

# For entrants in FY 2018

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.

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 developing scientists and engineers with an enriched humanity and broad education based on its educational principles:

- 1) To allow students to acquire fundamental knowledge and basic study ability in a wide variety of areas, the curriculum provides the peace study subjects, fundamental subjects for university education, disciplinary subjects, foreign language subjects, information subjects, health and sports subjects, society-related subjects, and fundamental subjects, structured in such a way as to provide those subjects to the whole university;
- 2) To allow students to systematically learn the specialized methodology and knowledge, the curriculum provides subjects for early experience, humanism in communication, the structure and characteristics of materials, natural medicine resources, and the mechanisms and functionality of living bodies as specialized fundamental subjects;
- 3) Set subjects related to effects of medical supplies, internal kinetics of medical supplies, health & environment, adjustment of preparations & management of medical supplies, illness and disease states, operations of a pharmacist, pharmaceutical affairs-related laws and regulations, and experimental techniques as specialized subjects for students to choose from to foster the expertise required to achieve their career aims,
- 4) Set graduation research as a required subject and provide detailed individual guidance to enable students to integrate the knowledge and skills they have acquired, and to foster scientific thinking that will be linked to the solution of problems and creation of new values,
- 5) Establish a certain standard for assignment to a laboratory,
- 6) The achievement in education is evaluated based on grade scores for the subjects, and the level of achievement against the target defined for the Program of Medicinal Sciences.
- 7) Certain criteria are established for the allocation of students to laboratories, and for qualification for Type-1 High School Teaching License (science);

5. Start time and acceptance conditions

Students select (start) this program in the first year.

6. Obtainable qualifications

- a) Type-1 High School Teaching License (science)
- b) Sanitary Inspection Technician, Drug distributors, engineers responsible for medical equipment manufacturers and import & sales offices, technical managers of garbage disposal facilities, pollution control managers related to noise, dust, and vibration, engineers controlling environmental hygiene in buildings, and managers of water supply technologies

7. Class subjects and their contents

For class subjects, refer to the subject table in Sheet 1. (The subject table is to be attached.)

For the details of the class subjects, refer to the syllabus that is published each academic year.

## 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 graduation research, students will acquire a series of research methods accepted by international society, and such methods form a basic part of research that provides students with the foundation to further deepen their knowledge in the field of pharmaceutical sciences in graduate school, and to become a global researcher in the future. Students shall be assigned to cover all related fields from the second semester of the third year because overemphasis on only some of the related fields is not considered beneficial for the development of pharmaceutical science in general, also in consideration of the convenience of each laboratory. The method and requirements of assignment shall be specified separately.

## 10. Responsibility

### (1) PDCA r

- Ozawa (in charge of academic affairs)).
- \_\_\_\_\_ of the School of Pharmaceutical Sciences, respecting the contents of the report after the dean consults with the committee in charge.

### (2) Program assessment

- Criteria for program assessment

The educational and social effects of this program will be assessed. For the educational effect, the achievements, evaluation of their attainment levels, and GPA. For the social effect, the social availability

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.

A social assessment shall be conducted by checking the employment rates in companies (such as medical supply, chemical, food, and cosmetic companies) and government offices that are closely related

Program. We then ask graduates to assess themselves and the Program.

- The idea and method of feedback for students

At regular intervals, the faculty council in charge distributes questionnaires to and holds interviews with students to inspect and assess the Program, and submits an improvement plan for the Program to the Educational Evaluation Committee and the resulting Improvement Report to the Bachelor Course

Program are checked and assessed, and the results are used to improve the Program. These results are fed

will be fed back for every class through the Momiji questionnaire on class assessment.

















Academic achievements		1st grade		2nd grade		3rd grade		4th grade	
Evaluation items		Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
Knowledge and Understanding	1. The knowledge of chemical compounds including medicine.	Foundation Courses (○)	Foundation Courses (○)	Organic Chemistry IA (◎)	Organic Chemistry II A (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)
			General Chemistry (◎)	Organic Chemistry IB (◎)	Organic Chemistry II B (◎)	Medicinal Organic Chemistry (◎)	Industrial Pharmaceutics (○)	Practice of Organic Reactions (○)	
				Nuclear Pharmacy (◎)	Natural Products Chemistry (◎)	Organic Chemistry III (◎)	Organic Chemistry IV (○)		
				Pharmaceutical Physical Chemistry (◎)	Experiments in Organic Chemistry (◎)	Herbal medicine & Kampo medicine (◎)	Research PracticeB (◎)		
					Experiments in Analytical Chemistry (◎)	Biophysical Chemistry (◎)			
				Training of Physical Chemistry (◎)	Experiments of Pharmacognosy (◎)				
	2. Knowledge of human and biological bodies.	Foundation Courses (○)	Foundation Courses (○)	Biochemistry I (◎)	Pharmacology I (◎)	Pharmacology II (◎)	Pharmacology III (○)	AnOutline of Pathology (◎)	Clinical Pharmacology A (○)
				Biochemistry II (◎)	Biological Chemistry IV (◎)	Biochemistry VI (◎)	Cell Motility (○)	Pharmacotherapy A (○)	Pharmacotherapy B (○)
				Biological Chemistry III (◎)	Biochemistry V (◎)	Physiological Chemistry (◎)	Genetic Engineering (○)	Practice of Microbiology (○)	
				Microbiology (◎)	Experiments of Biological Chemistry (◎)	Antibiotics and Drug resistance (◎)		Practice for clinical food science (△)	
						Experiments of Microbial Chemistry (◎)		Practice of Clinical Pharmacy (○)	
								Clinical food science (△)	
								Clinical Pharmacy (○)	
								Clinical Medicine and Pharmacotherapy I (○)	
							AnOutline of Immunology (○)		
							Clinical Medicine and Pharmacotherapy II (○)		
3. The knowledge relating to mutual reaction between chemical compounds including medicine and a human body			Public Health Chemistry I (◎)	Biopharmaceutics (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)	
			Public Health Chemistry II (◎)	Pharmacology I (◎)	Pharmacology II (◎)	Public Health Chemistry III (○)	Practice of Analytical Drug Discovery and Evaluation (○)	Drug Informatics (○)	
			Basic Kampo Medicine (◎)	Experiments in Analytical Chemistry (◎)	Pharmacokinetics (◎)	Research PracticeB (◎)	Pharmacotherapy A (○)	Clinical Pharmacology A (○)	
					Biophysical Chemistry (◎)	Pharmacology III (○)	Practice of Clinical Pharmacy (○)	Pharmacotherapy B (○)	
							Clinical Pharmacy (○)		
						Clinical Medicine and Pharmacotherapy I (○)			
						Clinical Medicine and Pharmacotherapy II (○)			
						Pharmaceutical Affairs Related Laws (○)			
4. Improving English comprehension to acquire capacity of chemical English	English subject GPA	English subject GPA	English subject GPA	English subject GPA		TOEIC			
	TOEIC		Communication III (○)	Communication III (○)					
	Communication Seminar (◎)	Communication Seminar (◎)							
	Communication I (◎)	Communication II (◎)							
	Non-English Foreign Languages (△)	Non-English Foreign Languages (△)							
Abilities and Skills	1. Development of knowledge of chemical compounds including medicine. (application)			Organic Chemistry IA (◎)	Organic Chemistry II A (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)
				Organic Chemistry IB (◎)	Organic Chemistry II B (◎)	Organic Chemistry III (◎)	Organic Chemistry IV (○)	Practice of Organic Reactions (○)	
				Pharmaceutical Physical Chemistry (◎)	Experiments in Organic Chemistry (◎)	Experiments of Pharmacognosy (◎)	Research PracticeB (◎)	Practice of Structural Elucidation (○)	
					Experiments in Analytical Chemistry (◎)				
	2. Development of knowledge about human and biological bodies. (advance)			Biochemistry I (◎)	Pharmacology I (◎)	Pharmacology II (◎)	Pharmacology III (○)	AnOutline of Pathology (◎)	Clinical Pharmacology A (○)
				Biochemistry II (◎)	Experiments in Analytical Chemistry (◎)	Antibiotics and Drug resistance (◎)	Genetic Engineering (○)	Pharmacotherapy A (○)	Pharmacotherapy B (○)
				Microbiology (◎)	Experiments of Biological Chemistry (◎)	Experiments of Microbial Chemistry (◎)		Practice of Microbiology (○)	
						Biochemistry VI (◎)		Practice for clinical food science (△)	
								Practice of Clinical Pharmacy (○)	
								Clinical food science (△)	
						Clinical Pharmacy (○)			
						Clinical Medicine and Pharmacotherapy I (○)			
						AnOutline of Immunology (○)			
						Clinical Medicine and Pharmacotherapy II (○)			

Academic achievements		1st grade		2nd grade		3rd grade		4th grade	
		Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester	Spring semester	Fall semester
Abilities and Skills	3. Development of knowledge relating to mutual reaction between chemical compounds including medicine and a human body (application)			Basic Kampo Medicine (◎)	Biopharmaceutics (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)
					Pharmacology I (◎)	Pharmacology II (◎)	Research PracticeB (◎)	Practice of Analytical Drug Discovery and Evaluation (○)	Drug Informatics (○)
					Experiments in Analytical Chemistry (◎)	Biophysical Chemistry (◎)	Pharmacology III (○)	Pharmacotherapy A (○)	Clinical Pharmacology A (○)
								Practice of Clinical Pharmacy (○)	Pharmacotherapy B (○)
								Clinical Pharmacy (○)	
	4. Being able to read English chemical papers and discuss them. (application)	Communication Seminar (◎)	Communication Seminar (◎)	Communication III (○)	Communication III (○)	Research PracticeA (◎)	Research PracticeB (◎)	Practice of Drug Delivery System (○)	
		Communication I (◎)	Communication II (◎)						
5. To be able to basically treat major chemical agents, substances related to the living body, and microbes.		Pharmaceutical Analysis (◎)	Bio-Analytical Science (◎)	Experiments in Organic Chemistry (◎)	Pharmacology Practice (◎)	Research PracticeB (◎)	Practice of Microbiology (○)		
			Biochemistry I (◎)	Experiments of Cellular and Molecular Biology (◎)	Research PracticeA (◎)	Genetic Engineering (○)	Clinical Pharmacy (○)		
			Biochemistry II (◎)		Antibiotics and Drug resistance (◎)		Clinical Medicine and Pharmacotherapy I (○)		
			Microbiology (◎)		Experiments of Microbial Chemistry (◎)		Clinical Medicine and Pharmacotherapy II (○)		
					Experiments of Pharmacognosy (◎)				
6. To be able to measure and evaluate major biological reactions.				Experiments in Analytical Chemistry (◎)	Experiments of Public health Chemistry (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)	
				Experiments of Biological Chemistry (◎)	Pharmacology Practice (◎)		Clinical Pharmacy (○)		
							Clinical Medicine and Pharmacotherapy I (○)		
7. Being able to collect assess information on medicine.	Information Courses (◎)						Clinical Pharmacy (○)	Drug Informatics (○)	
							Clinical Medicine and Pharmacotherapy I (○)		
							Clinical Medicine and Pharmacotherapy II (○)		
Attitudes	1. Having ability to act as member of a research team.	Introductory Seminar for First-Year Students (◎)	Health and Sports Courses (○)			Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)
		Health and Sports Courses (○)	Introduction to Pharmaceutical Sciences (○)				Research PracticeB (◎)	Practice of Analytical Drug Discovery and Evaluation (○)	
								Clinical Pharmacy (○)	
Comprehensive Abilities	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	Introductory Seminar for First-Year Students (◎)	Area Courses (○)		Training of Physical Chemistry (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical Sciences III (◎)
		Information Courses (◎)	Social Cooperation Courses (△)		Experiments in Organic Chemistry (◎)	Practice of Pharmaceutics (◎)	Research PracticeB (◎)	Practice of xenobiotics and molecular toxicology (○)	Drug Informatics (○)
		Peace Science Courses (◎)	Introduction to Pharmaceutical Sciences (○)		Experiments of Pharmacognosy (◎)	Herbal medicine & Kampo medicine (◎)	Biological Statistics (○)	Practice of Analytical Drug Discovery and Evaluation (○)	
		Introduction to University Education (◎)			Experiments in Analytical Chemistry (◎)	Experiments of Microbial Chemistry (◎)		Practice of Biochemical Pharmacology (○)	
		Area Courses (○)			Experiments of Biological Chemistry (◎)	Experiments of Pharmacognosy (◎)		Practice of Microbiology (○)	
		Social Cooperation Courses (△)				Experiments of Public health Chemistry (◎)			

Liberal Arts Education Subjects Basic Specialized Subjects Specialized Education Subjects Graduation Thesis (◎)Required (○)Elective/required (△)Free elective