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 Engineering

(Solid Waste Management)

Total Course Credits

- Core: 20 credits
- Non-core (Elective): 6 credits
- Dissertation: 6 credits
- Compensatory: 1 credits

Program Description:

Solid waste management is a branch of environmental health engineering which graduates will be able to identify and manage general and hazardous wastes from urban and rural, industrial, agricultural and healthcare, to maintain and promotion of human and environmental health. On the one hand, increasing the production of waste and on the other hand, the massive change and diversity in its quality are issues that in many societies, human health and the environment have faced crucial challenges. Along with completing the capacity of landfills, the production of unpleasant odors, and the leakage of leachate into water resources of large cities, including Tehran and many northern cities, face a crisis of urban and rural, industrial, and medical waste. Currently, in many European countries and the United States, students are accepted at the discontinuous masters and doctoral levels in this field. In our country, there is no history of activities in this field at any time.

Admission Requirements

1- Passing the entrance exam by the rules and conditions of the Ministry of Health and Medical Education
2- Holders of bachelor's degrees in the following fields:
   - Environmental health engineering
   - Environmental engineering
   - Civil engineering (all branches)
   - Mechanical engineering (all branches)
   - Chemical engineering (all branches)

Table 1. Materials of the Entrance Exam

Materials of the Entrance Exam	Weight
Principles of environmental health including foodstuffs hygine, residential and public places sanitation, radiation health	2
Principles of management as well as municipal, hazardous, healthcare and radioactive waste management	3
Air pollution	1
Water and wastewater treatment	2
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 and Skills

1. Expected general competencies

- Communication skills
- Computer skills (ICDL)
- Search in electronic resources
- Writing and critical evaluation of scientific papers
- English language skills (reading, comprehension, translation, speaking)
- Preparation of research questionnaire, checklist, rating scale

- Application of statistical methods and tests (sampling, determination of sample size, analysis of variance, common statistical tests)
- Critique of terms and conditions, protocols and relevant national and international standards
- Technical reports preparation skill

2. Special Competencies and Skills

- Assessing the impacts of development related to waste management on the environment (water, soil, air, sound, socio-economic conditions of people, traffic, biology, ecology, coastal areas, and culture)
- Calculation of per capita production and density waste
- Determining collection paths on the map according to economic, social, technical issues and local facilities.
- Generating energy from waste (Waste-to-Energy)
- Sampling and determining quantitative and qualitative physical, chemical and biological properties of waste, compost and sludge
- Sampling and determination of air pollutants concentration (carbon monoxide, sulfur dioxide, nitrogen oxides, photochemical oxidants, and dew point measurement)
- Design of leachate collection, treatment, and disposal systems
- Management of collection, storage, and transportation of hazardous waste (infectious and nuclear wastes)
- Site selection, preparation, design, implementation, and monitoring of municipal waste: such as incineration facilities, composting facilities, and landfill sites
- Site selection of hazardous waste
- Waste management in healthcare centers
- Risk assessment and management in waste-related activities (hazard probability determination, hazard identification, hazard analysis, hazard impact assessment, and risk management)
- Waste decontamination and detoxification
- Modeling the emission of pollutants from waste-related activities
- Rehabilitation contaminated soil

Educational Strategies
This program is based on the following strategies:

- Task-based learning
- Problem-based learning

- Subject-directed learning
- Evidence-based learning
- A combination of student-teacher centered
- Community-oriented learning
- Systematic learning

Ethical Expectations

Applicants are expected to:

- Follow the safety regulations of staff and work environment (These rules are determined by the relevant department)
- Comply with dress code (1)[*]
- Protect resources and equipment
- Respect lecturers, staff, peers, and other students 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

[*]The rules related to the dress code are available in Appendix 1 of the program.

Tables of the Courses

Table 2. Compensatory Courses

Course code	Course Title	Credits			Teaching Hours		
		Theory	Practical	Total	Theory	Practical	Total
1	Medical Information systems*	0.5	0.5	1	9	17	26
2	Technical language	2	0	2	34	0	34
3	Research methods in health sciences	2	0	2	34	0	34
4	Environmental impact assessment	2	0	2	34	0	34
5	Municipal and industrial solid waste	2	1	3	34	34	68
6	Municipal and industrial wastewater treatment	2	0	2	34	0	34
7	Air pollution	2	1	3	34	34	68
8	Environmental epidemiology	2	0	2	34	0	34
	Total	17					

* Passing this course is mandatory for all students as a compensatory course.

Table 3. Core Courses

Course code	Title of the Course	Credits				Teaching Hours				Prerequisite or concurrent courses
		Theory	Practical	Internship	Total	Theory	Practical	Internship	Total	
9	Solid waste management (1) (identification, classification, production, and minimization)	1	1	0	2	17	24	0	51	-
10	Solid waste management (2) (design of storage, collection, and transportation systems)	2	0	0	2	34	0	0	34	9
11	Sludge processing and disposal	2	0	0	2	34	0	0	34	6
12	Water quality monitoring and management	2	0	0	2	34	0	0	34	-
13	Material and energy recovery	1	0	0	1	17	0	0	17	-
14	Compost technology: Process and design	0.5	0.5	0	1	9	17	0	26	-
15	Technology of Incinerators	0.5	0.5	0	1	9	17	0	26	-
16	Landfill site management: (process and design)	1	1	0	2	17	34	0	51	-
17	Hazardous and nuclear waste management	2	0	0	2	34	0	0	34	-
18	Healthcare waste management	1.5	0.5	0	2	26	17	0	43	9, 10
19	Project	1	0	0	1	34	0	0	34	-

20	Internship	0	0	2	2	0	0	102	102	-
Total		20								

Table 4. Non-Core Courses*

Course code	Title of the Course	Credits			Teaching Hours			Prerequisite or concurrent courses
		Theory	Practical	Total	Theory	Practical	Total	
21	Soil pollution	2		2	34	0	34	-
22	Air pollution control	2	0	2	34	0	34	-
23	Risk assessment and management	2	0	2	34	0	34	30
24	Economy and environment	2	0	2	34	0	34	-
25	Environmental toxicology	2	0	2	34	0	34	-
26	Rights, laws and environmental policies	2	0	2	34	0	34	-
27	Leachate control and treatment	2	0	2	34	0	34	-
28	Wastewater treatment plant design	2	0	2	34	0	34	-
29	Industrial wastewater management	2	0	2	34	0	34	6
30	Environmental health impact assessment (EHIA)	2	0	2	34	0	34	4
Total		20						

* Students must pass six credits based on their thesis topics and approval of their supervisor and postgraduate education council.