

**Course List and Graduation Requirements for International Programs,  
Chemistry Program - School of Engineering (for Undergraduates Enrolled in October 2022)**  
(Major: Chemistry and Biotechnology)

Course Category	Course	Term	Credits				Minimum Requirement		
			No of Credits	Compulsory	Compulsory Elective	Elective			
Common Basic Courses	Introduction to Skills for Academic Success	I	1	1			1		
	First Year Seminar	I	2	2			2		
	Language and Culture	Japanese	Fall, Spring	8	8			8	
		Japanese/Second Foreign Languages/English	Fall, Spring	6	6			6	
	Health and Sports Science	Health and Sports Science: Lecture	I	2			2	2	
		Exercise and Sports A	I	1			1		
		Exercise and Sports B	II	1			1		
	Data Science	Introduction to Data Science (Lecture)	II	1	1			1	
		Data Science Exercise B	II	1	1			1	
	Liberal Arts Courses	Contemporary Liberal Arts (CLA)	Humanities and Social Sciences	Introduction to Cultural Studies ★	Spring	2			2
Introduction to Political Studies ★			III	2			2		
Introduction to Economics ★			Spring	2			2		
Introduction to Career Development Theory			Fall	2			2		
Global Liberal Arts		Interdisciplinary/Integration of Arts and Sciences	Art and Culture ★	Spring	2			2	
			Gender Studies	III	2			2	
		Global Liberal Arts	Disaster Prevention and Mitigation	III	2			2	
			Biotechnology	III	2			2	
			International Development	IV	2			2	
			International Society in the Age of Globalization★	Fall	2			2	
			International Studies	IV	2			2	
			Exploration of Japan: From the Outside looking Inside	Spring	2			2	
			Go in Japanese Culture	Fall	2			2	
			Studium Generale A	Fall	2			2	
			Studium Generale B	Spring	2			2	
			Introduction to Intercultural Competence	Fall	2			2	
			Immigration in Japan	IV	2			2	
			Content courses taught in Japanese	-	-			-	
			Problem/Project Based Learning Seminar	Summer Camp for General Academic Skills	VI	2			2
			Basic Courses in Natural Sciences	Calculus	Calculus I	I	2		
Calculus II	II	2					2		
Linear Algebra I	I	2					2		
Linear Algebra II	II	2					2		
Complex Analysis	III	2					2		
Fundamentals of Physics	Fundamentals of Physics I	I		2	2			8	
	Fundamentals of Physics II	II		2	2				
	Fundamentals of Physics III	II		2	2				
Fundamentals of Chemistry	Laboratory in Physics	III		2	2			6	
	Fundamentals of Chemistry I	I		2	2				
	Fundamentals of Chemistry II	II		2	2				
Fundamentals of Biology	Laboratory in Chemistry	II		2	2			4	
	Fundamentals of Biology I	I		2	2				
	Fundamentals of Biology II	II		2	2				
	Fundamentals of Earth Science I	I		2			2		
Fundamentals of Earth Science	Fundamentals of Earth Science II	II		2			2		
	Laboratory in Chemistry	II		2			2		
<b>Sum for Liberal Arts and Sciences Courses</b>				<b>37</b>	<b>0</b>	<b>14</b>	<b>51</b>		
Courses in Specialized Fields	Compulsory Courses ①	Analytical Chemistry	III	2	2			28	
		Organic Chemistry I	III	2	2				
		Physical Chemistry I	III	2	2				
		Physical Chemistry II	IV	2	2				
		Quantum Chemistry I	IV	2	2				
		Inorganic Chemistry II	V	2	2				
		Chemistry of Inorganic Materials I	V	2	2				
		Cell Biology I	III	2	2				
		Inorganic Chemistry I	IV	2	2				
		Organic Chemistry II	IV	2	2				
		Quantum Chemistry II	V	2	2				
		Chemistry and Biotechnology Laboratory 1	VI	3	3				
		Chemistry and Biotechnology Laboratory 2	VI	3	3				
		Elective Courses ②	Mathematics Tutorial I a	I	1				1
	Mathematics Tutorial I b		I	1			1		
	Fundamental Physics Tutorial I a		I	1			1		
	Fundamental Physics Tutorial I b		I	1			1		
	Mathematics Tutorial II a		II	1			1		
	Mathematics Tutorial II b		II	1			1		
	Fundamental Physics Tutorial II a		II	1			1		
	Biochemistry I		III	2			2		
	Analytical Mechanics I		III	2			2		
	Mathematical Physics I		III	2			2		
	Mathematical Physics Tutorial I		III	1			1		
	Statistical Physics I		III	2			2		
	Biochemistry II		IV	2			2		
	Cell Biology II		III	2			2		
	Electricity and Magnetism		IV	2			2		
	Structural Chemistry		V	2			2		
	Organic Chemistry III	V	2			2			
	Earth and Planetary Science	V	2			2			
	Quantum Chemistry III	VI	2			2			
	Earth Environmental Science	VI	2			2			
Inorganic Chemistry III	VI	2			2				
Compulsory Courses ③	Chemistry and Biotechnology Laboratory III	VII	3	3			18		
	Chemistry and Biotechnology Laboratory IV	VII	3	3					
	Advanced Chemistry Tutorial A	VII	1	1					
	Graduation Research A	VII	5	5					
	Advanced Chemistry Tutorial B	VIII	1	1					
	Graduation Research B	VIII	5	5					
Elective Courses ④	Biophysics	IV	2			2	18		
	Organic Chemistry V	V	2			2			
	Polymer Chemistry	V	2			2			
	Chemical Physics	V	2			2			
	Organic Chemistry IV	VI	2			2			
	Chemistry of Inorganic Materials II	VI	2			2			
	Computational Chemistry	V	2			2			
	Current Organic and Polymer Chemistry	VI	2			2			
Biochemistry IV	VI	2			2				
Cell Biology IV	VI	2			2				
Related Specialized Courses	Elective Courses ⑤	Outline of Engineering III	V	2			2		
		View of Advanced Electrical, Electronic and Information Engineering	V	2			2		
		Introduction to Civil Engineering and Architecture	V	2			2		
<b>Sum for Courses in Specialized Fields</b>				<b>46</b>	<b>0</b>	<b>36</b>	<b>82</b>		
<b>Total Sum</b>				<b>83</b>	<b>0</b>	<b>50</b>	<b>133</b>		

\*Confirm the prerequisite for each subject with the syllabus.

★Some of the courses on this column are offered in every other year. Confirm the offering term with the "Liberal Arts and Sciences Class Timetable" of the said year.

**Graduation Requirements for International Programs,  
Chemistry Program - School of Engineering (for Undergraduate)**

**1. Liberal Arts and Sciences Courses: A combined total of at least 51 credits must be acquired.**

**(1) Common Basic Courses:**

A total of at least 21 credits must be acquired, consisting of 1 credit of Introduction to Skills for Academic Success, 2 credits of First Year Seminar, 14 credits from "Language and Culture", at least 2 credits each of Lecture and Exercise for Health and Sports Science, and 1 credit each of Lecture and Exercise for Data Science.

**(2) Liberal Arts Courses:**

A total of 4 credits must be acquired, consisting of 2 credits from Contemporary Liberal Arts (Humanities and Social Science and Interdisciplinary/Integration of Arts and Sciences), and 2 credits from Global Liberal Arts Courses or Contemporary Liberal Arts (Humanities and Social Science and Interdisciplinary/Integration of Arts and Sciences) or Problem/Project Based Learning Seminar.

**(3) Basic Courses in Natural Sciences:**

A total of at least 26 credits must be acquired, consisting a total of at least 8 credits from Calculus I, II, Linear Algebra I, II or Complex Analysis, a total of 8 credits from Fundamentals of Physics I, II, III and Laboratory in Physics, a total of 6 credits from Fundamentals of Chemistry I, II, Laboratory in Chemistry, and a total of 4 credits from Fundamentals of Biology I, II are compulsory.

**2. Courses in Specialized Fields: A combined total of at least 82 course credits must be acquired from these course categories.**

**(1) Compulsory Courses:** A total of 46 compulsory course credits must be acquired, consisting of a total of 28 course credits from Compulsory Basic Specialized Courses ① and a total of 18 course credits from Compulsory Specialized Courses ③.

**(2) Elective Courses:** A total of at least 36 course credits must be acquired, consisting of at least 16 credits from Elective Basic Specialized Courses ②, that of at least 18 course credits from Elective Specialized Courses ④, and that of at least 2 course credits from Elective Related Specialized Courses ⑤.

**Advancement Requirements for International Programs,  
Chemistry Program - School of Engineering (for Undergraduate)**

Assesment Year	Course Categories	Minimum Courses/Credits Required	Requirements
At the End of the Second Year	Common Basic Courses, Liberal Arts Courses, Basic Courses for Specialized Fields	40 credits	<p>1. Common Basic Courses Must earn a total of at least 12 "Language and Culture" credits from Japanese, English or Second Foreign Languages. *Please note that if you choose Second Foreign Lanugages for Compulsory Elective (Japanese/English/Second Foreign Languages) credits, you must obtain at least 4 credits in each language from German, French, Russian, Chinese, Spanish or Korean for graduation.</p> <p>2. Basic Courses in Natural Sciences Must earn at least 18 credits from Basic Courses in Natural Sciences.</p>