<p style="text-align:center">**In the Name of God**</p>

<p style="text-align:center">**Islamic Republic of Iran
Ministry of Health and Medical Education
Deputy for Education**</p>

<h1 style="text-align:center">Medical Informatics</h1>
<p style="text-align:center">**Degree: Doctor of Philosophy (PhD)**</p>

Total Course Credits

- Core: 20
- Non-core (Electives): 8
- Dissertation (PhD): 20

Program Description

Medical Informatics first emerged as a new field to apply computer technology to medicine. It then developed further to extend its applications to other fields like decision science, information science, management science, cognitive science, and organizational and social sciences.

The first organization for informatics was developed by a German scientist Gustav Wagner in 1949. For the first time, during the 1960s, the term Medical Informatics (Informatique Medicale) was coined by French scientists. This was the time when specialized university departments and training programs for Medical Informatics were developed in some of the European countries such as France, the Netherlands, Germany, and Belgium. Later, during the 1970s, Medical Informatics units and departments were also developed in Poland and the US. The American Medical Informatics Association (AMIA) was founded in 1980 to provide support for this emerging discipline. The International Medical Informatics Association (IMIA) is an independent organization established under Swiss Law in 1989 in order to play a major global role in the application of Information Technology in the fields of healthcare and medical practice and research. Since 2001, young Iranian scholars have been sent abroad, mainly Canada, Sweden, The Netherlands, and Australia, to officially learn this new discipline of science. In 2003, in America, the famous report of the Institute of Medicine "Crossing the quality chasm" further highlighted the importance of this discipline by introducing the application of Health Information Technology as a way to alleviate the growing problems in the quality of current medical practice.

Definition:

The field of Medical Informatics is an interdisciplinary area of science dealing with the design, development, adoption and application of information and communication technology innovations in healthcare practice, health care management, and planning. It also deals with the organization of healthcare information, clinical decision-making, medical knowledge management and discovery, and evaluation of the impact of information technology on medical research, education, and patient care.

Aim:

With a growing need and new demands for the application of Medical Informatics knowledge on the one hand, and the return of first graduates from Canada and Europe, on the other, Medical Informatics was established as a PhD course by the Ministry of Health and Medical Education of the I.R. Iran in 2009. The main objectives were to meet the growing needs of the health care system and to disseminate and internalize the discipline's knowledge through training and educating specialized taskforce. The mission is to build a bridge between relevant disciplines of science, such as Artificial Intelligence, Computer Science, and Organizational Science on the one hand, and Medical Science on the other, in order to benefit from the advantages of the interdisciplinary cooperation.

Admission Requirements
- Having a master's degree (MSc) in one of the fields of Medical/Health Informatics, Health Information Technology (HIT), Computer Engineering or a doctorate degree in one of the fields of medicine and pharmacy.
- Being eligible to enter the course according to the PhD educational rules and regulations.

Expected Competencies at the End of the Program General Competencies*

Specific Competencies and Skills
The candidates must have the following specific qualifications and competencies:
- Holding an appropriate academic degree **o** Doctorate degree in Medicine, Dentistry, Pharmacy, and Laboratory sciences, **o** Master of Science in Electronics, Computer Sciences, Mathematics, Biophysics, bioinformatics, and statistics, **o** Master of Science in all healthcare related courses
- Professional competency at working with Microsoft office or other necessary packages
- Professional competency at working with Statistical packages

Educational Strategies, Methods and Techniques*

Student Assessment (Methods and Types)
a) Methods of assessment
   PhD candidates will be evaluated using Written; verbal; OSLE*; Logbook**-based assessment
b) Types of assessment Periodic and comprehensive monitoring of students' progress and assessment of the quality of their dissertation

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

Tables of the Courses

Table A illustrates the basic courses necessary for the PhD program which have not been previously completed by the students. Students should pass at least 16 compensatory course credits from these courses as specified by the Department of Education and approved by the Postgraduate Education Council.

Table A: Compensatory Courses

Code Of the Course	Title of the course	Number of Credits			Total hours		
		Theoretical	Practical	Total	Theoretical	Practical	Total
01	Health Information Technology systems*	0.5	0.5	1	9	17	26
02	Basics of Epidemiology	2	_	2	34	_	34
03	Statistics and Research Methodologies	1	1	2	17	34	51
04	Basics of Management	2	_	2	34	_	34

05	Introduction to Information Architecture	2	1	3	34	34	68
06	General concepts in Medicine	3	_	3	51	_	51
07	Data structure and programming basics	2	1	3	34	34	68
08	General Math	2	_	2	34	_	34
Total		14.5	3.5	18	247	119	366

*This course is obligatory for those candidates who have not passed it during undergraduate study.

Table B: Core Courses

Code of the course	Title of the course	Number of Credits			Total hours			Prerequisite or concurrent courses
		Theoretical	Practical	Total	Theoretical	Practical	Total	
09	Security and confidentiality and moral aspects of data in medical Informatics	1	_	1	17	_	17	_
10	Advanced Statistics and Epidemiology	1.5	0.5	2	26	17	43	_
11	Health Informatics	2	_	2	34	_	34	_
12	Data Mining and Knowledge discovery in medical data bases	2	1	3	34	34	68	_
13	Artificial Intelligence	1.5	0.5	2	26	17	43	_
14	Health Information systems	1.5	0.5	2	26	17	43	_
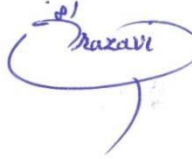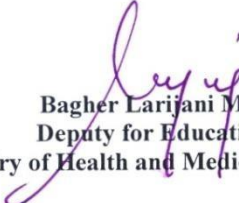
15	Medical Decision Making and Decision Support systems	2	_	2	34	_	34	_
16	Evaluation methods in Medical Informatics	1.5	0.5	2	26	17	43	_
17	Ontologies	1	_	1	_	34	34	_
18	Workflow analysis and design	1.5	0.5	2	26	17	43	_
19	Projects and Seminars	_	1	1	_	34	34	_
20	Dissertation	_	20	20				_
Total		15.5	24.5	40	249	187	436	

Table C: Non-Core Courses

Code of the course	Title of the course	Number of Credits			Total hours			Prerequisite or concurrent courses
		Theoretical	Practical	Total	Theoretical	Practical	Total	
21	Application of new technologies in Medicine	1	1	2	17	34	51	_
22	Intelligent explorers in medicine	2	_	2	34	_	34	_
23	Standards in health information	2	_	2	34	_	34	_
24	e-learning and knowledge sharing in Medical Informatics	1.5	0.5	2	26	17	43	_
25	Tools and methods of research in Medical Informatics	1.5	0.5	2	26	17	43	_

26	Project management in implementing health information system	2	_	2	34	_	34	_
27	System analysis and design in medical software	1.5	0.5	2	26	17	43	_
28	Telemedicine	1.5	0.5	2	26	17	43	_
Total		13	3	16	223	102	325	_

Students should pass 8 credits from the courses in Table C, depending on their dissertation need, supervisor approval, and confirmation of Postgraduate Education Council.

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