective	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Liberal Arts Education	Introductory Courses	2	Elective	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Weighted values of evaluation items in the subject

Weighted values of evaluation items

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Weighted values of evaluation items in the subject

Leaning and Educational Goals	Class Subjects							
	1st grade		2nd grade		3rd grade		4th grade	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
(A) To improve multiple thinking ability and understanding of relations among human, society, nature, and engineering. (Ethics as engineers)								
(B)E Development of logical thinking ability								
(C1) Engineering basis								
(C2) Chemical engineering basis.								
(C3) Chemical basis								
(C4) Chemical engineering field								
(C5) Chemical engineering application.								
(D) Developing the flexible adapting ability and creativity and cultivating motivation for self-development and-								