For entrants in FY 2016

Appended Form 1

Specifications for Major Program

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

Program name (Japanese)	
(English)	Medicinal Sciences Program
1 Degree: Bachelor (medi	cinal 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 pharmaceutics at pharmaceutical companies. Based on a broad education not only within the field of pharmaceutics 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 pharmacentics, 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 pharmaceutics 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 pharmaceutics 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, package 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 divided into groups to be assigned to each classroom. In the assignment of students to each classroom, individual student's wishes will be respected. 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, applicants for the qualification for the national examination for pharmacists will be allowed to choose the related lectures.

3. Diploma policies (degree conferment policy & Program attainment goals)

In the Medicinal Sciences Program, graduation will be certified for students who have acquired the abilities listed below and who have acquired the predetermined number of credits.

- 1) Basic abilities in physics, chemistry, biology, mathematics, and ethics, which are required to study medicinal sciences (knowledge, skills, and attitude),
- Basic knowledge of representative reactions, separation methods, and structure determination methods required to understand the basic reactivity of chemical substances including medical supplies and biological materials, and basic skills to conduct them,
- 3) Basic abilities related to the structure and functional adjustment of life forms required to understand the formation of life forms on the individual, organic, and cellular levels (knowledge, skills, and attitude),
- 4) Basic abilities related to the functions, mode of action, and the future effects of medicine in the body in the case of illness required to understand the medicinal action of medical supplies (knowledge, skills, and attitude),
- 5) Abilities related to basic and applied knowledge on drug therapy (knowledge, skills, and attitude),
- 6) Basic abilities related to the influence of medical supplies and chemical substances on people, and the relationships between the living environment & global ecosystem and human health (knowledge, skills, and attitude), and
- 7) The ability to continuously improve their capabilities to assess the organization and the results of experimentsoftBss

health sports subjects, and fundamental subjects under the university-wide implementation system to enable students to acquire broad and diversified basic knowledge and basic learning skills,

- 2) Set subjects related to early experience, communication & humanism, the structure & nature of substances, natural medical resources, and the structure & functions of living bodies as basic specialized subjects to enable students to systematically acquire professional methodologies and knowledge,
- 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) Provide the subjects required for a High School Teaching License for students who wish to obtain the license, and
- 7) For graduates of this Program to be qualified to take the national examination for pharmacists, they need to meet the following requirements: (1) To be enrolled in a Graduate School of Medicinal Sciences at this university for at least two years and complete the first semester of the doctor course, (2) To earn the additional credits necessary to graduate from the Program of Pharmaceutical Sciences (6-year course), and (3) To take pharmaceutical practical training during the period when they are not enrolled in this University's program or the graduate school (first semester of the doctor course) stated above.
- 5. Start of the Program / admission conditions

Start of this program is the first year (for choosing this Program).

6. Qualification(s)

a) Qualifications for candidates for the National Examination for Pharmacist $*^1$

- *¹ Graduates of the Program of Medicinal Sciences need to fulfill the following requirements to qualify for the national examination for pharmacist:
 - (1) To be enrolled in the Graduate School of Medicinal Sciences at this university for at least 2 years, and complete the first semester of the doctor course,
 - (2) To earn additional credits necessary to graduate from the Program of Pharmaceutical Sciences (6-year course), and
 - (3) To take pharmaceutical practical training during the period when they are not enrolled in Hiroshima University's program or graduate school (first semester of the doctor course) stated above.
 - b) Type-1 High School Teaching License (science)
 - c) 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 class content

See the Table of Registration Standards on Attached Sheet 1 for your class subjects. (Attach the Table of

(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 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 Meeting. Based on students' assessment of classes and the Program assessment, class subjects in this Program are checked and assessed, and the results are used to improve the Program. These results are fed back to students through "Momiji." Comments from students in the questionnaire on class assessment will be fed back for every class through the Momiji questionnaire on class assessment.

* Please enter the list of faculty members in charge on Attached Sheet 5.

Table of Registration Standards for Specialized Education Subjects

Medicinal Sciences Program

	pe	/le			No. of		,	Year i	n whi	ch th	e subj	ect is	taker	ı
/pe	ct ty]	n Sty	Required No. of	Class subjects etc	INO. OI credit	Type of course	1st a	trade	2nd a	arade	3rd c	trade	4th c	trade
T	ubje	essol	credits	Class Subjects, etc.	s	registration	130 8	auc	ع nu	graue	JIU	auc	FULE	graue
	S	Г					Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
			(2)	Introduction to Pharmaceutical Sciences	2	Free elective		2						
				Nuclear Pharmacy	2									
				General Chemistry	2									
				Organic Chemistry I	2									
				Biochemistry I	2									
				Biochemistry II	2									
	ts			Biological Chemistry III	2									
	jec			Public Health Chemistry I	2									
	qn			Pharmaceutical Analysis	2									
	d S	re		Basic Natural Product Chemistry	2									
	ize	ctu	49	Microbiology	2	Doguinod								
	ial	Le	42	Public Health Chemistry II	2	Required								
	pec			Punctional Morphology	2									
	C S			Pharmacognosy Biological Chemistry W	2									
	asi			Bionbarmacoutics	2 2									
	B			Dioplial inaceutics Dearmacoutical Deviceal Chamistry	2 2									
				Biochomistry V	2									
				Bio Analytical Science	2 2									
				Organic Chemistry	2									
ects				Dharmacology I	2									
ıbje				AnOutling of Pathology	2									
Sı			Т	AnOutline of Pathology 2 Total(Basic Specialized Subjects) 44					22	14			2	
ion			(2)	Practice for clinical food science	2	Free elective		0	~~				2	
cat			(~)	Research Practice	1								~	
np			2	Research Practice	1	Required								
ΗE				Practice of Structural Elucidation	1								1	
ize		<u>ب</u>		Practice of xenobiotics and molecular toxi	1								1	
iali		ina		Practice of Organic Reactions	1								1	
bec		emi.	1	Practice of Structural Biology	1								1	
SI		Ň	1	Practice of Drug Delivery System	1	Elective/required							1	
				Practice of Analytical Drug Discovery and	1								1	
				Practice of Biochemical Pharmacology	1								1	
	ects			Practice of Clinical Pharmacy	1	1							1	
	ıbjε			Total(Elective/required)	8								8	
	Su		(2)	Clinical food science	2	Free elective							2	
	sed			Pharmacology II	2						2			
	aliz			Chemistry of Natural Products	2						2			
	ecia			Pharmacokinetics	2						2			
	Sp			Biochemistry VI	2						2			
				Biophysical Chemistry	2						2			
		ure		Antibiotics and Drug resistance	2						2			
		ščti	26	Physiological Chemistry	2	Elective/required					2			
		Ľ	~0	Organic Chemistry III	2	Elective/required					2			
				Medicinal Organic Chemistry	2						2			
				Industrial Pharmaceutics	2							2		
				Cell Motility	2							2		
				Genetic Engineering	2							2		
				Organic Chemistry IV	2							2		
				Public Health Chemistry III	2							2		

	/pe	yle	Doguinad		No of			Year i	n whi	ch th	e subj	ect is	taker	ı
Type	ject ty	on St	No. of	Class subjects, etc.	credit	Type of course registration	1st g	grade	2nd g	grade	3rd g	grade	4th g	grade
	Sub	Less	credits		s		Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
				Biological Statistics	2							2		
				Pharmacology III	2							2		
				Clinical Pharmacy	2								2	
				Clinical Medicine and Pharmacotherapy I	2								2	
		a)		Pharmacotherapy A	2								2	
		un	26	AnOutline of Immunology	2	Elective/required							2	
		,ect		Clinical Medicine and Pharmacotherapy I	2								2	
		Г		Pharmaceutical Affairs Related Laws	2								2	
				Clinical Pharmacology A	2									2
cts				Pharmacotherapy B	2									2
bje	ts			Drug Informatics	2									2
Su	jec			Total(Elective/required	50						18	14	12	6
on	qn			Experiments in Analytical Chemistry	1									
ati	s p			Training of Physical Chemistry	1									
luc	ize			Experiments in Organic Chemistry	1									
E	ial			Experiments of Cellular and Molecular B	1									
zed	pec	ice	10	Experiments of Biological Chemistry	1	Required								
ali	S	act	10	Experiments of Pharmacognosy	1	Requireu								
eci		\mathbf{Pr}		Experiments of Microbial Chemistry	1									
$_{\rm Sp}$				Pharmacology Practice	1									
				Practice of Pharmaceutics	1									
				Experiments of Public health Chemistry	1									
				Total(Practice)	10					5	5			
		duation		Special laboratory Works in Pharmaceuti	2									
		for Gra	6	Special laboratory Works in Pharmaceuti	2	Required								
		al Study		Special laboratory Works in Pharmaceuti	2									
		Speci	Т	otal(Special Study for Graduation	6							2	2	2
				Total(Specialized Subjects	85					5	25	17	30	8
			87	Total(Specialized Education Subjects	127									

Note: You need at least 1 credit per subject in Elective/Required Subjects I, and at least 26 credits from 13 subjects in Elective/Required Subjects II.

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

Graduation requirement	Required No. of credits
Liberal Arts Education Subjects	40
Specialized Education Subjects	87
Basic Specialized Subjects	42
Free elective subjects	(2)
Required Subjects	42
Specialized Subjects	45
Free elective subjects Seminar	(2)
Required Subjects Seminar	2
Elective/required Seminar	1
Free elective subjects Lecture	(2)
Elective/required Lecture	26
Required Subjects Practice	10
Required Subjects Special Study for Graduation	6
Total	127

Academic achievements of Medicinal Sciences Program

Relationships between th	he evaluation items	s and evaluation	criteria
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		Academic achievements		Evaluation criteria	
		Evaluation items	Excellent	Very Good	
	(1)	The knowledge of chemical compounds including medicine.	 Being able to name representative components and correctly write down the structural formula. Being able to select chemical reaction. Being able to correctly announce results gained by clarifying used procedure or process. Being able to enumerate additives used for medical drug production and to explain their roles and physicochemical character. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 80%. 	 Being able to name representative components and correctly write down the structural formula. Being able to select appropriate chemical reaction. 3. Being able to announce results gained by clarifying used procedure or process. 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 nam and correctly write of 2. Being able to explicit chemical reaction. 3 announce outlines of procedures. 4. Being additives used for m their physicochemica attainment level is of evaluation of grades formulae. The stand
ge and Understanding	(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 com representative enzy chemical reaction ar able to explain produ- functions and mecha adjustment of repres- substances. 3. Being major human biophy learning attainment average evaluation of designated formulae 60%.

Sheet 2

Good

ne representative components down the structural formula. lain the outline the proposed 3. Being able to present and of used process and ag able to explain the roles of nedical drug production and cal character. 5. The learning calculated as an average s based on designated dard is more than 60%.

pare characteristics of me reaction to general nd explain them. 2. Being luctive organs, physiological anism of secretion esentative physiological active of able to briefly explain ylaxis reaction. 4. The t level is calculated as an of grades based on e. The standard is more than

Academic achievements		Evaluation criteria	
Evaluation items	Excellent	Very Good	
The knowledge relating to mutual reaction between chemical compounds including medicine and a human body			

(3)

Good

		Academic achievements		Evaluation criteria	
		Evaluation items	Excellent	Very Good	
	(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 out methods of presente outline ways to mea of presented physiol Being able to outlin relating to diseases. level is calculated a grades based on des standard is more th
	(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 inve nutrition in Japan a Being able to invest interaction, conside the appropriate way learning attainment average evaluation designated formulae 60%.
oilities 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 atta calculated combinin TOEIC tests and sc based on designated more than 60%.

Good

tline activity measurement red enzyme. 2. Being able to asure activation and secretion ological active substances. 3. ne human biophylaxis reaction

s. 4. The learning attainment as an average evaluation of signated formulae. The han 60%.

vestigate current situation of and enumerate the issues. 2. tigate examples of drug er the mechanism and select by of avoidance. 3. The nt level is calculated as an of grades based on ae. The standard is more than

ainment level is generally ng grades, average scores of cores of graduation research ed formulae. The standard is

Academic achievements		Evaluation criteria	
Evaluation items	Excellent	Very Good	
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	 Being able to construct pathways for synthesis combining presented chemical reaction and synthesize them. Being able to construct ways of qualitative tests, separation and refinement, and structural determination and identify them. Being able to construct ways of separate cultivation and authentic cultivation and conduct them. Being able to construct ways of identification of presented bacteria and conduct 	1. Being able to synt synthesis combining reaction. 2. Being a qualitative tests, se structural determin construct ways of se authentic cultivation able to construct wa presented bacteria a
(5)	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%.	them. 5. Being able to conduct various kinds of experiments relating presented biologically relevant materials and conduct them. 4. The learning attainment level is calculated as an average evaluation of grades based on designated formulae. The standard is more than 70%.	able to conduct varie relating presented b materials and condu attainment level is o evaluation of grades formulae. The stand

Good

nthesize using pathways for ag presented chemical able to identify using ways of eparation and refinement, and nation. 3. Being able to eparate cultivation and on and conduct them. 4. Being ays of identification of and conduct them. 5. Being ious kinds of experiments biologically relevant luct them. 4. The learning calculated as an average es based on designated ndard is more than 60%.

		Academic achievements		Evaluation criteria	
		Evaluation items	Excellent	Very Good	
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. 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 inver research results on select must-be-solve of goals. 3. Being al based on experimen Being able to integr them and present th integrate the results attainment level is o based on designated evaluation of grades research . The star

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

Good

vestigate and estimate the issues so far. 2. Being able to ed issues for the attainment able to carry out research nt plans of proposed issues. 4. rate the results, consider hem. 5. Being able to ts in theses. 6.The learning comprehensively calculated d formulae combining average es and results of graduation ndard is more than 60%.



													Evaluation items												,	T / 1					
					Knowledge and Understanding													Ab	ilities	and Ski	lls						Atti	tudes	Comprehens	ive Abilities	1 otal weighted
Subject			Type of	l	()	1)	()	2)	(3	3)	(•	4)	()	1)	()	2)	()	3)	(4)	(!	5)	(6	5)	(7	7)	(1)	(1)	(8)	values of
Education	Practice of Structural Biology	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
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																											0
Specialized Education	Clinical food science	2	Free elective	7																											0
Specialized Education	Pharmacology II	2	Elective/required	5			25	1	30	1					25	1	20	1													100
Specialized Education	Chemistry of Natural Products	2	Elective/required	5	50	1																							50	1	100
Specialized Education	Pharmacokinetics	2	Elective/required	5					100	1																					100
Specialized Education	Biochemistry VI	2	Elective/required	5																											0
Specialized Education	Physical Chemistry III	2	Elective/required	5																											0
Specialized Education	Antibiotics and Drug resistance	2	Elective/required	5			40	1							30	1					30	1									100
Specialized Education	Physiological Chemistry	2	Elective/required	5			100	1																							100
Specialized Education	Organic Chemistry III	2	Elective/required	5	50	1							50	1																	100
Specialized Education	Medicinal Organic Chemistry	2	Elective/required	5	100	1																									100
Specialized Education	Industrial Pharmaceutics	2	Elective/required	6	100	1																									100
Specialized Education	Cell Motility	2	Elective/required	6			100	4																							100
Specialized Education	Genetic Engineering	2	Elective/required	6			50	1							25	1					25	1									100
Specialized Education	Organic Chemistry IV	2	Elective/required	6	50	1							50	1																	100
Specialized Education	Public Health Chemistry III	2	Elective/required	6					100	1																					100
Specialized Education	Biological Statistics	2	Elective/required	6																											0
Specialized Education	Pharmacology III	2	Elective/required	6			25	1	30	1					25	1	20	1													100
Specialized Education	Clinical Pharmacy	2	Elective/required	7																											0
Specialized Education	Clinical Medicine and Pharmacotherapy I	2	Elective/required	7																											0
Specialized Education	Pharmacotherapy A	2	Elective/required	7			30	1	30	1					20	1	20	1													100
Specialized Education	AnOutline of Immunology	2	Elective/required	7																											0
Specialized Education	Clinical Medicine and Pharmacotherapy II	2	Elective/required	7																											0
Specialized Education	Pharmaceutical Affairs Related Laws	2	Elective/required	7																											0
Specialized Education	Clinical Pharmacology A	2	Elective/required	8			30	1	30	1					20	1	20	1													100
Specialized Education	Pharmacotherapy B	2	Elective/required	8																											0
Specialized Education	Drug Informatics	2	Elective/required	8					40	1							20	1							20	1			20	1	100
Specialized Education	Clinical Tests & Experiments in Clinical Tests	1	Free elective	5																											0
Specialized Education	Training of Chemical Analysis	1	Required	4																											0
Specialized Education	Experiments in Organic Chemistry	1	Required	4	20	1							20	1							20	1							40	1	100
Specialized Education	Experiments of Pharmacognosy	1	Required	5																											0
Specialized Education	Experiments of Cellular and Molecular Biology	1	Required	4																	100	6									100
Specialized Education	Experiments of Biological Chemistry	1	Required	4																											0
Specialized	Experiments of Microbial Chemistry	1	Required	5			10	1							10	1					40	1							40	1	100
Specialized	Pharmacology Practice	1	Required	5																	50	1	50	1							100
Specialized																															
Luutation																															

																E	valuati	ion ite	ms												
						Kı	nowled	ge and	Under	standi	ng							Ab	oilities	and Sk	ills						Attit	udes	Comprehen	sive Abilities	Total
Subject			Type of		(1	(1) (2) (3) (4)									(1) (2) (3) (4) (5) (6) (7) (1)								1)	(1)	values of						
Specialized Education	Special laboratory Works in Pharmaceutical Sciences II	2	Required	7	10	1			10	1			10	1			10	2					10	2			20	5	30	5	100
Specialized Education	Special laboratory Works in Pharmaceutical Sciences III	2	Required	8	10	1			10	1			10	1			10	2					10	2			20	5	30	5	100
					870	17	915	23	715	17	380	5	420	12	255	12	245	16	240	7	590	19	180	8	80	2	325	21	685	28	5900

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		Academic achievements	1st g	grade	2nd g	grade
╞		Evaluation items	Spring semester	Fall semester	Spring semester	Fall se
					Peace Science Courses	
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			Integrated Courses	Integrated Courses		
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Curriculum Map of Medicinal Sciences Program

Sheet 4

	3rd grade		4th grade		
mester	Spring semester	Fall semester	Spring semester	Fall semester	

including medicine.			Organic Chemistry I	Organic Chemistry II	Research Practice A	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences II	Special laboratory Works in Pharmaceutical Sciences III
			Nuclear Pharmacy	Experiments in Organic Chemistry	Medicinal Organic Chemistry	Industrial Pharmaceutics	Practice of Organic Reactions	
			Basic Natural Product Chemistry		Organic Chemistry III	Organic Chemistry IV		
					Chemistry of Natural Products	Research Practice B		
Knowledge of human and biological bodies.	Health and Sports Courses	Health and Sports Courses	Biochemistry I	Pharmacology I	Pharmacology II	Pharmacology III	Pharmacotherapy A	Clinical Pharmacology A
			Biochemistry II	Biological Chemistry IV	Biochemistry VI	Cell Motility		
			Biological Chemistry III	Biochemistry V	Physiological Chemistry	Genetic Engineering		
			Microbial Physiology		Antibiotics and Drug resistance			
The knowledge relating to mutual reaction between chemical compounds			Public Health Chemistry I	Biopharmaceutics	Research Practice A	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences II	Lecture on Learning and Curriculum Development III
including medicine and a human body			Public Health Chemistry II	Pharmacology I	Pharmacology II	Public Health Chemistry III	Practice of Analytical Drug Discovery and Evaluation	Drug Informatics
					Pharmacokinetics	Research Practice B	Pharmacotherapy A	Clinical Pharmacology A
						Pharmacology III		
Improving English comprehension to acquire capacity of chemical English	Basic English Usage	Basic English Usage	Communication III	Communication III				
	Communication I	Communication II						
	The Second Foreign Languages	The Second Foreign Languages						
	English subject GPA	English subject GPA	English subject GPA	English subject GPA				
	TOEIC					TOEIC		
Development of knowledge of chemical	1					1		
compounds including medicine.			Organic Chemistry I	Organic Chemistry II	Research Practice A	Special laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences II	Special laboratory Works in Pharmaceutical Sciences III
compounds including medicine. (application)			Organic Chemistry I	Organic Chemistry II Experiments in Organic Chemistry	Research Practice A Organic Chemistry III	Special laboratory Works in Pharmaceutical Sciences I Organic Chemistry IV	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Special laboratory Works in Pharmaceutical Sciences III
compounds including medicine. (application)			Organic Chemistry I	Organic Chemistry II Experiments in Organic Chemistry	Research Practice A Organic Chemistry III	Special laboratory Works in Pharmaceutical Sciences I Organic Chemistry IV Research Practice B	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation	Special laboratory Works in Pharmaceutical Sciences III
compounds including medicine. (application)			Organic Chemistry I	Organic Chemistry II Experiments in Organic Chemistry	Research Practice A Organic Chemistry III	Special laboratory Works in Pharmaceutical Sciences I Organic Chemistry IV Research Practice B	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation	Special laboratory Works in Pharmaceutical Sciences III
compounds including medicine. (application) Development of knowledge about human and biological bodies. (advance)			Organic Chemistry I	Organic Chemistry II Experiments in Organic Chemistry	Research Practice A Organic Chemistry III Image: Chemistry III	Special laboratory Works in Pharmaceutical Sciences I Organic Chemistry IV Research Practice B Pharmacology III	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Clinical Analysis	Special laboratory Works in Pharmaceutical Sciences III
compounds including medicine. (application) Development of knowledge about human and biological bodies. (advance)			Organic Chemistry I Organic I Chemistry I Biochemistry I Biochemistry II	Organic Chemistry II Experiments in Organic Chemistry Pharmacology I	Research Practice AOrganic Chemistry IIIImage: Chemistry	Special laboratory Works in Pharmaceutical Sciences IOrganic Chemistry IVResearch Practice BPharmacology IIIGenetic Engineering	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Clinical Analysis Pharmacotherapy A	Special laboratory Works in Pharmaceutical Sciences III Clinical Pharmacology A
compounds including medicine. (application) Development of knowledge about human and biological bodies. (advance)			Organic Chemistry I Image: Chemistry I Image: Chemistry I Image: Chemistry I Image: Chemistry II Image: Chemistry II <t< td=""><td>Organic Chemistry II Experiments in Organic Chemistry Pharmacology I</td><td>Research Practice A Organic Chemistry III Pharmacology II Antibiotics and Drug resistance</td><td>Special laboratory Works in Pharmaceutical Sciences I Organic Chemistry IV Research Practice B Pharmacology III Genetic Engineering</td><td>Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Clinical Analysis Pharmacotherapy A</td><td>Special laboratory Works in Pharmaceutical Sciences III Image: special laboratory Works in Pharmaceutical Sciences III Im</td></t<>	Organic Chemistry II Experiments in Organic Chemistry Pharmacology I	Research Practice A Organic Chemistry III Pharmacology II Antibiotics and Drug resistance	Special laboratory Works in Pharmaceutical Sciences I Organic Chemistry IV Research Practice B Pharmacology III Genetic Engineering	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Clinical Analysis Pharmacotherapy A	Special laboratory Works in Pharmaceutical Sciences III Image: special laboratory Works in Pharmaceutical Sciences III Im
compounds including medicine. (application) Development of knowledge about human and biological bodies. (advance) Development of knowledge relating to mutual reaction between chemical			Organic Chemistry I Image: Chemistry I Image: Chemistry I Image: Chemistry I Image: Chemistry II Image: Chemistry II<	Organic Chemistry II Experiments in Organic Chemistry Pharmacology I Biopharmaceutics	Research Practice A Organic Chemistry III Pharmacology II Antibiotics and Drug resistance Research Practice A	Special laboratory Works in Pharmaceutical Sciences IOrganic Chemistry IVResearch Practice BPharmacology IIIGenetic EngineeringSpecial laboratory Works in Pharmaceutical Sciences I	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Practice of Structural Elucidation Clinical Analysis Pharmacotherapy A Special laboratory Works in Pharmaceutical Sciences II	Special laboratory Works in Pharmaceutical Sciences III Image: Pharma cology A
compounds including medicine. (application) Development of knowledge about human and biological bodies. (advance) Development of knowledge relating to mutual reaction between chemical compounds including medicine and a human body (application)			Organic Chemistry I Image: Chemistry I Image: Chemistry I Image: Chemistry I Image: Chemistry II Image: Chemistry II <t< td=""><td>Organic Chemistry II Experiments in Organic Chemistry Pharmacology I Biopharmaceutics Pharmacology I</td><td>Research Practice A Organic Chemistry III Image: Pharmacology II Antibiotics and Drug resistance Image: Pharmacology II Image: Pharmacology II</td><td>Special laboratory Works in Pharmaceutical Sciences IOrganic Chemistry IVResearch Practice BPharmacology IIIGenetic EngineeringSpecial laboratory Works in Pharmaceutical Sciences IResearch Practice B</td><td>Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Clinical Analysis Pharmacotherapy A Special laboratory Works in Pharmaceutical Sciences II Practice of Analytical Drug Discovery and Evaluation</td><td>Special laboratory Works in Pharmaceutical Sciences III Image: Pharma ceutical Sciences III Image: Pharma ceutical Pharmacology A Image: Pharma ceutical Pharma ceutical Sciences III Image: Pharma ceutical Sciences III</td></t<>	Organic Chemistry II Experiments in Organic Chemistry Pharmacology I Biopharmaceutics Pharmacology I	Research Practice A Organic Chemistry III Image: Pharmacology II Antibiotics and Drug resistance Image: Pharmacology II	Special laboratory Works in Pharmaceutical Sciences IOrganic Chemistry IVResearch Practice BPharmacology IIIGenetic EngineeringSpecial laboratory Works in Pharmaceutical Sciences IResearch Practice B	Special laboratory Works in Pharmaceutical Sciences II Practice of Organic Reactions(Practice of Structural Elucidation Clinical Analysis Pharmacotherapy A Special laboratory Works in Pharmaceutical Sciences II Practice of Analytical Drug Discovery and Evaluation	Special laboratory Works in Pharmaceutical Sciences III Image: Pharma ceutical Sciences III Image: Pharma ceutical Pharmacology A Image: Pharma ceutical Pharma ceutical Sciences III Image: Pharma ceutical Sciences III
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