In the Name of God
Islamic Republic of Iran
Ministry of Health and Medical Education
Deputy Ministry of Education

Master of Science in Environmental Health
(Environmental Toxicology)

Total Course Credits

- Core: 23 credits

- Non-core (Elective): 5 credits

- Thesis: 4 credits

Program Description

The field of environmental toxicology is one of the branches of environmental health, in which students learn about the dose-response, absorption, distribution and accumulation of chemicals in living organisms (including humans). In addition, learners with acquisition of knowledge about the various effects of toxic chemicals including mutagenesis, carcinogenesis, abortion and risk assessment will be able to study:

- Properties of pesticides, solvents, organic toxicants, PCB, dioxins, heavy metals and their effect on environmental and public health.

- Environmental aspects such as climate change, acid rain, ozone layer depletion, and water and soil pollution, etc.

- Adverse health effects of chemicals on human including cancer and blood disease.

Admission Requirements

1- Passing the entrance exam (by the Ministry of Health).
2- Having a bachelor's degree from the following majors:

- Environmental health engineering

- Occupational health engineering

- Environmental engineering (all disciplines in environmental health engineering)

- Environmental sciences

- Entomology (in general, medical and agricultural disciplines)

- Agricultural pest control

- Pure and applied chemistry

- Toxicology

- Plant pathology

- Medical laboratory science

- Biology

Table 1. Materials of the Entrance Exam

Materials of the Entrance Exam	Weight
Principles of toxicology	2
Environmental chemistry and biochemistry	2
Water and wastewater treatment	2
Municipal, hazardous and toxic solid waste management	1
Air pollution	1
Application of pesticides	1
Environmental ecology	1
Biostatistics	1
Environmental microbiology	1
General English language	2

Note: To access the latest updates, see guide booklet of discontinuous master's exam in medical sciences.

Expected Competencies at the End of the Program

General Competencies

- Communication and interaction skills

- Research methodology

- Writing and reviewing scientific papers

- Management skills

- Applying statistics and statistical analyses

- Criticizing the related laws, regulations, and guidelines

- Computer skills (ICDL)

- Using of statistical and specialized software

- Educating skill

Specific Competencies and Skills

- Identification, analysis, and titration of toxins
- Operation and calibration of the related instruments
- Sampling of air, water, wastewater, soil, agricultural products, viable organisms, and foodstuffs for toxicological studies
- Applying separation techniques including solvent extraction, solid phase extraction, ion chromatography, chromatography, gas chromatograph (GC), high performance liquid chromatography (HPLC), etc.
- Using of temperature analysis methods and stereochemistry
- Chemical analysis using atomic absorption
- Applying of electrochemical and spectrophotometric methods
- Pesticides analysis

Educational Strategies

Educational strategies of the M.Sc training program in the field of environmental toxicology includes:

- Task-based learning
- Problem-based learning
- Subject-directed learning
- Community-oriented learning
- Evidence-based learning
- Systematic learning
- A combination of student- and teacher-based learning

Student Assessment (Methods and types)

Assessment methods:

- Computer-interactive test
- Written exam
- OSLE
- Oral exam
- 360° exam
- Assessment of portfolio: assessment of Log book, test results, articles, etc.

Types of exams:

Quizzes, midterm, and final exam

Ethical Considerations

Applicants are expected to:

- Follow the safety regulations of staff and work environment
- Comply with dress code
- Strictly observe the ethical rules if working with animals
- Follow professionalism
- Protect resources and equipment to work under any circumstances
- Respect teachers, staff, peers, and other learners, and try to provide a friendly atmosphere in the workplace
- Observe social and professional ethical considerations in the critique of programs
- Observe the ethical points of research in performing field-related studies

Tables of the Courses

Table 2. Compensatory Courses

Course code	Course Title	Credits			Teaching Hours		
		Theory	Practical	Total	Theory	Practical	Total
1	Medical information system	0.5	0.5	1	9	17	26
2	biostatistics	2	0	2	34	0	34
3	Water and wastewater treatment	2	0	2	34	0	34
4	Air pollution	2	1	3	34	34	68
5	Industrial and municipal solid waste	2	1	3	34	34	68
6	Principles of environmental health	2	0	2	34	0	34
7	Methods and techniques of teaching	2	0	2	34	0	34
8	Research methodology in	1.5	0.5	2	26	17	43

	health sciences						
9	Environmental chemistry	1	1	2	17	34	51
10	Environmental impact assessment	2	0	2	34	0	34
11	Biochemistry	2	0	2	34	0	34
12	Physiology	2	0	2	34	0	34
13	Cellular and molecular biology	2	0	2	34	0	34

Table 3. Core Courses

Course code	Title of the Course	Credits			Teaching Hours		
		Theory	Practical	Total	Theory	Practical	Total
1	English for the students of environmental health engineering-environmental toxicology	2	0	2	34	0	34
2	Environmental ecology	1	0	1	17	0	17
3	Safety in application of chemicals and toxic substances	1	0	1	17	0	17
4	Principles of toxicology	2	0	2	34	0	34
5	Identification and measurement of environmental toxins	2	0	2	34	0	34
6	Pesticides	1	0	1		0	17
7	Solid waste management	1.5	0.5	2	26	26	52
8	Environmental toxicology	2	1	3	34	51	85
9	Transformation and biodegradation of toxins	2	0	2	34	0	34
10	Earth toxicology	2	0	2	34	0	34

11	Health impact assessment	2	0	2	34	0	34
12	Project	0	1	1	0	51	51
13	Internship	0	2	2	0	102	102

Table 4. Non-Core Courses*

Course code	Title of the Course	Credits			Teaching Hours		
		Theory	Practical	Total	Theory	Practical	Total
1	Working with laboratory animals	0.5	0.5	1	9	17	26
2	Effects of toxins on cells and molecules	1.5	0.5	2	26	26	52
3	Application of statistical methods in environmental health	1.5	0.5	2	26	26	52
4	Environmental epidemiology	1	0	1	17	0	17
5	Chemistry and physics of aerosols	2	0	2	34	0	34
6	Biodegradation of xenobiotic	2	0	2	34	0	34
7	Microbial toxins	1	0	1	17	0	17
8	Application of remote sensing and GIS	1	0.5	0.5	9	26	35
9	Health risk assessment and management	1	0	1	17	0	17
10	Environmental toxicology in disasters and emergencies	1	0	1	17	0	17

* The student must pass 5 credits of the above table in accordance with the thesis topic, the approval of the supervisor and the graduate council of the university.