Course List and Graduation Requirements for International Programs, Chemistry Program – School of Engineering (for Undergraduates Enrolled in October 2019)

(Major: Chemistry and Biotechnology)

Course Category			Course	Term	Credits				
					No of Credits	Compulsory	Compulsory Elective	Elective	Minimum Requirement
Liberal Arts and Sciences Courses	Basic General Education Courses	First Year Seminar	First Year Seminar A	I	2	2			2
		Language and Culture	Japanese/Languages except English	I, II	12	12			12
		Health and Sports Science	Health and Sports Science: Lecture	I	2			2	2
			Health and Sports Science: Practicum I	II	1			1	
			Health and Sports Science: Practicum II	III	1			1	
	Basic Courses in Humanities and Social Sciences ★		History	II	2			2	4
			Literature	I	2			2	
			Comparative Studies of Cultures	*2020-I*	2			2	
	Liberal Education Courses in Humanities and Social Sciences ★		Introduction to Cultural Studies	II	2			2	
			Culture and Representation	II	2			2	
			Past and Present of Democracy	*2020-I*	2			2	
			International Society of Globalization Age	I	2			2	
	Liberal Education Courses in Natural Sciences		Biotechnology	I	2			2	4
			Modern Biology	II	2			2	
			Science of Materials	III	2			2	
	Liberal Education Courses in Interdisciplinary Fields ★		Exploration of Japan: From the Outside Looking Inside	II	2			2	2
			Introduction to Career Development Theory	I	2			2	
			Preparedness for Imminent Natural Disasters	III	2			2	
			Thinking about Japanese Society in the 21st Century from Gender Perspectives	I	2			2	
			Special Lecture (Studium Generale I)	I	2			2	
			Special Lecture (Studium Generale II)	II	2			2	
			Special Lecture (Go in Japanese Culture)	III	1			1	
			Special Lecture (Summer Camp for General Academic Skills)	IV	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			6
			Fundamentals of Physics II	I	2	2			
			Fundamentals of Physics III	II	2	2			
			Fundamentals of Physics IV	II	2			2	
			Fundamentals of Chemistry I	I	2	2			4
			Fundamentals of Chemistry II	II	2	2			
			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 II	II	2			2	
			Laboratory in Physics	III	1.5	1.5			1.5
			Laboratory in Chemistry	II	1.5	1.5			1.5
			Laboratory in Biology	II	1.5			1.5	
	Sum for Liberal Arts and Sciences Courses					27	0	20	**47**
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	IV	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/Biotechnology Tutorial I	V	0.5	0.5			20
			Chemistry/Biotechnology Tutorial II	VI	0.5	0.5			
			Chemistry/Biotechnology Tutorial III	VI	0.5	0.5			
			Chemistry/Biotechnology Tutorial IV	VII	0.5	0.5			
			Chemistry and Biotechnology Laboratory III	VII	3	3			
			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	Introduction to Chemical and Biological Industries	IV	2			2	18
			Biophysics	IV	2			2	
			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	3
			View of Advanced Electrical, Electronic and Information Engineering	V	2			2	
			Introduction to Civil Engineering and Architecture	V	2			2	
			Introduction to Physical Science and Engineering	VIII	2			2	
	Sum for Courses in Specialized Fields					48	0	37	**85**
Total Sum						**75**	**0**	**57**	**132**

・Confirm the prerequisite for each subject with the syllabus.

・Refer to the derail of the Term on the page 4 of "AY2019 Liberal Arts and Sciences Course Registration Guide for International Programs Sutdents"

★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 47 credits must be acquired.

(1) Basic General Education Courses: A total of at least 16 credits must be acquired, consisting of 2 credits from first year seminar A, 12 credits from Japanese/Languages except English, and at least 2 credits from Health and Sports Science Courses.

(2)Basic Courses in Humanities and Social Sciences and Liberal Education Courses in Humanities and Social Sciences: A total of at least 4 course credits must be acquired from these two Course Categories.

(3) Liberal Education Courses in Natural Sciences: A total of at least 4 elective course credits must be acquired.

(4) Liberal Education Courses in Interdisciplinary Fields: At least 2 elective course credits must be acquired.

(5) Basic Courses in Natural Sciences: A total of at least 21 credits must be acquired, consisting of 6 compulsory course credits from Fundamentals of Physics I to III, a total of at least 8 course credits from 5 Fundamental Mathematics Courses, 1.5 compulsory course credits of Laboratory in Physics, 1.5 compulsory course credits of Laboratory in Chemistry, and 4 compulsory course credits from Fundamentals of Chemistry I and II.

2. Courses in Specialized Fields: A combined total of at least 85 course credits must be acquired from these course categories.

(1) Compulsory Courses: A total of 48 compulsory course credits must be acquired, consisting of a total of 28 course credits from Compulsory Basic Specialized Courses ① and a total of 20 course credits from Compulsory Specialized Courses ③.

(2) Elective Courses: A total of at least 37 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 3 course credits from Elective Related Specialized Courses ⑤.

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

Year When Judgment is Made	Course Categories	A Required Minimum Number of Courses/Credits	Details
At the End of the First Grade	Basic Courses in Natural Sciences	5 courses	A minimum of 5 courses from the Basic Courses in Natural Sciences must be acquired.
At the End of the Second Grade	Basic General Education Courses, Basic Courses in Humanities and Social Sciences, Liberal Education Courses in Humanities and Social Sciences, Basic Courses in Natural Sciences, Liberal Education Courses in Natural Sciences, Liberal Education Courses in Interdisciplinary Fields	41 credits	1. Basic General Education Courses: A total of at least 10.5 course credits must be acquired from the Language and Culture Courses: Japanese, German, French, Russian, Chinese, Spanish, or Korean 2. Basic Courses in Natural Sciences: A total of at least 17.5 course credits must be acquired from Basic Courses in Natural Sciences, including 1.5 credits of Laboratory in Physics.