

Appended Form 1

Specifications for Major Program

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

Program name (Japanese)	
(English)	Program of Medicinal Sciences

1. Degree to be obtained: Bachelor of Medicinal Science
2. Overview

The Program of Medicinal Sciences is a four-year course which was established aiming to foster pharmaceutical specialists such as researchers and developers of drugs, providers of medical information, experts in environment/health when the pharmacist training course was transformed into 6-year system and the Program of Pharmaceutical Sciences was newly established in the School of Pharmaceutical Sciences. Based on a broad education not only within the field of the pharmaceutical sciences but also in a range from organic chemistry to life science, this program cultivates researchers in the wide field of life sciences as well as researchers/technicians engaged in drug development. Researches on environmental problems and hygiene are also conducted widely in this program, and students are trained to be researchers/experts handling these subjects through the essential education and research on pharmaceutical sciences as a foundation of research and development on pharmaceuticals. 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 on life sciences, organic chemistry, inorganic chemistry, physical chemistry, and analytical chemistry but also knowledge that can be acquired only from pharmaceutical fields such as pharmacology and pharmaceutics to foster students who can play an active role in various fields with different skills from students completed studies in other fields. The pharmaceutical sciences have cultivated human resources engaged in research, development, and production of pharmaceuticals in Japan. The history and know-hows to nurture such human resources in the 4-year program should be succeeded and developed more.

Besides, such human resources have been insufficient compared to the other countries so that the mission imposed on the four-year course of medicinal sciences is incalculable.

This program aims to foster students who are able to develop a new field of knowledge and contribute to local/global communities having a rich humanity by reinventing themselves looking ahead the future society based on the tradition of the pharmaceutical sciences. Specifically, this program provides students education to allow them to acquire 1) the fundamental knowledge and skills required to develop the strong questioning mind in sciences and motivation for learning; 2) the advanced skills required for exercising their creative thinking abilities to try to solve new problems actively and autonomously; and 3) the advanced and the wide-ranging knowledge and skills on pharmaceutical and medical sciences required to become researchers/technicians on drug development, biomedical innovators, providers of advanced medical information, experts in environment/health who are able to work globally as well.

Expecting students to be researchers/experts with global prospective in the public agencies or industries such as

pharmaceuticals, foods chemicals and cosmetics after graduation, this program fosters students to be able to lead the society as researchers at the forefront after acquiring the advanced knowledge and skills in graduate school.

In the first step after admission (Attached Sheet 1), 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 participate in the “Early Joint Experience Practice.”

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

- 5) The basic knowledge about drug treatment and the ability to explain it;
- 6) Fundamental knowledge, skills, and attitude regarding the effect of medicines and chemical substances on a human being and the effect of living environment and global ecosystem on human health, and the ability to explain and exercise that knowledge, and those skills;
- 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 Program of Medicinal Sciences, the curriculum (educational course) is arranged according to the policies described below in order to develop scientists and engineers who have abilities mentioned in the diploma policy and have deep humanity and wide-ranging intelligence.

- 1) To allow students to acquire fundamental knowledge such as physics, biology, mathematics and “Psychology for Medical Care Workers” as well as 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 and data science 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 in the 1st and 2nd year;
- 2) To allow students to understand the fundamental characteristics on medicines and chemical substances including biological materials, and to learn the fundamental knowledge about typical reactions, separation methods, configuration determination methods, etc., the curriculum provides subjects on the structure and characteristics of materials besides natural medicine resources such as Organic Chemistry and Analytical Chemistry. After learning lectures about these subjects, the curriculum also provides the practical training subjects;
- 3) To allow students to understand structures of living organisms at the level of individuals, organs and cells, and to learn the fundamental knowledge on the structures and functional regulations of living organisms, the curriculum provides subjects related to the structures and functions of living organisms such as Biochemistry as the Basic Specialized Subjects in the 1st and 2nd year, and subjects including more advanced contents like Physiological Chemistry and Cellular Biology as Specialized Subjects in the 3rd year. After taking lectures on these subjects, the practical training subjects are prepared for the fall semester in the 2nd year and the spring semester in the 3rd year in order to acquire the technical skills based on knowledge;
- 4) To allow students to understand the process of pharmacological actions of medicines, and to get the fundamental knowledge about the medicine’s actions to diseases, the action mechanism and in vivo fate, the curriculum provides subjects related to the actions and the in vivo fate of medicines such as Pharmacology and Biopharmaceutics as the Basic Specialized Subjects in the 1st and 2nd year, and subjects including more advanced contents like Pharmacokinetics as the Specialized Subjects in the 3rd year. After taking lectures on these subjects, the practical training subjects are prepared for the fall semester in the 2nd year and the spring semester in the 3rd year in order to acquire the technical skills based on knowledge;

- 5) To allow students to learn the fundamental knowledge about the pharmacotherapy, the curriculum provides the lecture subjects related to the diseases and the conditions such as Clinical Pharmacy and Pharmacotherapy in the 4th year as Specialized Subjects. These subjects are set as Elective/Required Subjects to foster the specialties for the future;
- 6) To allow students to learn the fundamental knowledge about effects of medicine and chemical substance to the human as well as the human health with the living environments and/or global ecosystem, the curriculum provides Lecture Subjects related to the health and the environment such as Public Health Chemistry in the 2nd and 3rd year. The practical training subjects are prepared for the 3rd year in order to acquire the technical skills and the attitudes based on knowledge;
- 7) To allow students to acquire the essential abilities to find and solve problems to be active as an enthusiastic researcher who can deal flexibly with the multiple needs, the curriculum fosters the ability of scientific abilities which lead to the problem-solving and the creation of the new value integrating the acquired knowledge and skills. Thereby the curriculum provides Seminar Subjects: Research Practices for the fall semester in the 3rd year, and subjects including basic contents: Special laboratory Works in Pharmaceutical Sciences I -III for the fall semester in the 3rd year and in the whole 4th year as the Specialized Study for Graduation, well-instructing students individually;
- 8) To allow students to acquire the fundamental abilities required to keep improving themselves grasping the new information and knowledge in order to deal with progresses of pharmacy, sciences and medical cares, the curriculum provides a more professional foreign language subject: Practical English for Pharmaceutical Students in the 2nd year in addition to the Foreign Languages Subjects in the 1st and 2nd year. Besides, The Specialized Study for Graduation Subjects: Special laboratory Works in Pharmaceutical Sciences I – III are provided from the fall semester in the 3rd year, well-instructing individually.
- 9) The curriculum provides subjects in order to get the qualification for Type-1 High School Teaching License (science) for applicants;

The learning achievements are evaluated by the suitable ways to each learning method of the curriculum based on the above Curriculum policy 1) to 9), and the program aims to achieve the Diploma policy. Basically, the Lecture Subjects are evaluated by written-examinations or written-examinations besides report assignments. The Practice Subjects are evaluated comprehensively by report assignments, practice notes, etc. The participatory learning subjects are evaluated by report assignments and presentation. The Seminar Subjects are evaluated by written-examinations, report assignments or presentation. The Specialized Study for Graduation Subjects are evaluated by a rubric determined separately.

Besides these evaluations, students are appraised by their attainment of the goals set by the Program of Medicinal Sciences.

To promote the systematic learning, the program sets a certain standard for the assignment to laboratories.

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) 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.)

While acquiring a series of research methods working in the society through their graduation research, students continue to graduate school to do pharmaceutical researches more deeply and establish the foundation of a sequence of the research as a basis to be worldwide researchers. Students are allocated to the laboratories to cover all related fields based on the laboratories' conveniences because the overemphasis on a specific field is regarded as not beneficial for the development of pharmaceutical sciences. The allocation method and requirements are defined separately.

10. Responsibility

(1) PDCA responsibility system (“Plan,” “Do,” “Check,” and “Act”)

“Plan” and “Do” shall be conducted by the Faculty Council of Pharmaceutical Sciences (Chief: Takuya Kumamoto (in charge of academic affairs)).

“Check” and “Act” shall be conducted by the dean 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 1.9 (ch) (9.5cy/P 4MClec) 11.2(am) 19.1 2 (n) esp 12.9 (r)-189 (am) 19.1 (ass2ssm) 19.1 (en) 22(t)] TJ0 Tc 0 T

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	Development of knowledge				Biopharmaceutics	Research Practice	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences	Special laboratory Works in Pharmaceutical Sciences
					Pharmacology I	Biophysical Chemistry	Research Practice	Practice of Analytical Drug Discovery and Evaluation	Drug Informatics
					Basic Kampo Medicine	Pharmacology III	Pharmacology IV	Pharmacotherapy A	Clinical Pharmacology A
					Experiments in Analytical Chemistry			Practice of Clinical Pharmacy	Clinical Medicine and Pharmacotherapy II
					Pharmacology II			Clinical Pharmacy	
								Clinical Medicine and Pharmacotherapy I	
								Pharmacotherapy B	
	Being able to read English	Communication Seminar	Communication Seminar		Practical English for Pharmaceutical Students	Research Practice	Research Practice	Practice of Drug Delivery System	
		Communication	Communication						
	To be able to basically treat		Pharmaceutical Analysis	Bio- Analytical Science	Microbiology	Pharmacology Practice	Research Practice	Practice of Microbiology	Clinical Medicine and Pharmacotherapy II
			Biochemistry I		Experiments in Organic Chemistry	Research Practice	Genetic Engineering	Clinical Pharmacy	
			Biochemistry II		Experiments of Cellular and Molecular Biology	Antibiotics and Drug resistance		Clinical Medicine and Pharmacotherapy I	
						Experiments of Microbial Chemistry			
						Experiments of Pharmacognosy			
	To be able to measure and				Experiments in Analytical Chemistry	Experiments of Public health Chemistry	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences	Special laboratory Works in Pharmaceutical Sciences
					Experiments of Biological Chemistry	Pharmacology Practice		Clinical Pharmacy	Clinical Medicine and Pharmacotherapy II
								Clinical Medicine and Pharmacotherapy I	
	Being able to collect assess	Information and Data Science Courses	Information and Data Science Courses					Clinical Pharmacy	Drug Informatics
								Clinical Medicine and Pharmacotherapy I	Clinical Medicine and Pharmacotherapy II
	Having ability to act as member	Introductory Seminar for First- Year Students	Health and Sports Courses			Research Practice	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences	Special laboratory Works in Pharmaceutical Sciences
		Health and Sports Courses	Introduction to Pharmaceutical Sciences				Research Practice	Practice of Analytical Drug Discovery and Evaluation	Clinical Medicine and Pharmacotherapy II
								Clinical Pharmacy	
								Clinical Medicine and Pharmacotherapy I	
		Introductory Seminar for First- Year Students	Area Courses	Peace Science Courses	Training of Physical Chemistry	Research Practice	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences	Special laboratory Works in Pharmaceutical Sciences
		Information and Data Science Courses	Information and Data Science Courses		Experiments in Organic Chemistry	Practice of Pharmaceutics	Research Practice	Practice of xenobiotics and molecular toxicology	Drug Informatics
		Introduction to University Education	Social Cooperation Courses		Experiments of Pharmacognosy	Herbal medicine & Kampo medicine	Biological Statistics	Practice of Analytical Drug Discovery and Evaluation	
		Area Courses	Introduction to Pharmaceutical Sciences		Experiments in Analytical Chemistry	Experiments of Microbial Chemistry		Practice of Biochemical Pharmacology	
		Social Cooperation Courses			Experiments of Biological Chemistry	Experiments of Pharmacognosy		Practice of Microbiology	
						Experiments of Public health Chemistry			

Required

Elective/required

Free elective