In the Name of God

Islamic Republic of Iran
Ministry of Health and Medical Education
Deputy for Education

Biomedical Engineering (Bioelectric)

Master of Sciences (MSc)

Total Course Credits :32

- Core: 17
- Non-core (Electives): 9
- Thesis (MSc):6

- Students have to register and pass all **17** core credits from table 2
- Students have to take and pass 9 credits of non-core elective credits from table 3specified by Biomedical Engineering Department and approved by their thesis adviser and Postgraduate Education Office.
- Students must successfully complete and defend 6 credits of thesis

Program Description

This discipline is an integration of Engineering, Basic Sciences, Medicine and Biology . It attempts to bridge toward modern technology while studying the principles and functions of living systems and applying biological and physiological data on the human body ,.Biomedical Engineering plays a significant role in different areas such as Biomedical Instrumentation, Modeling and Controlling Biologic Systems, Processing of Biologic Signals and Medical Images, Robotics in Medical Design, Neural Networks, Modeling of the Structure and Human Brain Functions, Rehabilitation Engineering and Artificial Organs.

The main objective of this discipline is to educate and train bioelectrical engineering specialists as a member of clinical research and education centers or hospitalsandto enable them to evaluate, select and observe the implementation of the following for clinical research and optimal application of medical equipmentin clinical diagnosis and therapy:

- Evaluation, selection and application of new technological systems
- Management of preventive maintenance and repair of medical equipments
- Applied education of medical staff in clinics and hospitals
- Administration of technical hospital information system and collaborating with physicians, technicians and nurses
- Standardization of applied medical engineering systems
- Advancing the qualitative and quantitative aspects of patients diagnosis and therapy
- Provision of related expert and consulting services for the medical staff in hospitals and health centers
- performing advanced research in medical and engineering fields in order to develop new methods and techniques for design and production of medical diagnostic and therapeutic devices

Admission Requirements

In addition to the general qualifications required by the Supreme Council of Educational Planning' regulations, the following requirements should be fulfilled by all of the candidates:

a) Having an MD, a DMD ,a Pharm-D or a BSc. degree in engineering and technology (all branches), basic sciences, medical and paramedical fields all awarded by an Iranian or a foreign university and approved by Iran's Ministry of Health ,Treatment and Medical Education

b) Being accepted in a special entrance exam including the subjects in the following table:

No	Subject	Coefficient
1	Engineering Mathematics	2
2	Medical Physics and Biomedical Engineering	2
3	Signals and Systems	2
4	Electronic Circuits and Electronics	2
5	Anatomy and physiology	1
6	General English	3
	Total coefficient	12

Expected Competencies at the End of the Program

General Competencies*

Specific Competencies and Skills

At the end of the program learners will be competent in the following skills:
Graduates would have the precise andup- to- date knowledge of almost alldiagnostic andtherapeutic bioelectrical devicesfor:

- teaching theoretical and applied courses to medical andbiomedical engineering students and hospital staff
- supervising biomedical engineering department in a hospital and cooperating with hospital management on the following issues:

- purchasing and installing new medical devices
- performing periodic safety checks
- maintaining and repairing medical devices
- conducting research in biomedical engineering science and technology

Educational Strategies, Methods and Techniques*

Student Assessment:

a) Methods of assessment

Written; verbal; OSLE and Logbook-based

b) Types of the assessment

- Formative (Quizzes, Mid-term)
- Summative (final)
- Comprehensive exam
- Monitoring the progress,completionand defense of the thesis

Ethical Considerations*

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

Tables of the Courses

Table 1:Complementary or Compensatory Courses

No	Course title	Credits	Theoretical Hours	practical Hours	Total Hours
1	Anatomy and Physiology	3	51		51
2	Engineering Mathematics	3	51		51
3	Management of Clinical Health Services	2	34		34
4	Digital Signal Analysis	3	51		51
5	Electrical Safety and protection	2	34		34
6	Medical Informatics	1	9	17	26
7	Hospital Equipments	2	34		34
	Total Credits	16			

Note: Besides the core and non-core courses, students should register and pass all or part of the above complementary or compensatory courses from table 1as specified by Biomedical Engineering Department and approved by the Postgraduate Education Council.

Table 2: Core Courses

No.	Course Title	Credits	Teachinghours (theoretical-practical)		Total
1	Medical imaging systems and methods	3	51	-	51
2	Biomedical Signals processing	3	51	-	51
3	Physiological Systems Modeling	3	51	-	51
4	Medical Instrumentations	2	34	-	34
5	Clinical Engineering Lab. 1	1		34	34
6	Clinical Engineering Lab. 2	1		34	34
7	Internship	2		102	102
8	Seminar	2		68	68
9	Thesis	6	-	-	-
Total		23			

Table 3: Non-CoreCourses(electives)

No.	Course Title	Credits	Teachinghours (Theoretical-Practical)		Total
1	Medical Informatics	3	51	-	51
2	Optics and its applications in Biomedical Engineering	3	51	-	51
3	Digital image Processing	3	51	-	51
4	Ultrasound in Medicine	3	51	-	51
5	Pattern Recognition	3	51	-	51
6	Smart Systems (Nerve and Fuzzy) in Medicine	3	51	-	51
7	Bio-electromagnetics	3	51	-	51
8	IT and its application in Medicine	3	51	-	51
9	Biological Systems Modeling	3	51	-	51
10	Technical Management of Equipments and Safety Standards in Medicine	3	51	-	51
11	Special Topics in Biomedical Engineering	3	51	-	51
12	Clinical Biomechanics	3	51	-	51
13	Biometrical	3	51	-	51
Total		39			

Jamshid Hajati PhD
Secretariat of the Council for Education of Health and Basic Medical Sciences (Undergraduate and Postgraguate)

Seyed Mansour Razavi MD
Secretary of the Supreme Council for Medical Sciences Planning

Bagher Larijani MD
Deputy for Education
Ministry of Health and Medical Education