

In the Name of God

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

Laboratory Hematology and Transfusion Sciences Degree: Doctor of Philosophy (PhD)

Total Course Credits

- Core: 17 (Both Laboratory Hematology and Transfusion Sciences)
- Core: 10 (Laboratory Hematology)
- Core: 10 (Transfusion Sciences)
- Non-core (Elective): 3
- Dissertation: 20
- Compensatory: It varies based on the students' previous degrees.

Program Description

Hematology and transfusion sciences are dynamic medical subjects in medical sciences. They are of paramount importance in the assessment of blood compatibility, production of plasma derived biologic components, cell-tissue engineering, cell therapy, transplantation, HLA banking, bone marrow, blood products, etc. Although Hematology and blood transfusion are considered as two subdivisions of the same discipline, they may develop into two separate disciplines in future.

PhD of Hematology and Transfusion Sciences has two subdisciplines: Laboratory Hematology and Transfusion Sciences. In this program, students will get familiar with laboratory hematology and transfusion sciences skills and obtain the competence for education, research and laboratory diagnostic services in different health fields at national and international levels. The mission of the program is to train competent experts who can provide both educational and treatment services in different fields of medicine where and when necessary.

Admission Requirements:

- Entrance exam
- Interview
- Acceptable resume and recommendation letters

Degrees which can apply for the program:

- Holders of Degrees of Doctor of Medicine, Doctor of Pharmacy, Doctor of Laboratory Sciences, Doctor of Dentistry, and Doctor of Veterinary
- Holders of MSc Degrees in Laboratory Hematology and Blood Banking, Medical Immunology, Pathobiology, Clinical Biochemistry, Laboratory Sciences, and Human Genetics.

The entrance exam includes the subjects in the following table.

Subjects of Entrance Exam	weight
Hematology	3.5
Transfusion Sciences	3.5
Medical immunology	1.5
Molecular and cellular biology	1.5
Total	10

Expected Competencies at the End of the Program

General Competencies*

Specific Competencies and Skills

At the end of the program learners will be competent in the following skills:

- Diagnosing and interpreting peripheral blood and bone marrow slides
- Using and calibrating different types of equipment such as; Cell counters, Coagulometers, Flow cytometry, Aggregometers
- Carrying out flow cytometry panel based on probable diagnosis from morphology and their interpretations
- Performing tissue and stem cell culture
- Carrying out molecular tests related to the subjects such as, PCR, RT-PCR, FISH, Blotting, Gel electrophoresis and Karyotype.
- Evaluating and assessing blood transfusion, from donors to recipients.

Educational Strategies, Methods and Techniques

Student Assessment (Methods and Types)

- Formative (Quizzes and Midterm Exam)
- Summative (Final Exam)
- Comprehensive Exam
- Methods of assessment: oral, written, OSLE, and Logbook

Ethical Considerations*

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

Tables of the Courses

Table 1. Compensatory Courses

Code of the Course	Title of the Course	Credits			Teaching Hours		
		Theoretical	Practical	Total	Theoretical	Practical	Total
01	Medical Information Systems*	0.5	0.5	1	9	17	26
02	Basic Immunoematology	2	1	3	34	34	68
03	Basic Medical Immunology	2	-	2	34	-	34
04	Molecular Cell Biology	2	-	2	34	-	34
05	Basic Hematology	2	1	3	34	34	68
Total		11					

Note: Students, based on the department decision, are required to pass some or all of the courses in table 1.

* Taking this course is compulsory for all students who has not passed it before.

Table 2: Core Courses (both Laboratory Hematology and Transfusion Sciences)

Code of the Course	Title of the Course	Credits			Teaching Hours			Prerequisite or Concurrent Courses
		Theoretical	Practical	Total	Theoretical	Practical	Total	
06	Tissue and Bone Marrow Culture Techniques	0.5	0.5	1	9	17	26	-
07	Principles of Modern Hematology and Blood Transfusion Instruments	1	1	2	17	34	51	Advanced Immunoematology, Code 11
08	Laboratory Animals and Animal Models of Hematologic Disorders	0.5	0.5	1	9	17	26	-
09	Infectious Diseases Transmitted from Blood and Blood Products	1	-	1	17	-	17	Basic Immunoematology, Code 02
10	Medical Bioinformatics	0.5	0.5	1	9	17	26	Medical Information Systems, Code 01
11	Advanced Immunoematology	2	1	3	34	34	68	Basic Immunoematology, Code 02
12	Principles of Cell and Gene Therapy	0.5	0.5	1	9	17	26	Molecular Cell Biology, Code 04
13	Molecular	-	2	2	-	68	68	Principles of

	Techniques and Cytogenetics in Diagnosis of Hematologic Disorders							Modern Hematology and Blood Transfusion Instruments, Code 07
14	Quality Assurance and Quality Control in Hematology and Blood Banking	1	-	1	17	-	17	Advanced Immunohematology, Code 11 and Molecular Techniques and Cytogenetics in Diagnosis of Hematologic Disorders, Code 13
15	Management of Laboratory Services	1	-	1	17	-	17	Advanced Immunohematology, Code 11 and Molecular Techniques and Cytogenetics in Diagnosis of Hematologic Disorders, Code 13
16	Advanced Biostatistics	0.5	0.5	1	9	17	26	-
17	Diagnostic Approach to Hematologic Disorders	1	1	2	17	34	51	Molecular techniques and Cytogenetics in Diagnosis of Hematologic Disorders, Code 13
Total		17						

Table 3: Non- Core Courses

Code of the Course	Title of the Course	Credits			Teaching Hours			Prerequisite or Concurrent Courses
		Theoretical	Practical	Total	Theoretical	Practical	Total	
								-
18	Immunocytochemistry Methods in the Diagnosis of Hematologic Disorders	-	1	1	-	34	34	-
19	Genetics of Hematologic Disorders and Blood Groups	2	-	2	34	-	34	-
20	Ethics and Professional Rights	1	-	1	17	-	17	-
21	Principles of Epidemiology	2	-	2	34	-	34	-
Total		6						

Note: Students have to pass 3 course credits from the above table.

Workshops: The departments should hold one of the following workshops for their own students or students of other departments.

The workshop certificate is necessary for Comprehensive (Board) Exam:

Biosafety Workshop,

Scientific Paper Writing Workshop,

Critical Thinking and Problem Solving Workshop

Table 4: Core courses for Laboratory Hematology subdiscipline

Code of the Course	Title of the Course	Credits			Teaching Hours			Prerequisite or Concurrent Courses
		Theoretical	Practical	Total	Theoretical	Practical	Total	
22	New Advances in Hematology	2	-	2	34	-	34	Basic Hematology, Code 05
23	Seminar in Hematology	1	-	1	17	-	17	New advances in Hematology, Code 22
24	Hematomorphology	-	3	3	-	102	102	Molecular Techniques and Cytogenetics in Diagnosis of Hematologic Disorders, Code 13 and New Advances in Hematology, Code 22
25	Education and Training in Clinical Hematology	-	4	4	-	272	272	Diagnostic Approaches to Hematologic Disorders, Code 17, New Advances in Hematology, Code 22 and Quality Assurance and Quality Control in Hematology and Blood Banking, Code 14
Total		10						

Note: All of the courses in this table are compulsory for students who have selected the Laboratory Hematology subdiscipline.




- The subject of the seminar should be related to Hematology.
- Clinical training should be in the third or fourth semester for 4 months.

Table 5: Core courses for Transfusion Sciences subsdiscipline

Code of the Course	Course	Credits			Teaching Hours			Prerequisite or Concurrent Courses
		Theoretical	Practical	Total	Theoretical	Practical	Total	
26	Plasma Derived Biological Products	1	1	2	15	34	51	Infectious Diseases Transmitted from Blood and Blood Products, Code 09
27	Medical Immunology of Transplantation	0.5	0.5	1	9	17	26	Basic Medical Immunology, Code 03
28	Tissue Processing and Cell Therapy	0.5	0.5	1	9	17	26	Principles of Cell and Gene Therapy, Code 12
29	Donor Education, Attraction and Maintenance	-	-	1	17	-	17	Advanced Immunohematology, Code 11
30	Immunohematology Seminars	1	-	1	17	-	17	Advanced Immunohematology, Code 11
31	Clinical Training in Hospitals and Blood Transfusion Organization Sections	-	4	4	-	272	272	Advanced Immunohematology, Code 11 and Plasma Derived Biological Products, Code 26
Total					10			

Note: All of the courses in this table are compulsory for students who have selected the Transfusion Sciences subsdiscipline.

- The subject of the seminars should be related to Transfusion Sciences.
- Clinical training should be in the 3th or 4th semester for 4 months.

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