In the Name of God

Islamic Republic of Iran
Ministry of Health and Medical Education
Deputy Minister of Education
Digital Health Technology

Total Course Credits:

Non- Core: 6
Core Courses: 18
Thesis: 20

Total: 44

Program Description:

Since digital health technology is an interdisciplinary major, and its practical applications in the health system, especially in the clinical domain, have increased in recent years due to the growth and development of applications of artificial intelligence and specialized tools and methods in this area, there is a growing need for specialists and graduates in this major. To become a digital health specialist, it is necessary to receive concentrated and integrated education in interdisciplinary knowledge from basic and clinical medical sciences, information technology, and bioinformatics to biomedical engineering and other related specialties. Therefore, a Ph.D. student specializing in digital health technology should possess the necessary knowledge and skills in the mentioned subjects.

Introduction:

Digital health technology is rapidly growing, and there are abundant job opportunities in this field. Some of the specialized applications and capabilities of digital health technology include:

- Designing and implementing the necessary systems for use at all levels of healthcare service delivery:
  - Including hospital, pharmaceutical, and laboratory information systems, etc., virtual clinics, and applications offering required services at the community level
- Wearable technologies:
  - These devices can track health data such as heart rate, blood sugar level, and physical activity.
- Health data analysis:
  - These technologies can utilize data collected from wearable technologies and other sources to identify patterns and trends.
- Telehealth services:
  - These services use communication technologies such as telephone, video, and messaging to provide telemedicine services.

- Clinical decision support systems:
  - It is a system and tool that transfers clinical recommendations relevant to clinical assessment topics to the physician to assist in more accurate decision-making or attention to important points.
- Designing predictive models:
  - They are program that predict future events based on specific and recognized data, with accepted accuracy thresholds.
- Applications of artificial intelligence in healthcare service delivery:
  - Utilizing algorithms and various artificial intelligence methods in healthcare system applications.
- Providing personalized medical solutions:
  - Utilizing genetic data and employing algorithms and systems biology and bioinformatic methods in diagnosing, evaluating, and predicting diseases, as well as proposing treatment options.

Course duration:

4 years

Admission Requirements:

Holders of master's degrees in all fields of medical sciences approved by the Supreme Council of Medical Sciences Planning, as well as master's degrees in computer engineering (all specializations), computer science, and information technology.
Holders of general doctorate degrees (medicine, dentistry, and pharmacy).

The Aims of the Course:

• Enhancement of human resources, facilities, and equipment in the healthcare system.
• Providing services related to digital health technology without considering temporal and spatial dimensions.
• Equity in accessing healthcare services for all segments of society.
• Reduction of costs and optimal use of financial and human resources.
• Training specialized workforce for educating the community and improving digital health literacy.

Expected Competencies at the End of the Program:

General Competencies[1]:

The increasing use of digital health technology in providing optimal levels of the triple aim requires specialists who, in addition to training other specialized personnel, practically contribute to the development and advancement of technology based on digital technology in healthcare and play a central role in managing these services. These specialists, by providing technology-based services,

1. General competencies expected of the graduates such as communication skills, critical thinking & problem-solving skills, professionalism ….

especially digital health services, alongside clinical teams and the public, serve as both providers and recipients of health services, design and evaluate relevant systems, and enhance the efficiency of these systems through proper understanding of medicine and engineering.
Graduates will engage in educational, healthcare, and industrial systems in the areas of education and research, providing services, producing technological products, and consulting in related areas. Different roles for these graduates in the mentioned fields are accessible in various locations:
A. Healthcare service provision centers
B. Medical universities and faculties across the country
C. Research centers as well as research and development centers
D. Knowledge-based companies and related industries

Specific Competencies and Skills:

- In the teaching role:
  - Providing educational needs for digital health technology
  - Producing systems and educational products based on digital technology to enhance medical education
  - Serving as a faculty member at universities
- In the research role:
  - Designing and implementing research projects related to digital health technology
- In the advisory role:
  - Providing consultation services regarding the use and implementation of digital health technologies at healthcare service centers
- In the product development role:
  - Offering services, producing digital health technology products, and establishing knowledge-based companies

Educational Strategies[1], Teaching & Learning Methods[2] (aligned with the expected competencies):

Student Center
Problem-based
Community Oriented
Integrated
Systematic
Electiveness

1. Educational Strategies such as Problem-Based Education, Discipline-Based Education, Hospital- Based Education, Community-Based Education, Electives, Student-Centered Education, etc.
2. Teaching & Learning Methods such as Interactive Lecture (questions and answers, group discussions, etc.), Small Group Discussion, Role Play, Guided Discovery Learning, Team-Based Learning (TBL), Problem-Based Learning (PBL), Case-Based Learning, Peer Education, etc.

Student Assessment Types and Methods (aligned with the expected competencies):

Formative Assessment[1]:

Assignment
Quizzes
Presentation

Summative Assessment[2]:

Essay
Multiple Choice Questions
matching
Projects

The overall structure of the course:

General Courses/ Compensatory Courses (22 Credits)

Code	Course Title	Course Credits			Credit Hours			Prerequisite
		Total	Theoretical	Practical	Total	Theoretical	Practical	
1	Physiology	**2**	**2**	**0**	**34**	**34**	**0**	-
2	Anatomy	**2**	**2**	**0**	**34**	**34**	**0**	-
3	Medical Informatics	**2**	**2**	**0**	**34**	**34**	**0**	-
4	Advanced research methods and statistics	**2**	**2**	**0**	**34**	**34**	**0**	-
5	Computer programming	**2**	**1**	**1**	**51**	**17**	**34**	-
6	Principles of Telehealth	**2**	**2**	**0**	**34**	**34**	**0**	-
7	Design and evaluation	**2**	**1**	**1**	**51**	**17**	**34**	-

1. During the course, the residents are evaluated by monitoring their activities and how all the activities are carried out, reviewing the residents' reports, including the number of absences and leave days, medical and ethical errors, assessing by workplace-based assessment methods such as Mini-CEX, Direct Observation of Procedural Skills (DOPS), etc.
2. Residents should take part in the final exam at the end of the course. Summative assessment is conducted using multiple methods like clinical reasoning tests including key feature exam, script concordance test, performance-based assessments can include a variety of objective structured tests such as OSCE (Objective Structured Clinical Examination), workplace-based assessments by the means such as Portfolio, Logbook, Global Rating Form (GRF), Multi Source Feedback (MSF), etc.

	of digital health systems							
8	Project management in digital health	**2**	**2**	**0**	**34**	**34**	**0**	-
9	Principles of computer networks	**1**	**1**	**0**	**17**	**17**	**0**	-
10	An introduction to illustration methods	**2**	**1**	**1**	**51**	**17**	**34**	-
11	An introduction to machine learning	**2**	**1**	**1**	**34**	**17**	**17**	-
12	Medical information systems	**1**	**0.5**	**0.5**	**25.5**	**8.5**	**17**	-
Total		**22**						

Core Courses (18 Credits)

Code	Course Title	Course Credits			Credit Hours			Prerequisite
		Total	Theoretical	Practical	Total	Theoretical	Practical	
13	Applied methods in the design and evaluation of digital health systems	**2**	**0**	**2**	**68**	**0**	**68**	**07**
14	Data standards and data-system interoperability	**1**	**1**	**0**	**17**	**17**	**0**	**05 and 09**
15	Computational medicine	**2**	**1**	**1**	**51**	**17**	**34**	**-**

16	Practical mobile health applications	**1**	**1**	**0**	**17**	**17**	**0**	**06**
17	Artificial intelligence and digital health	**2**	**1**	**1**	**51**	**17**	**34**	**03 05 and and 11**
18	Data mining methods and the use of big data	**2**	**2**	**0**	**34**	**34**	**0**	**11and 17**
19	Databases in health	**1.5**	**1**	**0.5**	**34**	**17**	**17**	**09**
20	Personal medicine and digital health	**2**	**2**	**0**	**34**	**34**	**0**	**15and 17**
21	Data security in digital Health	**1.5**	**1**	**0.5**	**34**	**17**	**17**	**09**
22	Internship	**2**		**2**	**102**		**102**	
23	Seminar	**1**	**1**	**0**	**17**	**17**	**0**	
Total		**18**						

Elective Courses (19 Credits)

Code	Course Title	Course Credits			Credit Hours			Prerequisite
		Total	Theoretical	Practical	Total	Theoretical	Practical	
24	Application of artificial intelligence in diagnosis and treatment	**2**	**2**	**0**	**34**	**34**	**0**	**15 and17**
25	Tele wellness	**2**	**1**	**1**	**51**	**17**	**34**	**16**
26	Computational	**2**	**1**	**1**	**51**	**17**	**34**	**15 and 17 and 20**

	neuroscience							
27	Tele monitoring	**2**	**2**	**0**	**34**	**34**	**0**	**16**
28	Community health literacy and digital health	**2**	**2**	**0**	**34**	**34**	**0**	**-**
29	Principles of evaluation and analysis of medical images	**2**	**1**	**1**	**51**	**17**	**34**	**17**
30	Designing clinical decision support systems	**2**	**1**	**1**	**51**	**17**	**34**	**05and 17**
31	Regulation principles of digital health systems	**2**	**2**	**0**	**34**	**34**	**0**	**-**
32	Entrepreneurship in digital health	**1**	**1**	**0**	**17**	**17**	**0**	**07and 16**
33	Principles of bioinformatics	**2**	**1**	**1**	**51**	**17**	**34**	**15 and 20**
Total		**19**						

Note: It should be noted that the applicant must take 6 units out of 19 units form the above table