As of April 1, 2024

For entrants in FY 2024

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 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 III by being allocated into each laboratory. Student’s requests are respected for the allocation. This 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 can acquire sufficient knowledge and skills. During the fourth step, Lecture of Program of Pharmaceutical Sciences will be allowed to choose the related lectures.

The student who chose a program by English for finding employment in foreign countries can meet completion requirements by choosing "B" in the language column of the syllabus.

3. Diploma policy (policy for awarding degrees and goal of the program)

The Program of Pharmaceutical Science will approve the graduation of, and award the degree Bachelor (medicinal sciences) to, students who have acquired the capabilities described below, and earned the required credits defined for the educational course:

1) The fundamental abilities on subjects required for learning pharmaceutical sciences such as physics, chemistry, biology and ethics as well as wide-ranging liberal arts;
2) The fundamental knowledge and skills regarding such things as major reactions, separation methods, structure determination methods, that are required for understanding the properties of chemical substances including medicines and biological materials, and the ability to explain and exercise that knowledge and those skills;
3) The fundamental knowledge and skills regarding the structure and mechanisms of function coordination in living bodies that are required for understanding the constitution of the living body at various levels, such as the individual body, an organ in the body, and a cell in the organ, and ability to explain and exercise that knowledge and those skills;
4) The fundamental knowledge, skills, and attitude regarding such matters as the effect of a medicine on a disease, mechanisms of action, and metabolic end result that are required for understanding the processes of the pharmacological action of medicines, and the ability to explain and exercise that knowledge, those skills, and that attitude;

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 the 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)

Program of Medicinal Sciences

Policy for design, education and learning method of curriculum

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-raging 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, basic 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;

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.

Students present the results of their research at the graduation research presentation assembly that is held in the early March in the fourth year.

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: Norimitsu Morioka(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 for program assessment

The educational and social effects of this program will be assessed. For the educational effect, the program’s effect on students’ learning will be judged based on the evaluation of their academic 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. Students’ program assessments from the questionnaire will be added to the program assessment 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 to the content of the program. At regular intervals, we ask students’ main employers to assess the p

[redacted]

[redacted]	...he subject is taken			
[redacted]	3rd grade		4th grade	
[redacted]	Spring	Fall	Spring	Fall
[redacted]			①	
[redacted]			1	
[redacted]			2	
[redacted]	①			
[redacted]		①		
[redacted]	1	1		
[redacted]			1	
[redacted]			1	
[redacted]			1	
[redacted]			1	
[redacted]			1	
[redacted]			1	
[redacted]			1	
[redacted]			1	
[redacted]			8	
[redacted]	1	1	10	
[redacted]			2	
[redacted]			1	
[redacted]				
[redacted]	②			
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[redacted]	②			
[redacted]		②		
[redacted]	14	4	3	
[redacted]		2		
[redacted]		2		
[redacted]		2		

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
				Public Health Chemistry 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
					28					2	0	8	12	6
					55				2	6				

Academic achievements of Medicinal Sciences Program

Relationships between the evaluation items and evaluation criteria

Academic achievements			Evaluation criteria		
Evaluation items			Excellent	Very Good	Good
Knowledge and Understanding	(1)	The knowledge of chemical compounds including medicine.	1. Being able to name representative components and correctly write down the structural formula. 2. Being able to select chemical reaction. 3. Being able to correctly announce results gained by clarifying used procedure or process. 4. Being able to enumerate additives used for medical drug production and to explain their roles and physicochemical character. 5. 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 name representative components and correctly write down the structural formula. 2. Being able to select appropriate chemical reaction. 3. Being able to announce results gained by clarifying used procedure or process. 4. Being able to explain the roles of additives used for medical drug production and their physicochemical character. 5. 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 name representative components and correctly write down the structural formula. 2. Being able to explain the outline the proposed chemical reaction. 3. Being able to present and announce outlines of used process and procedures. 4. Being able to explain the roles of additives used for medical drug production and their physicochemical character. 5. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	(2)	Knowledge of human and biological bodies.	1. Being able to enumerate characteristics of representative enzyme and explain the characteristics of reaction comparing to general chemical reaction. 2. Being able to enumerate representative physiological active substances and explain their productive organs, physiological functions, mechanism of secretion adjustment and the related diseases. 3. Being able to briefly explain major human body's protective reaction mechanism in the level of tissue, cells and molecules. 4. 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 enumerate characteristics of representative enzyme and explain the characteristics of reaction comparing to general chemical reaction. 2. Being able to enumerate representative physiological active substances and explain their productive organs, physiological functions, mechanism of secretion adjustment and the related diseases. 3. Being able to briefly explain major human body's protective reaction mechanism in the level of tissue, cells and molecules . 4. 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 compare characteristics of representative enzyme reaction to general chemical reaction and explain them. 2. Being able to explain productive organs, physiological functions and mechanism of secretion adjustment of representative physiological active substances. 3. Being able to briefly explain major human biophylaxis reaction. 4. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	(3)	The knowledge relating to mutual reaction between chemical compounds including medicine and a human body	1. Being able to enumerate and explain basic matters on nutrition, metabolism, food safety, and hygiene which are necessary for health maintenance. 2. Being able to enumerate and explain about basic matters chemical effects to humans and relation between living environment and ecology and human health. 3. Being able to enumerate representative medicine and to explain basic matters on the action mechanism and the destiny in human body. 4.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 enumerate and explain basic matters on nutrition, metabolism, food safety, and hygiene which are necessary for health maintenance. 2. Being able to enumerate and explain about basic matters chemical effects to humans and relation between living environment and ecology and human health. 3. Being able to enumerate representative medicine and to explain basic matters on the action mechanism and the destiny in human body. 4.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 explain basic matters on nutrition, metabolism, food safety, and hygiene which are necessary for health maintenance. 2. Being able to enumerate and explain about basic matters chemical effects to humans and relation between living environment and ecology and human health. 3. Being able to enumerate presented medicine and to explain basic matters on the action mechanism and the destiny in human body. 4. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	(4)	Improving English comprehension to acquire capacity of chemical English	The level of achievement will be assessed based on a formula that includes the average points calculated based on the student's TOEIC score and an evaluation in class. 80% is minimum.	The level of achievement will be assessed based on a formula that includes the average points calculated based on the student's TOEIC score and an evaluation in class. 70% is minimum.	The level of achievement will be assessed based on a formula that includes the average points calculated based on the student's TOEIC score and an evaluation in class. 60% is minimum.
Abilities and Skills	(1)	Development of knowledge of chemical compounds including medicine. (application)	1. Being able to construct synthetic pathways indicating appropriate chemical reaction. 2. Being able to properly announce the acquired results specifying the process and ways. 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 pathways for synthesis combining appropriate chemical reaction among presented ones. 2. Being able to announce results gained by clarifying the used procedure and pathways. 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 construct pathways for synthesis combining presented chemical reaction. 2. Being able to announce results gained by clarifying the used procedure and pathways. 3. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	(2)	Development of knowledge about human and biological bodies. (advance)	1. Being able to construct activity measurement methods of representative enzyme. 2. Being able to construct measurements of activation and secretion of representative physiological active substances. 3. Being able to explain major human biophylaxis reaction relating with diseases. 4. 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. 2. Being able to construct ways to measure activation and secretion of presented physiological active substances. 3. Being able to explain human biophylaxis reaction relating to diseases. 4. 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 outline activity measurement methods of presented enzyme. 2. Being able to outline ways to measure activation and secretion of presented physiological active substances. 3. Being able to outline human biophylaxis reaction relating to diseases. 4. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.
	(3)	Development of knowledge relating to mutual reaction between chemical compounds including medicine and a human body (application)	1. Being able to investigate current situation of nutrition in Japan, explain the issues using used data and propose the solution. 2. Being able to investigate examples of drug interaction, explain the mechanism and propose the way of avoidance. 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 investigate current situation of nutrition in Japan and explain the issues using used data. 2. Being able to investigate examples of drug interaction, consider the mechanism and propose the way of avoidance. 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 investigate current situation of nutrition in Japan and enumerate the issues. 2. Being able to investigate examples of drug interaction, consider the mechanism and select the appropriate way of avoidance. 3. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 60%.

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%.
	(5)	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%.
	(6)	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%.
	(7)	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.

Relationships between the evaluation items and class subjects(Program of Medicinal Sciences)

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																										Total weighted values of evaluation items in the subject
					Knowledge and Understanding								Abilities and Skills														Attitudes		Comprehensive Abilities		
					(1)		(2)		(3)		(4)		(1)		(2)		(3)		(4)		(5)		(6)		(7)		(1)		(1)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Liberal Arts Education	Peace Science Courses	2	Required	3-2T																									100	1	100
Liberal Arts Education	Introduction to University Education	2	Required	1-1T																									100	1	100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	Required	1-1T																							50	1	50	1	100
Liberal Arts Education	Area Courses	8	Elective/required	1～2																									100	1	100
Liberal Arts Education	Communication Seminar	2	Required	1-1T 2-3T							60	1							40	1											100
Liberal Arts Education	Communication Ⅰ	2	Required	1							80	1							20	1											100
Liberal Arts Education	Communication Ⅱ	2	Required	2							60	1							40	1											100
Liberal Arts Education	Non-English Foreign Languages	0	Free elective	1～2							100	1																			100
Liberal Arts Education	Information and Data Science Courses	4	Required Elective/required	1～2																					60	1			40	1	100
Liberal Arts Education	Health and Sports Courses	2	Elective/required	1～2																							100	1			100
Liberal Arts Education	Social Cooperation Courses	0	Free elective	1～2																									100	1	100
Liberal Arts Education	Foundation Courses	10	Elective/required	1～2	50	1	50	1																							100
Specialized Education	Practical English for Pharmaceutical Students	2	Required	4-3T							80	1							20	1											100
Specialized Education	Introduction to Pharmaceutical Sciences	2	Required	2-3T																							50	1	50	1	100
Specialized Education	General Chemistry	2	Required	1-2T	100	1																									100
Specialized Education	Pharmaceutical Analysis	2	Required	2-4T																	100	1									100
Specialized Education	Nuclear Pharmacy	2	Required	3-1T	100	1																									100
Specialized Education	Organic Chemistry IA	1	Required	1-1T	50	1							50	1																	100
Specialized Education	Organic Chemistry IB	1	Required	1-2T	50	1							50	1																	100
Specialized Education	Biochemistry I	2	Required	2-3T			50	1							25	1					25	1									100
Specialized Education	Biochemistry II	2	Required	2-4T			60	1							20	1					20	1									100
Specialized Education	Biological Chemistry III	2	Required	3-1T			100	1																							100
Specialized Education	Public Health Chemistry I	2	Required	3-1T					100	1																					100
Specialized Education	Basic Kampo Medicine	2	Required	4-4T					80	1							20	1													100
Specialized Education	Microbiology	2	Required	4-4T			60	1							20	1					20	1									100
Specialized Education	Public Health Chemistry II	2	Required	3-2T					100	1																					100
Specialized Education	Pharmaceutical Physical Chemistry	2	Required	3-1T	80	1							20	1																	100
Specialized Education	Bio-Analytical Science	2	Required	3-2T																	100	1									100
Specialized Education	Natural Products Chemistry	2	Required	3-1T	100	1																									100
Specialized Education	Biological Chemistry IV	2	Required	3-2T			100	1																							100
Specialized Education	Biopharmaceutics	2	Required	4-3T					50	1							50	1													100
Specialized Education	Biochemistry V	2	Required	4-3T			100	4																							100
Specialized Education	Organic Chemistry ⅡA	1	Required	2-3T	50	1							50	1																	100
Specialized Education	Organic Chemistry ⅡB	1	Required	2-4T	50	1							50	1																	100
Specialized Education	Pharmacology I	2	Required	4-3T			25	1	30	1					25	1	20	1													100
Specialized Education	Functional Morphology	2	Required	3-2T			80	1							20	1															100
Specialized Education	Outline of Pathology	2	Required	7			80	1							20	1															100
Specialized Education	Practice for clinical food science	2	Free elective	7			80	1							20	1															100
Specialized Education	Research PracticeA	1	Required	5	10	1			10	1			10	1			10	1	10	1	10	1					20	1	20	1	100
Specialized Education	Research PracticeB	1	Required	6	10	1			10	1			10	1			10	1	10	1	10	1					20	1	20	1	100
Specialized Education	Practice of Structural Elucidation	1	Elective/required	7									100	1																	100
Specialized Education	Practice of xenobiotics and molecular toxicology	1	Elective/required	7																									100	1	100
Specialized Education	Practice of Organic Reactions	1	Elective/required	7	50	1							50	1																	100
Specialized Education	Practice of Microbiology	1	Elective/required	7			10	1							10	1					40	1							40	1	100
Specialized Education	Practice of Drug Delivery System	1	Elective/required	7															100	1											100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																										Total weighted values of evaluation items in the subject
					Knowledge and Understanding								Abilities and Skills														Attitudes		Comprehensive Abilities		
					(1)		(2)		(3)		(4)		(1)		(2)		(3)		(4)		(5)		(6)		(7)		(1)		(1)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Specialized Education	Practice of Analytical Drug Discovery and Evaluation	1	Elective/required	7					25	1							25	1									25	1	25	1	100
Specialized Education	Practice of Biochemical Pharmacology	1	Elective/required	7																									100	1	100
Specialized Education	Practice of Clinical Pharmacy	1	Elective/required	7			20	1	20	1					30	1	30	1													100
Specialized Education	Clinical food science	2	Free elective	7			80	1							20	1															100
Specialized Education	General Organic Chemistry and Practice	1	Free elective	7	50	1							50	1																	100
Specialized Education	Pharmacology II	2	Required	4-4T			25	1	30	1					25	1	20	1													100
Specialized Education	Herbal medicine & Kampo medicine	2	Required	5-1T	50	1																							50	1	100
Specialized Education	Pharmacokinetics	2	Required	5-1T					100	1																					100
Specialized Education	Biochemistry VI	2	Required	4-4T			80	1							20	1															100
Specialized Education	Biophysical Chemistry	2	Required	5-2T	40	1			40	1							20	1													100
Specialized Education	Antibiotics and Drug resistance	2	Required	5-2T			40	1							30	1					30	1									100
Specialized Education	Physiological Chemistry	2	Required	5-2T			100	1																							100
Specialized Education	Organic Chemistry III	2	Required	3-1T	50	1							50	1																	100
Specialized Education	Medicinal Organic Chemistry	2	Required	5-2T	100	1																									100
Specialized Education	Biological Statistics	2	Required	6																									100	1	100
Specialized Education	Pharmacology III	2	Required	5-1T			25	1	30	1					25	1	20	1													100
Specialized Education	Pharmacology IV	2	Required	6-3T			25	1	30	1					25	1	20	1													100
Specialized Education	Industrial Pharmaceutics	2	Elective/required	6-4T	100	1																									100
Specialized Education	Cell Motility	2	Elective/required	6-4T			100	4																							100
Specialized Education	Genetic Engineering	2	Elective/required	6-3T			50	1							25	1					25	1									100
Specialized Education	Organic Chemistry IV	2	Elective/required	4-3T	50	1							50	1																	100
Specialized Education	Public Health Chemistry III	2	Elective/required	6-3T					100	1																					100
Specialized Education	Clinical Pharmacy	2	Elective/required	7-2T			20	1	20	1					10	1	10	1			10	1	10	1	10	1	10	1			100
Specialized Education	Clinical Medicine and Pharmacotherapy I	2	Elective/required	7-1T			20	1	20	1					10	1	10	1			10	1	10	1	10	1	10	1			100
Specialized Education	Pharmacotherapy A	2	Elective/required	8-3T			30	1	30	1					20	1	20	1													100
Specialized Education	AnOutline of Immunology	2	Elective/required	7-2T			50	1							50	1															100
Specialized Education	Clinical Medicine and Pharmacotherapy II	2	Elective/required	8-3T			20	1	20	1					10	1	10	1			10	1	10	1	10	1	10	1			100
Specialized Education	Pharmaceutical Affairs Related Laws	2	Elective/required	7-2T					100	1																					100
Specialized Education	Clinical Pharmacology A	2	Elective/required	8-3T			30	1	30	1					20	1	20	1													100
Specialized Education	Pharmacotherapy B	2	Elective/required	7-1T			30	1	30	1					20	1	20	1													100
Specialized Education	Drug Informatics	2	Elective/required	8-3T					40	1							20	1							20	1			20	1	100
Specialized Education	Experiments in Analytical Chemistry	1	Required	4	5	1			5	1			20	1	20	1	20	1					20	1					10	1	100
Specialized Education	Training of Physical Chemistry	1	Required	4	10	1							80	1															10	1	100
Specialized Education	Experiments in Organic Chemistry	1	Required	4	20	1							20	1							20	1							40	1	100
Specialized Education	Experiments of Cellular and Molecular Biology	1	Required	4																	100	6									100
Specialized Education	Experiments of Biological Chemistry	1	Required	4			10	1							40	1							40	1					10	1	100
Specialized Education	Experiments of Pharmacognosy	1	Required	5	10	1							40	1							40	1							10	1	100
Specialized Education	Experiments of Microbial Chemistry	1	Required	5			10	1							10	1					40	1							40	1	100
Specialized Education	Pharmacology Practice	1	Required	5																	50	1	50	1							100
Specialized Education	Practice of Pharmaceutics	1	Required	5																									100	1	100
Specialized Education	Experiments of Environmental Health Science	1	Required	5																			90	1					10	1	100
Specialized Education	Special laboratory Works in Pharmaceutical Sciences I	2	Required	6	10	1			10	1	5	1	10	1			10	2	5	1			10	2			20	5	20	5	100
Specialized Education	Special laboratory Works in Pharmaceutical Sciences Ⅱ	2	Required	7	10	1			10	1	5	1	10	1			10	2	5	1			10	2			20	5	20	5	100
Specialized Education	Special laboratory Works in Pharmaceutical Sciences Ⅲ	2	Required	8	10	1			10	1	5	1	10	1			10	2	5	1			10	2			20	5	20	5	100
Total					1215	26	1560	37	1080	27	395	8	730	19	570	26	405	25	255	10	660	23	260	13	110	5	355	24	1305	39	8900

Curriculum Map of Medicinal Sciences Program

Sheet 4

	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 (○)	Nuclear Pharmacy (◎)	Experiments in Organic Chemistry (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical SciencesIII (◎)
		Organic Chemistry IA (◎)	Organic Chemistry II A (◎)	Pharmaceutical Physical Chemistry (◎)	Experiments in Analytical Chemistry (◎)	Medicinal Organic Chemistry (◎)	Industrial Pharmaceutics (○)	Practice of Organic Reactions (○)	
		Organic Chemistry IB (◎)	Organic Chemistry II B (◎)	Natural Products Chemistry (◎)	Training of Physical Chemistry (◎)	Herbal medicine & Kampo medicine (◎)	Research PracticeB (◎)	General Organic Chemistry and Practice (△)	
		General Chemistry (◎)		Organic Chemistry III (◎)	Organic Chemistry IV (○)	Biophysical Chemistry (◎)			
						Experiments of Pharmacognosy (◎)			
	2. Knowledge of human and biological bodies.	Foundation Courses (○)	Foundation Courses (○)	Biological Chemistry III (◎)	Pharmacology I (◎)	Physiological Chemistry (◎)	Pharmacology IV (◎)	AnOutline of Pathology (◎)	Clinical Pharmacology A (○)
			Biochemistry I (◎)	Biological Chemistry IV (◎)	Microbiology (◎)	Antibiotics and Drug resistance (◎)	Cell Motility (○)	Pharmacotherapy A (○)	Clinical Medicine and Pharmacotherapy II (○)
			Biochemistry II (◎)	Functional Morphology (◎)	Biochemistry V (◎)	Experiments of Microbial Chemistry (◎)	Genetic Engineering (○)	Practice of Microbiology (○)	
					Experiments of Biological Chemistry (◎)	Pharmacology III (◎)		Practice for clinical food science (△)	
					Pharmacology II (◎)			Practice of Clinical Pharmacy (○)	
					Biochemistry VI (◎)			Clinical food science (△)	
								Clinical Pharmacy (○)	
								Clinical Medicine and Pharmacotherapy I (○)	
								AnOutline of Immunology (○)	
								Pharmacotherapy B (○)	
	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 SciencesIII (◎)
				Public Health Chemistry II (◎)	Pharmacology I (◎)	Pharmacokinetics (◎)	Public Health Chemistry III (○)	Practice of Analytical Drug Discovery and Evaluation (○)	Drug Informatics (○)
					Basic Kampo Medicine (◎)	Biophysical Chemistry (◎)	Research PracticeB (◎)	Pharmacotherapy A (○)	Clinical Pharmacology A (○)
					Experiments in Analytical Chemistry (◎)	Pharmacology III (◎)	Pharmacology IV (◎)	Practice of Clinical Pharmacy (○)	Clinical Medicine and Pharmacotherapy II (○)
					Pharmacology II (◎)			Clinical Pharmacy (○)	
								Clinical Medicine and Pharmacotherapy I (○)	
								Pharmacotherapy B (○)	
								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			Practical English for Pharmaceutical Students (◎)		Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical SciencesIII (◎)
		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 (◎)	Pharmaceutical Physical Chemistry (◎)	Experiments in Organic Chemistry (◎)	Research PracticeA (◎)	Special laboratory Works in Pharmaceutical Sciences I (◎)	Special laboratory Works in Pharmaceutical Sciences II (◎)	Special laboratory Works in Pharmaceutical SciencesIII (◎)
		Organic Chemistry IB (◎)	Organic Chemistry II B (◎)	Organic Chemistry III (◎)	Experiments in Analytical Chemistry (◎)	Experiments of Pharmacognosy (◎)	Research PracticeB (◎)	Practice of Organic Reactions (○)	
					Training of Physical Chemistry (◎)			Practice of Structural Elucidation (○)	
					Organic Chemistry IV (○)			General Organic Chemistry and Practice (△)	
	2. Development of knowledge about human and biological bodies. (advance)		Biochemistry I (◎)	Functional Morphology (◎)	Pharmacology I (◎)	Antibiotics and Drug resistance (◎)	Pharmacology IV (◎)	AnOutline of Pathology (◎)	Clinical Pharmacology A (○)
			Biochemistry II (◎)		Microbiology (◎)	Experiments of Microbial Chemistry (◎)	Genetic Engineering (○)	Pharmacotherapy A (○)	Clinical Medicine and Pharmacotherapy II (○)
					Experiments in Analytical Chemistry (◎)	Pharmacology III (◎)		Practice of Microbiology (○)	
					Experiments of Biological Chemistry (◎)			Practice for clinical food science (△)	
					Pharmacology II (◎)			Practice of Clinical Pharmacy (○)	
					Biochemistry VI (◎)			Clinical food science (△)	
								Clinical Pharmacy (○)	
								Clinical Medicine and Pharmacotherapy I (○)	
								AnOutline of Immunology (○)	
								Pharmacotherapy B (○)	

Program of Medicinal Sciences: Course Step

Selection of Program on matriculation (Students in Program of Medicinal Sciences, School of Pharmaceutical Sciences)

First Step: Undergraduate Introductory

- Liberal Arts Education Program
  required elective: ☞ Course Table
- Introductory Seminar • Early Practice Training
  compulsory: ☞ Course Table
- Communication • Humanism
  required elective : ☞ Course Table

Second Step

- Structure and Properties of Materials
  compulsory: ☞ Course Table
- Natural Medicines
  compulsory:☞ Course Table
- Biological Structure and Function
  compulsory:☞ Course Table

Third Step

- Action of Medicines
  required elective:
  ☞ Course Table
- Diseases and Pathologies
  required elective:
  ☞ Course Table
- Pharmacist Services
  required elective :
  ☞ Course Table
- Pharmaceutical Laws and Regulations
  required elective :
  ☞ Course Table
- Pharmacokinetics of medicines
  required elective :
  ☞ Course Table
- Preparation of pharmaceutics and administration of medicines
  required elective :
  ☞ Course Table
- Health and Environmental
  required elective:
  ☞ Course Table
- Practice
  compulsory:
  ☞ Course Table

If a student has not taken three or more compulsory subjects, the student cannot progress to the fourth step.

Fifth Step

- Research Practice A/B
  compulsory:☞ Course Table
- Laboratory Works for Graduation
  compulsory:☞ Course Table

Requirement for Graduation: Completion of Program of Medicinal Sciences

Graduation of Program of Medicinal Sciences,
School of Pharmaceutical Sciences, Bachelor of Medicinal Science