

In the Name of God

Islamic Republic of Iran Ministry of Health and Medical Education Deputy Ministry for Education

Pharmaceutical Biotechnology Degree: Doctorate of Philosophy (PhD)

Total Course Credits

Core: 18

Non-core: 8

Thesis: 22

Total: 48

Program Description

Biotechnology is one of the leading forefronts of technologies of the future. The interdependence of human health and new products together with the advent of molecular biology manipulations along with the information management system technologies at various levels of gene, transcript, and protein has generated a new research and industrial field for pharmaceutical sciences. Thus, new technologies and existing pharmaceutical requirements have come hand-in-hand to lead to new generations of biopharmaceuticals with improved activities and selective modes of action to combat diseases such as cancer, and other debilitating illnesses.

Biotechnology is the use of living systems and organisms to develop or make products, or any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use. Before the development of biotechnology as an independent program, the multidisciplinary task of producing a recombinant therapeutic agent, its analysis and other related fields co-existed in various institutions. However, as the applications of this area became evident and entered into educational courses and systematic education, it became independently recognized as a program namely, Pharmaceutical Biotechnology, which could be differentiated from other fields of biotechnology such as medical, agricultural, industrial, etc. In this field, it is highly desired to, not only, design, produce and control drugs by the help of microorganisms or other biological entities, but also, to influence the healthcare system through various targeted and smart pharmaceuticals.

Aims and Objectives

The aim of this program is to educate the students to become qualified as successful researchers in the field and to develop broader skills necessary to perform assigned tasks in various career positions such as academia, industry, provision of services to private institutions or small-size companies.

Admission Requirements

Candidates having Doctorate of Pharmacy (PharmD) or Master of Science degree (MSc) in the related fields awarded by one of the domestic or overseas universities approved by the Ministry of Health and Medical Education are considered eligible to sit for the written entrance examination. Candidates must pass both written and oral entrance exam. They should also demonstrate proficiency in verbal and written English. Successful candidates will enter the program according to the PhD educational rules and regulations.¹

¹ Important note: These general conditions do not necessarily exclude specific conditions of each institute or university.

Expected Competencies at the End of the Program

General Competencies*

Specific Competencies and Skills

- Critical thinking.
- Writing abilities.
- Teamwork.
- Skills in working with the specialized equipment.
- Skills in handling the cell lines, animals and other biological materials.
- Interpreting the results and avoiding unethical practices of manipulating or falsifying the results.

Educational Strategies, Methods, and Techniques*

Student assessment

The following items will be part of assessment system for the students:

Attendance, team work, theoretical written exams, oral presentations, practical exams, research seminars, thesis preparation and presentation, conference proceeding contribution, paper submission and acceptance.

Ethical issues*

*Note: The related document(s) can be found at <http://hcmeq.behdasht.gov.ir/>.

Tables of the Courses

Table 1. Compensatory courses

Code	Course title	Credit			Hours		
		Theoretical	Practical	Total	Theoretical	Practical	Total
01	Medical Informatics	0.5	0.5	1	9	17	26
02	Microbiology	3	none	3	51	none	51
03	Industrial Pharmacy	3	none	3	51	none	51
04	Biochemistry	4	none	4	68	none	68
05	Pharmacology	2	none	2	34	none	34
06	Instrumental Analysis	3	none	3	51	none	51
15.5	0.5	16			264	17	281

Student will be asked to pass all or part of compensatory courses (Table 1). The composition of these courses will be determined by the department in which the student is admitted according to student's background.

Table 2. Core courses

Code	Course title	Credit			Hours		
		Theoretical	Practical	Total	Theoretical	Practical	Total
07	Cellular & Molecular Biology	3	None	3	51	none	51
08	Genetic Engineering & Molecular Genetics	3	None	3	51	none	51
09	Biotechnological Process 1	2	None	2	34	none	34
10	Biotechnological Process 2	2	None	2	34	none	34
11	Bioinformatics	2	None	2	34	none	34
12	Protein Chemistry	3	None	3	51	none	51
13	Methods in Biotechnology	none	3	3	none	102	102
Total		15	3	18	255	102	357

Table 3. Non-core courses

Code	Course title	Credit			Hours		
		Theoretical	Practical	Total	Theoretical	Practical	Total
14	Immunology	2	none	2	34	none	34
15	Mammalian Cell Culture	2	none	2	34	none	34
16	Protein-based Drug Formulation	2	none	2	34	none	34
17	Nanobiotechnology	2	none	2	34	none	34
18	Industrial Enzymology	2	none	2	34	none	34
19	Quality Control of Biologicals	2	none	2	34	none	34
Total		12	none	12	204	none	204

Student should take 8 out of 12 credits specified by the corresponding department.

Table 4. Thesis

Thesis	Credit
Thesis 1	5
Thesis 2	5
Thesis 3	6
Thesis 4	6
Total	22

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