

**In the Name of God**

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

**Tissue Engineering  
Doctor of Philosophy (PhD)**

**Total Course Credits: 50**

Core: 24

Non-core: 6

Dissertation: 20

**Program Description**

Tissue engineering is an emerging field that aims at the regeneration of natural tissues using biological cells and biomaterials to contribute to biotechnology, and clinical medicine.

Tissue engineering is an interdisciplinary field which uses the knowledge of engineering and other related fields to develop biological substitutes for restoring tissues and organs. Tissue engineering involves the use of living cells to develop biological substitutes for tissue replacements with the ultimate goal of regeneration and repairing the damaged organs.

The School of Advanced Technologies in Medicine was established in 2009 at Tehran University of Medical Sciences. In the Tissue Engineering Department of the school, multi disciplinary investigations are conducted in a broad range of the different scientific fields. The main mission of the course is training committed, knowledgeable and competent graduates in tissue engineering.

**Admission Requirements**

A master's degree (MSc) in one of the fields of medical mycology, bacteriology, parasitology, pathobiology, microbiology or general doctorate in one of the fields of Medicine, Pharmacy or professional doctorate in the Laboratory Sciences awarded by one of the home universities or those in other countries and approved by the Ministry of Health, Treatment and Medical Education. - Being eligible to entering the course as stipulated in the PhD educational rules and regulations. \*Important note: These general conditions do not necessarily exclude specific conditions of each institute or university.

**Expected General and Specific Competencies at the End of the Program:  
General Competencies\***

**Specific Competencies and Skills:**

Graduates will be able to take educational responsibilities, conduct research and offer expert consulting services related to tissue engineering.

In **education**, contributing to teaching tissue engineering to students of various fields according to the university needs.

In **research** designing, implementing and evaluating basic and applied research in various contexts of the related fields.

In **consulting services**, offering high technology methods for the laboratory diagnosis of tissue engineering .

### **Educational Strategies, Methods and Techniques\***

#### **Student Assessment:**

A master's degree (MSc) in one of the fields of medical mycology, bacteriology, parasitology, pathobiology, microbiology or general doctorate in one of the fields of Medicine, Pharmacy or professional doctorate in the Laboratory Sciences awarded by one of the home universities or those in other countries and approved by the Ministry of Health, Treatment and Medical Education. - Being eligible to entering the course as stipulated in the PhD educational rules and regulations. \*Important note: These general conditions do not necessarily exclude specific conditions of each institute or university.

### **Ethical Considerations\***

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

## Tables of the Courses:

### Table 1-Compensatory Courses

Code	Title of the Course	Credits			Teaching Hours			Prerequisites
		Theoretical	Practical	Total	Theoretical	Practical	Total	
01	Medical Information Systems*	0.5	0.5	1	9	17	26	-
02	General Anatomy and Embryology	1	0.5	1.5	17	17	34	-
03	Histology	1	0.5	1.5	17	17	34	-
04	Cell Physiology	2	-	2	34	-	34	-
05	General Pathology	2	-	2	34	-	34	-
06	General Pharmacology	2	-	2	34	-	34	-
07	Fundamentals of Immunology	2	-	2	34	-	34	-
08	Cellular and Molecular Biology	2	-	2	34	-	34	-
09	Statistics and Research Methods	2	-	2	34	-	34	-
10	Genetics	1	-	1	17	-	17	-
11	Biomechanics	2	-	2	34	-	34	-
12	Fundamentals of Materials Sciences	2	-	2	34	-	34	-
13	Fundamentals of Biochemistry	2	-	2	34	-	34	-
14	Fundamentals of Biophysics	2	-	2	34	-	34	-
<b>Total</b>		<b>24</b>						

\*This course is compulsory to take for all students who had not taken the course previously. - Based on the department schedule and approval of the post graduate council students should take 16 credit courses from Table 1.

### Table 2. Core Courses

Code	Title of the Course	Credits			Teaching Hours			Prerequisites
		Theoretical	Practical	Total	Theoretical	Practical	Total	

15	Principals of Tissue Engineering	2	0.5	2.5	34	17	51	02 , 03, 04, 05, 06, 07
16	Care and Use of Laboratory Animals	1	1	2	17	34	51	-
17	Cell Culture	2	1	3	34	34	68	03
18	Histological Study	1	1	2	17	34	51	-
19	Methods	1.5	-2	3.5	26	-68	94	08, 09
20	Bioinformatics, Research Methods, Clinical Trials	2	0.5	2.5	34	17	51	15
21	Mechanisms of Tissues and Organs Repair	2	1	3	34	34	68	-
22	Bio-scaffolds	1.5	0.5	2	26	17	43	07
23	Graft Biology and Immunology	2.5	1	3.5	43	34	77	08
24	Dissertation	20						
<b>Total</b>		<b>38</b>						

**Table 3. Non-core Courses**

code	Title of the course	Credits			Teaching Hours			Prerequisites
		Theoretical	Practical	Total	Theoretical	Practical	Total	
25	Cellular Bank	1.5	0.5	2	26	17	43	15,20
26	Angiogenesis	1.5	0.5	2	26	17	43	04, 05, 06
27	Principles of Biomaterial	1.5	0.5	2	26	17	43	-
28	Effective Strategies for Communicating with Policymakers and Investors	1.5	0.5	2	26	17	43	-
29	Ethics in Medical Education	2	-	2	34	-	34	28
30	Molecular Genetics	1.5	0.5	2	26	17	43	08, 10
31	Nanobiotechnology	1	1	2	17	34	51	17
32	Three Dimensional Cell Culture							

Total

14

Seeking the consent of supervising professors and the approval of post-graduate education council, students are due to take 6 credit courses related to their dissertation from table 3.

