Course List and Graduation Requirements for International Programs, Chemistry Program – School of Engineering (for Undergraduates Enrolled in October 2018)

(Major: Chemistry and Biotechnology)

Course Category			Course	* Notes (offerd Academic Year)	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	
	*2 Basic Courses in Humanities and Social Sciences		History	*1 AY2020	TBD	2			2	4
			Literature	*1	II	2			2	
			Comparative Studies of Cultures	*1	I	2			2	
	*2 Liberal Education Courses in Humanities and Social Sciences		Introduction to Cultural Studies	*1 AY2020	TBD	2			2	
			Culture and Representation	*1 AY2020	TBD	2			2	
			Past and Present of Democracy	*1	I	2			2	
			International Society of Globalization Age	*1 AY2019	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	
	*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・II	2			2	
			Special Lecture (Go in Japanese Culture)		III	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 3		VII	3	3			
			Chemistry and Biotechnology Laboratory 4		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**

(Important) Please confirm the prerequisite for each subject with syllabus.

*1 Some of the courses on this column are offered in every other year. Please confirm the offering term with the "Liberal Arts and Sciences Class Timetable-Table B" of the said year.

Please refer to the detail of the Term on the page 1 of 'Student Handbook'.

*2 Offering term of the courses in this column may be subject to change.

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	Minimum Required Course Credits/Number of Courses	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.