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				
					No of Credits	Compulsory	Compulsory Elective	Elective	Minimum Requirement
Liberal Arts and Sciences Courses	Common Basic Courses	Introduction to Skills for Academic Success	Introduction to Skills for Academic Success	Ⅰ	1	1			1
		First Year Seminar	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	Humanities and Social Sciences	Introduction to Cultural Studies ★	Spring	2			2	4 Including of 2 credits from CLA.
			Introduction to Political Studies ★	Ⅲ	2			2	
			Introduction to Economics ★	Spring	2			2	
		Interdisciplinary/Integration of Arts and Sciences	Introduction to Career Development Theory	Fall	2			2	
			Art and Culture ★	Spring	2			2	
			Gender Studies	Ⅲ	2			2	
			Disaster Prevention and Mitigation	Ⅲ	2			2	
			Biotechnology	Ⅲ	2			2	
		Global Liberal Arts	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 Ⅰ	Ⅰ	2			2	8
			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 Ⅰ	Ⅰ	2	2			8
			Fundamentals of Physics Ⅱ	Ⅱ	2	2			
			Fundamentals of Physics Ⅲ	Ⅱ	2	2			
			Laboratory in Physics	Ⅲ	2	2			
			Fundamentals of Chemistry Ⅰ	Ⅰ	2	2			6
			Fundamentals of Chemistry Ⅱ	Ⅱ	2	2			
			Laboratory in Chemistry	Ⅱ	2	2			
			Fundamentals of Biology Ⅰ	Ⅰ	2	2			4
			Fundamentals of Biology Ⅱ	Ⅱ	2	2			
			Fundamentals of Earth Science Ⅰ	Ⅰ	2			2	
			Fundamentals of Earth Science Ⅱ	Ⅱ	2			2	
			Laboratory in Chemistry	Ⅱ	2			2	
	Sum for Liberal Arts and Sciences Courses					**37**	**0**	**14**	**51**
Courses in Specialized Fields	Basic Specialized Courses	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	16
			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	
			Fundamental Physics Tutorial Ⅱ b	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	
	Specialized Courses	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	2
			View of Advanced Electrical, Electronic and Information Engineering	Ⅴ	2			2	
			Introduction to Civil Engineering and Architecture	Ⅴ	2			2	
	Sum for Courses in Specialized Fields					46	0	36	**82**
Total Sum						**83**	**0**	**50**	**133**

・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	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. 2. Basic Courses in Natural Sciences Must earn at least 18 credits from Basic Courses in Natural Sciences.