

For entrants in FY 2019

Appended Form 1

Specifications for Major Program

Name of School (Program) [School of Pharmaceutical Sciences (Program of Medicinal Sciences)]

Program name (Japanese)	薬科学プログラム
(English)	Program of Medicinal Sciences

1. Degree: Bachelor (medicinal sciences)

2. Outline

Along with the introduction to the six-year Pharmacist Training Program and establishment of the Program in Pharmaceutical Sciences, this is a four-year program in the School of Pharmaceutical Sciences established for the purpose of drug discovery and development, pharmaceutical and medical supply development operations, medical supply information, and for training persons in charge of the environmental and health fields and researchers in pharmaceuticals at pharmaceutical companies. Based on a broad education not only within the field of pharmaceuticals but also in a range from organic chemistry to life science, this Program shall implement broad basic educational research into life science, and train researchers covering extensive life science and researchers and engineers involved in the development of new drugs. Through educational research in Pharmaceutical Sciences important as the basis for R&D into new drugs, this Program shall also implement research and develop researchers and professional engineers in charge of environmental problems and health. Although these human resources are not necessarily limited only to people from the field of pharmaceutical sciences, this Program offers a wide-ranging education from basics to clinical medicine based on not only knowledge acquired from basic education of life sciences, organic & inorganic chemistry, and analytical chemistry but also knowledge that can be acquired only from pharmaceutical fields such as pharmacology and pharmaceuticals, to foster human resources can play an active role in extensive fields naturally, with different skills from students who completed studies in other fields. In Japan, the field of pharmaceuticals has played a leading role in developing human resources involved in pharmaceutical R&D and production technologies, and we need to inherit the circumstances of having implemented four-year programs as an educational system for that purpose and the expertise of having fostered in those circumstances, and to further develop these inheritances in the future.

In addition, based on the present situation where we are short of these human resources compared to other countries, the mission of the four-year medicinal sciences course is of great importance.

While expecting students after graduation to become researchers or professional engineers with a global perspective in governmental agencies related to pharmaceuticals or in fields such as pharmaceuticals, food, chemical, and perfumery & cosmetics, this Program will foster human resources who can play a leading social role as front-line researchers after acquiring advanced knowledge and skills from their studies in graduate school.

Although this Program is mainly implemented by members of the Pharmaceutical Sciences faculty, part of the Program, such as Pathology, shall be implemented by members of the School of Medicine and researchers of the Radiation Effects Research Foundation.

In the first step after admission (Attached Sheet 2-2), students take liberal arts education subjects necessary for a special course education and develop broad knowledge necessary for their future character-building, such common

subjects with the Program of Pharmaceutical Sciences as fundamental subjects, information literacy basics and seminars, and foreign languages focusing on communication. Also, the first step is designed to allow students to

Furthermore, science classes for supplemental education that student did not chose for their individual scholastic ability tests are also prepared.

In the second step, set as the basis of education in pharmaceutical sciences, students will take basic specialized subjects in line with the common educational models and core curricula in pharmaceutical sciences in the Program in Pharmaceutical Sciences. At the same time, students will acquire the basics of experimenting by completing practices in all the fields of pharmaceutical sciences starting from basic chemical practice. In the third step, more specialized lectures are arranged and allocated as elective subjects so that students can acquire the knowledge required for pharmaceutical sciences to become their field of expertise in the future. In the fourth step, to take part in research in their desired field of expertise, students will select graduation research from Basic Research I, II, and III by being divided into groups to be assigned to each classroom. In the assignment of students to each classroom, graduation research is an introduction to conducting advanced research in a graduate school at a later date, in which the class content is taken into consideration so that students

- 7) The ability to identify the problem and show the direction toward that solution in order to play an active role as a passionate researcher who can flexibly meet diversifying social needs;
 - 8) The fundamental capability to identify new information and knowledge, and to autonomously improve one's ability, in order to keep up with progress in pharmacology, science, and medical areas;
4. Curriculum policies (policies for organizing & providing curricula)

In the Medicinal Sciences Program, curricula are planned based on the following policies with the aim of

8. Academic achievement

The evaluation criteria are specified for each evaluation item for academic achievement, and the achievement level against these criteria is designated for each academic year.

The academic achievement, from when the student enters our university to the end of the last semester, is represented based on the average of evaluation scores for each evaluation item. The evaluation score for each subject is converted to a numerical value (S = 4, A = 3, B = 2, and C = 1) and the evaluation standard for the academic achievement is determined using these values while applying weightings.

Achievement evaluation	Numerical conversion
S (Excellent:90 or more points)	4
A (Very good: 80 - 89 points)	3
B (Good: 70 - 79 points)	2
C (Passed: 60 - 69 points)	1
Academic achievement	Evaluation standard
Excellent	3.00 - 4.00
Very Good	2.00 - 2.99
Good	1.00 - 1.99

* Refer to the relationship between evaluation items and evaluation criteria described in Sheet 2.

* Refer to the relationship between evaluation items and class subjects described in Sheet 3.

* Refer to the curriculum map in Sheet 4.

9. Graduation thesis (graduation research) (meaning, student allocation, timing, etc.)

In doing g

of this Program will be judged.

- Implementing the assessment (relationship with class assessment will also count.)

Achievements in this Program will be assessed based on these criteria in the second semester of the fourth year. At the same time, a questionnaire on program assessment will be distributed each semester.

conducted every year.

The educational effect shall be assessed in a comprehensive manner based on the evaluations of academic achievement and the achievement levels of students who have studied on this Program, and GPA.

Table of Registration Standards for Liberal Arts Education Subjects

Medicinal Sciences Program

Type	Subject type		Required No. of credits	Class subjects, etc.	No. of credits	Type of course registration	Year in which the subject is taken(Note 1)													
							1st grade		2nd grade		3rd grade		4th grade							
							Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall						
Liberal Arts Education Subjects	Peace Science Courses		2		2	Required			○											
	Basic Courses in University Education	Introduction to University Education	2	Introduction to University Education	2	Required	○													
		Introductory Seminar for First-Year Students	2	Introductory Seminar for First-Year Students	2	Required	○													
	Common subjects	Area Courses		4	Courses in Arts and Humanities/SocialSciences	2	Elective/required	○	○											
		(Note 8)		4	Courses in Natural Sciences	2	Elective/required		○											
		Foreign Languages	English (Note 2)	Communication Seminar	2	Communication Seminar I	1	Required	○											
				Communication Seminar II	1															
			Communication I	Communication IA	2	Communication IA	1	Required	○											
				Communication IB	1															
			Communication II	Communication IIA	2	Communication IIA	1	Required		○										
				Communication IIB	1						○									
			Non-English Foreign Languages (Select one language from German, French and Chinese) (note 3)			0	Basic Foreign Language I	1	Free elective	○										
							Basic Foreign Language II	1												
		Basic Foreign Language III					1			○										
		Basic Foreign Language IV					1				○									
		Information Courses		2	Elements of Information Literacy(Note 4)	2	Required	○												
		Health and Sports Courses		2		1or2	Elective/required	○	○											
	Social Cooperation Courses		0		1or2	Free elective	○	○												
	Foundation Courses		6		Psychology for Medical Care Workers(Note 5)	2	Required		○											
					Statistics	2														
Anatomy for understanding human being I					1															
Anatomy for understanding human being II					1															
2				Foundation physics for life science(Note 6)	2	Elective/required	○													
				Foundation biology for life science(Note 7)	2		○													
4				Species Biology	2	Elective/required	○													
				Basic Calculus	2		○													
	Basic Linear Algebra	2			○															
				2 subjects from the three subjects above																
Total(Liberal Arts Education Subjects)			36																	

- Note 1: The indicated semester represents that in which students typically take the subject. If they have failed to earn the credit in the semester, it is allowed to take the subject after the semester. It is required to confirm the semester in which the subject is provided in the class schedule for liberal arts education subjects that is published every academic year, because some subjects might be provided in a semester other than that which is shown in this document.
- Note 2: The credits for "Field Research in the English-speaking World" that are earned through such activities as a short-term study abroad, and those for "Online English Seminar A" and "Online English Seminar B" that are earned through a program of self-study, are accepted as the credit for English required for graduation (6 credits). Achievement in a foreign language skill test and language training might be accepted as credit. For the details, refer to the description regarding English subjects in the liberal arts education and the item "Credit based on Achievement in Foreign Language Skill Test" in the Students Handbook.
- Note 3: Although 4 credits of "Basic Foreign Language" are not included as those required for graduation, it is recommended to earn those credits.
- Note 4: It is required to take the subject "Elements of Information Literacy" that is provided in the first year. Only when failing to earn the credit for "Elements of Information Literacy" is the credit for the subject "Exercise in Information Literacy" accepted as that for the information subjects required for graduation (2 credits).
- Note 5: It is required to take the subject "Psychology for Medical Care Workers" that is provided in the first year. Only when failing to earn the credit for "Psychology for Medical Care Workers" is the credit for the subject "Psychology A" or "Psychology B" accepted as that for the information subjects required for graduation (2 credits).
- Note 6: Students who did not take the subject "Physics" in the National Center Test for University Admissions are required to take the subject "Foundation physics for life science."
- Note 7: Students who did not take the subject "Biology" in the National Center Test for University Admissions are required to take the subject "Foundation biology for life science."
- Note 8: Of the 4 credits required for the disciplinary subjects (Courses in Arts and Humanities/SocialSciences), 2 credits are required to be earned for the subject "Ethics."

Spring

Type	Subject type	Lesson Style	Required No. of credits	Class subjects, etc.	No. of credits	Type of course registration	Year in which the subject is taken										
							1st grade		2nd grade		3rd grade		4th grade				
							Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall			
Specialized Education Subjects	Specialized Subjects	Lecture	8	Biological Statistics	2	Elective/required II						2					
				Pharmacology III	2						2						
				Clinical Pharmacy	2								2				
				Clinical Medicine and Pharmacotherapy I	2								2				
				Pharmacotherapy A	2								2				
				AnOutline of Immunology	2								2				
				Clinical Medicine and Pharmacotherapy II	2								2				
				Pharmaceutical Affairs Related Laws	2								2				
				Clinical Pharmacology A	2									2			
				Pharmacotherapy B	2									2			
				Drug Informatics	2									2			
				Total(Elective/required II (Lecture))				32						14	12	6	
				Total (Lecture)				52					18	14	14	6	
				Specialized Subjects	Practice		10	Experiments in Analytical Chemistry	1	Required				①			
	Training of Physical Chemistry	1							①								
	Experiments in Organic Chemistry	1							①								
	Experiments of Cellular and Molecular Biology	1							①								
	Experiments of Biological Chemistry	1							①								
	Experiments of Pharmacognosy	1										①					
	Experiments of Microbial Chemistry	1										①					
	Pharmacology Practice	1										①					
	Practice of Pharmaceutics	1										①					
	Experiments of Public health Chemistry	1										①					
	Total (Practice)					10						5	5				
	Special Study for graduation	6	Special laboratory Works in Pharmaceutical Sciences I			2		Required								②	
			Special laboratory Works in Pharmaceutical SciencesII			2									②		
			Special laboratory Works in Pharmaceutical SciencesIII	2									②				
Total(Special Study for Graduation)				6						2	2	2					
Total(Specialized Subjects)				80				5	24	17	26	8					
89			Total(Specialized Education Subjects)		124												

Note: You need at least 1 credit per subject in Elective/Required Subjects I, and at least 8 credits from 4 subjects in Elective/Required Subjects II.

Note: Subjects with a circle in the “Year in which the subject is taken” column are required subjects.

Graduation requirement	Required No. of credits
Liberal Arts Education Subjects	36
Specialized Education Subjects	89
Basic Specialized Subjects	44
Required Subjects	44
Specialized Subjects	45
Free elective subjects (Seminar)	(2)
Required Subjects (Seminar)	2
Elective/required I (Seminar)	1
Free elective subjects (Lecture)	(2)
Required Subjects (Lecture)	18
Elective/required II (Lecture)	8
Required Subjects (Practice)	10
Required Subjects (Special Study for Graduation)	6
Total	125

Academic achievements of Medicinal Sciences Program

Relationships between the evaluation items and evaluation criteria

Excellent

Very Good

Good

(1)

Academic achievements		Evaluation criteria		
Evaluation items		Excellent	Very Good	Good
Abilities and Skills	(4) Being able to read English chemical papers and discuss them. (application)	1. The learning attainment level is generally calculated combining grades, average scores of TOEIC tests and scores of graduation research based on designated formulae. The standard is more than 80%.	1. The learning attainment level is generally calculated combining grades, average scores of TOEIC tests and scores of graduation research based on designated formulae. The standard is more than 70%.	1. The learning attainment level is generally calculated combining grades, average scores of TOEIC tests and scores of graduation research based on designated formulae. The standard is more than 60%.
	To be able to basically treat major chemical agents, substances related to the living body, and microbes.	1. Being able to construct pathways for synthesis of compounds including representative functional compounds and to synthesize them. 2. Being able to construct fixing tests, ways of separate refinement, ways of constructive decision and to identify them. 3. Being able to construct separate cultivation measures and authentic cultivation measures of representative micro-organism and to carry out them. 4. Being able to construct identification measures of representative bacteria and to identify them. 5. Being able to construct various kinds of experiments on biological related materials. 6. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 80%.	1. Being able to construct pathways for synthesis combining presented chemical reaction and synthesize them. 2. Being able to construct ways of qualitative tests, separation and refinement, and structural determination and identify them. 3. Being able to construct ways of separate cultivation and authentic cultivation and conduct them. 4. Being able to construct ways of identification of presented bacteria and conduct them. 5. Being able to conduct various kinds of experiments relating presented biologically relevant materials and conduct them. 6. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 70%.	1. Being able to synthesize using pathways for synthesis combining presented chemical reaction. 2. Being able to identify using ways of qualitative tests, separation and refinement, and structural determination. 3. Being able to construct ways of separate cultivation and authentic cultivation and conduct them. 4. Being able to construct ways of identification of presented bacteria and conduct them. 5. Being able to conduct various kinds of experiments relating presented biologically relevant materials and conduct them. 6. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	To be able to measure and evaluate major biological reactions.	1. Being able to construct activity measurement methods of representative enzyme and measure them. 2. Being able to construct measurements of activation and secretion of representative physiological active substances and measure them. 3. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 80%.	1. Being able to construct activity measurement methods of presented enzyme and conduct them. 2. Being able to construct ways to measure activation and secretion of presented physiological active substances and conduct them. 3. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 70%.	1. Being able to conduct activity measurement methods of presented enzyme. 2. Being able to conduct ways to measure activation and secretion of presented physiological active substances. 3. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	Being able to collect assess information on medicine.	1. Being able to find out necessary information on medicine and to collect them by themselves and estimate them. 2. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 80%.	1. Being able to find out necessary information on medicine and to estimate them. 2. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 70%.	1. Being able to find out necessary information. 2. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
Attitudes	(1) Having ability to act as member of a research team.	1. Being able to lead a team actively acting as a member of the team. 2. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 80%.	1. Being able to actively act as a member of a research team. 2. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 70%.	1. Being able to act as a member of a research team. 2. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
Comprehensive Abilities	(1) 1. The active attitude of dealing with issues on drug development and environmental hygiene. 2. The social responsibility as a specialist of drug development and environmental hygiene. 3. The comprehensive, scientific and calm attitude to solve problems. 4. The cooperative attitude in team research. 5. The ability to make communication and presentation. 6. The ability of assessment and analysis. 7. The active usage of information technology and the management ability. 8. The ethical consideration toward genetically modified foods and animal experiments	1. Being able to investigate and estimate the research results on issues so far. 2. Being able to select must-be-solved issues for the attainment of goals. 3. Being able to find issues by themselves and make a experiment plan. 4. Being able to carry out the experiments along with the plan. 5. Being able to integrate the results, consider them and present them. 6. Being able to integrate the results in reports or theses. 7. Being able to propose the next research issues based on their own research results. 8. The learning attainment level is comprehensively calculated based on designated formulae combining average evaluation of grades and results of graduation research . The standard is more than 80%.	1. Being able to investigate and estimate the research results on issues so far. 2. Being able to select must-be-solved issues for the attainment of goals. 3. Being able to make a experiment plan on proposed issues. 4. Being able to carry out the experiments along with the plan. 5. Being able to integrate the results, consider them and present them. 6. Being able to integrate the results in reports or theses. 7. The learning attainment level is comprehensively calculated based on designated formulae combining average evaluation of grades and results of graduation research . The standard is more than 70%.	1. Being able to investigate and estimate the research results on issues so far. 2. Being able to select must-be-solved issues for the attainment of goals. 3. Being able to carry out research based on experiment plans of proposed issues. 4. Being able to integrate the results, consider them and present them. 5. Being able to integrate the results in theses. 6. The learning attainment level is comprehensively calculated based on designated formulae combining average evaluation of grades and results of graduation research . The standard is more than 60%.

Placement of Liberal Arts Education in the Major Program

Liberal arts education in this Program shall play a role in establishing the academic base to receive specialized education, and is placed as education for cultivating scientific thinking on the basis of respect for a voluntary and independent attitude, and of information gathering capabilities, analytical capabilities, and critical power. Furthermore, it is expected through the liberal arts education of this Program to develop a problem-solving ability, to cultivate a linguistic ability, and to strengthen interest in matters related to peace. Through these processes, students will foster an enriched humanity, and acquire a broader education.



