

## MSc Human Genetics – Course details

### 1. Course description

Genetics is a program in medical and health sciences that investigates the patterns of inheritance and explains the principles of the genetic affinity among the species. The MSc in human genetics specifically focuses on the causes of genetic disorders in human with describing the exact presentations and molecular drivers. The science will help with suggesting solutions to promote prophylaxis and prenatal diagnosis.

Human genetics students during the MSc program will learn about the genetics in the fields of medicine, agriculture, and industry. They will gain knowledge about the hereditary background of disorders and the close bond between genetics and prevalent disorders such as cancer, thalassemia, and mental incompetence. The inheritance hierarchy, genetic consultation (for the purpose of marriage or having a child), epigenetics, and personal medicine are the other courses discussed in this program.

### 2. Admission requirements\*

- Students must have obtained a bachelor's degree from an accredited university in the following programs: biology (any branch), biotechnology (industrial), virology, medical parasitology, genetics, biochemistry, immunology, microbiology, medical laboratory sciences, nutrition, gynecology, doctor of medical laboratory sciences, doctor of medicine, doctor of dentistry, and doctor of pharmacy.
- Taking the entrance exam

\* Any changes regarding the admission requirements and the content of entrance exam could be found in Medical MSc Guidebook which publishes for each coming academic year.

### 3. Career and professional perspective

Graduates may start their career at:

- Genetic diagnostic and cytology laboratories
- Research centers laboratories, population control and reform, production of bio-recombinants
- Food, drugs and cosmetics laboratories
- Vaccine and sera laboratories, laboratories of hospitals and health care centers
- Medical laboratories (wards of genetics, cancer, and tumor markers)
- Forensic medicine (identification)
- Research centers

- Educational centers
- Genetic consultation centers

#### 4. Expected competencies

#### 5. Teaching and Learning

Educational strategies

- Task-based education
- Problem-based education
- Lab-based education
- Community-oriented education

#### 6. Student assessment (formative and summative)

- Cognitive: essay exam
- Project assignments
- Assessment of team assignments through the semester, and problem solving

#### 7. Course details\*

Core credits: 18

Non-core credits: 6

Thesis: 8

\* Students may have to pass compensatory courses due to department recommendation and university post-graduate board confirmation.

**Table 1.** Compensatory courses\*

Course code	Course title	Count of credits			Teaching hours			Courses of prerequisite /concurrent
		total	theoretical	practical	total	theoretical	practical	
01	Principals and applications of the computer and Internet**	2	1.5	0.5	43	17	26	-
02	Research methodology	2	2	-	34	34	-	-
03	Biostatistics software	2	2	-	34	34	-	-
Total		7						

\*\* These courses are mandatory for all students.

**Table 2.** Core credits

Course code	Course title	Count of credits			Teaching hours			Courses of prerequisite/ concurrent
		total	theoretical	practical	total	theoretical	practical	
04	Human genetics	3	3	-	51	51	-	-
05	Cytology	3	2	1	34	34	68	-
06	Genetic engineering	2	2	-	34	34	-	-
07	Molecular genetics	3	2	1	34	34	68	05
08	Cancer genetics	2	2	-	34	34	-	05, 07
09	Population genetics and epidemiology	2	2	-	34	34	-	04, 07
10	Bioinformatics	1	-	1	34	-	34	-
11	Seminar (1)	1	1	-	17	17	-	In the second semester
12	Seminar (2)	1	1	-	17	17	-	In the third semester
13	Thesis	8						
Total		26						

**Table 3.** Non-core credits

Course code	Course title	Count of credits			Teaching hours			Courses of prerequisite/ concurrent
		total	theoretical	practical	total	theoretical	practical	
10	Bacterial and viral genetics	2	1	1	51	17	34	-
11	Human biochemical genetics	2	1	1	51	17	34	-
12	Immune genetics	1	0.5	0.5	26	9	17	-
13	Cell and tissue culture	2	2	-	34	34	-	-
14	Bioethics and biosafety	2	2	-	34	34	-	-
15	Advance English	2	2	-	34	34	-	-
Total		14						

\* The student must pass 6 credits of the above courses based on thesis title and supervisor and department confirmation.