Introduction

Medicinal chemistry is a field that applies the principles of chemistry and biology and creates knowledge in which therapeutic substances are obtained. Therefore, a graduate of the field of medicinal chemistry must not only be an organic chemist, but also must have basic information in biological sciences. In particular, it has biochemistry, pharmacology and pharmacokinetics. Medicinal plants have always been related to humans throughout history, and their medicinal effects and uses are not hidden from anyone. Medicinal plants have a large market in the world. Therefore, many of these plants must be cultivated in large farms. In creating a field, basic factors must be considered to maintain the quality and amount of its effective substances. Therefore, plant resources are one of the most important sources for the production and introduction of leader compounds in the process of drug development. Medicinal chemistry deals with the development of drugs (Drug Discovery), which requires mastery of sciences such as organic chemistry, biochemistry, and pharmacology. Synthesis of drugs, design of new molecules and molecular modifications in order to optimize drug effects are important issues in this branch of medicinal chemistry. The use of molecular modeling software is very helpful in this regard, which is divided into a branch called Computational Medicinal Chemistry, which graduates of medicinal chemistry can work in this field. This topic is combined with the science of Drug Design. On the other hand, an important branch of medicinal chemistry is the analysis of medicinal and chemical substances, which can be very important in determining the molecular structure of chemical and medicinal substances by using devices for determining the chemical structure such as UV JR Mass MR and also by using their advanced techniques. The subject is very useful in the emergence of new compounds of natural origin by the other way , an graduate of medicinal chemistry using quantitative analysis methods such as chromatography and their advanced types as well as other quantitative devices such as polarography AA polarimetry and... in the quantitative control of medicinal substances and determining the amount of chemical and medicinal substances in different chemical matrices and Biological can be very decisive. In fact, the important branch of analysis in medicinal chemistry establishes a very close relationship with industries, which is very useful in the qualitative and quantitative control of drugs. The development of new analysis methods to determine the amount of substances. for various purposes, such as pharmacokinetic studies, doping, quantitative and qualitative control of drugs, and stability studies. It is one of the capabilities of a student of medicinal chemistry, since the master's course in the field of medicinal chemistry will create an effective step in the direction of the training of drug synthesis specialists, and it will help activate the pharmaceutical industry and provide the basis for economic growth. To be inside the country, according to the above content and after obtaining the opinion of the experts in this field, the present program has been compiled and made available to the universities of medical sciences of the country. The editing committee welcomes the valuable opinions of respected experts in this field in revising this program.

Name and definition of the field and degree

Master's Degree in Pharmaceutical Chemistry (M.Sc.) The Ph.D.

in Pharmaceutical Chemistry at the Master's degree is an unprecedented branch of pharmaceutical sciences in which the chemistry and biology of therapeutic substances is achieved by reinforcing the principles and foundations. Students of this discipline are acquainted with the principles of bioscience such as pharmaceutical biochemistry, pharmacokinetics, drug discovery technology, the properties of

medicinal plants and methods of small and qualitative control of drugs and play an important role in the creation of new medicinal compounds.

History of the field in the world and Iran

Since 1997, the Faculty of Pharmacy of Tehran University of Medical Sciences has organized a Ph.D. course in medicinal chemistry, and in the following years, it was also launched in Isfahan, Shiraz, Shahid Beheshti, Tabriz, and Mazandaran universities. Currently, this field is recruiting students in USM University of Malaysia.

Considered Values

The values that are emphasized in this course are: - Emphasis on health-oriented by producing drugs with more effective effect and minimal side effects for body parts, emphasis on national resources (abundant potential of planting and harvesting medicinal plants, coordination with modern science and utilization From the scientific and cultural treasures of Iran in the field of native medicinal plants, emphasis is placed on increasing the quality of life by reducing the adverse effects of drugs

Emphasis on self-reliance in the field of self-sufficiency in drug production

Emphasis on optimization of drug use in the country, emphasis on compliance with professional ethics, especially in RCT research and compliance with ethical principles in different stages

Production to consumption of drugs

Mission

The mission of this field is to train knowledgeable, skilled, capable and experienced manpower for drug factories, food and drug control laboratories, relevant institutions and universities.

Vision of the educational program

With the launch of this course, it is hoped that in the next 10 years, there will be a continuous master's course in medicinal chemistry by using the latest standards and scientific achievements and new techniques in the preparation and manufacture of new And specific drugs and how their job can play a significant role in the preparation and control of drug consumption in society and take an effective step towards self-sufficiency in production and performance and optimizing drug consumption in the country.

Aims

Training and provision of human resources for the country’s pharmaceutical industries, regarding the synthesis and analysis of pharmaceutical substances.
providing experts needed for educational and research departments in educational centers and the food and drug control departments of the country.

Role Definition

The roles of graduates in this field are:
1.Service
2.Research
3.Consulting
4.Educational

task analysis

Service field

providing services in food and drug quality control laboratories and pharmaceutical and chemical factories.

Research field

presenting research projects from different fields, preparation and design of medicines, determining the mechanism, function, and effect of Nano-drugs, and like that.

supervision of research projects in related fields

Do scientific and industrial research in related centers.

Consulting field

Providing consulting services to applicants

Educational field

Providing training courses, empowerment workshops, and related centers

cooperation in the development of instructions related to the field or health authorities

General educational strategies

The following strategies are used in the implementation of this program:

A Combination of student and professor

Strategy based on professional duties

Paying attention to the needs of the community at local, regional and national levels

Paying attention to the problem

Strategy based on laboratory

Prediction of optional lessons in the problem

Conditions and methods of student admission

Passing the entrance exam according to the rules and regulations of ministry of health, treatment and medical education

Holders of bachelor's degree in pharmacy, pure chemistry, applied chemistry, chemistry secretary, biochemistry, Medical laboratory sciences

The test materials and their coefficients are as follow:

Coefficients	Test Materials
2	Organic Chemistry
2	Analytical Chemistry
2	Biology
2	Biochemistry
2	General English Language
10	Total

*In order to get information about the latest changes in accepted academic documents and exam coefficients for each academic year, please refer to the non-consecutive master's exam booklet of medical sciences related to that academic year.

Similar courses

in the country, an independent course under this title in the non-continuous master's degree has not been established so far.

Similar courses abroad

in some countries, such as Turkey and Punjab City University and...

The conditions required to start the course are according to the rules of the Development Council of Medical Sciences Universities

Other cases

No more.

Course specification of the educational program of the master's course in the field of pharmaceutical chemistry

1) Name and definition of the field and related section:

Pharmaceutical chemistry (M.Sc.)

2) Length of period and structure:

In accordance with the educational regulations of the postgraduate course of discontinuous approved by the Supreme Council of Medical Sciences Planning

3) Total number of courses:

The number of courses in this course is 32 units, which are as follows:

*Compulsory Dedicated Units:21 units

*Optional Dedicated Units: 5 units

*Thesis: 6 units

Note: The student is required to pass all or a number of deficient or compensatory courses in addition to passing the courses with the recognition of the department and the approval of the Graduate Council of the University

table A): Deficient or compensatory courses of the postgraduate course of Medicinal Chemistry:

Prerequisite	Number of Lesson Hours				Number of courses				Course name	Course code
	Internship	Theoretical	Practical	Total	Internship	Theoretical	Practical	Total		
_	_	34	_	34	_	2	_	2	Biology	01
_	_	17	34	51	_	1	1	2	Statistics and Pharmaceutical Information Systems	02
_	_	51	_	51	_	3	_	3	Physiology	03
_	_	51	_	51	_	3	_	3	Biochemistry	04
_	_	9	17	26	_	.05	.05	1	Medical Information Systems*	05
11									Total	

* Passing this course is mandatory as a deficient or compensatory course for all students.

Prerequisite or simultaneous	Number of Lesson Hours				number of courses				Name of Course	Lesson code
	Internship	Theoretical	Practical	Total	Internship	Theoretical	Practical	Total		
_____	_____	34	34	68	_	2	1	3	Basics of synthesis	05
04&03	_____	51	_	51	_	3	_	3	Pharmacology	06
06	_____	34	_	34	_	2	_	2	Medicinal chemistry 1	07
07	_____	34	_	34	_	2	_	2	Medicinal chemistry 2	08
_____	_____	51	34	85	_	3	1	4	Instrumental chemistry	09
_____	_____	51	_	51	_	3	_	3	Heterocyclic Chemistry	10
_____	_____	51	_	51	_	3	_	3	Computational chemistry of drug design	11
_____	_____	17	_	17	_	1	_	1	Seminar	12
6									Thesis	13
27									Total	

Table B) Dedicated lessons Educational program of the non-continuous master's course in the field of medicinal chemistry

Table C) Table of special-optional courses Educational program of the non-continuous master's course in the field of medicinal chemistry

Prerequisite or simultaneous	Number of Lesson Hours				number of courses				Name of Course	Lesson code
	Internship	Theoretical	Practical	Total	Internship	Theoretical	Practical	Total		
_____	_____	34	____	34	_____	2	_____	2	Chemistry of natural compounds	14
_____	_____	51	____	51	_____	3	_____	3	Medicinal chemistry and nanotechnology	15
_____	_____	34	34	68	_____	3	1	3	Biological tests	16
_____	_____	34	____	34	_____	2	_____	2	Radio pharmacy	17
_____	_____	34	_____	34	_____	2	_____	2	Basics of biotechnology	18
12									Total	

The student must complete 5 units of the above courses according to the topic of the thesis, with the approval of the supervisor and the approval of the graduate education council of the university.