Faculty of Engineering at benha

Model No.13
Programme Specifications
Biomedical Engineering
Academic Year2017 - 2018

Farabi Quality Management of Education and Learning - 23/1/201923/1/2019
University :Benha university
Faculty :Faculty of Engineering at benha

A- Basic information :

1. Programme title	Biomedical Engineering
2. Programme type	Single
3. Adoption program Date	
4- Department responsible for the program	Department 1 - الهندسة الكهربية / Faculty of Engineering at benha

B- Specialized information :

1- General objectives of the program

- 1- a) Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems
- 2- b) Design a system; component and process to meet the required needs within realistic constraints
- 3- c) Design and conduct experiments as well as analyze and interpret data
- 4- d) Identify, formulate and solve fundamental engineering problems
- 5- e) Use the techniques, skills, and appropriate engineering tools, necessary for engineering practice and project management
- 6- f) Work effectively within multi-disciplinary teams
- 7- g) Communicate effectively
- 8- h) Consider the impacts of engineering solutions on society & environment
- 9- i) Demonstrate knowledge of contemporary engineering issues
- 10- j) Display professional and ethical responsibilities; and contextual understanding
- 11- k) Engage in self- and life- long learning

2- Intended learning outcomes (ILOS)

a- Knowledge and Understanding

- a1- Concepts and theories of mathematics and sciences, appropriate to biomedical engineering
- a2- Basic electrical, control and computer engineering subjects related to the discipline
- a3- Principles and techniques of System and control engineering
- a4- Economics, regulatory and societal environment of research, process or product development in system and biomedical engineering
- a5- Appropriate computer methods and data acquisition techniques for the analysis of dynamic systems applied in biomedical engineering
- a6- Analytical Methods and tools for biomedical instrumentations and rehabilitation devices
- a7- Role of a biomedical engineer in hospitals and healthcare facilities according to the safety codes and standards

- a8- Management, finance, liability and quality control as related to biomedical engineering
- a9- Contributions from multiple engineering disciplines to solve problems in systems engineering
- a10- Ethical and legal principles of professional practice in biomedical engineering, and healthcare environment

b- Intellectual Capacity

- b1- Evaluate and appraise designs, process and products then propose improvements
- b2- Use mathematical and ICT methods in analyzing and solving biomedical engineering problems
- b3- Analyze the performance of the dynamical systems and apply numerical analysis and processing techniques to solve problems in biomedical engineering
- b4- Address problems related to biological, medical and healthcare then exchange results information with community
- b5- Use the principles of biomedical engineering in developing solutions to practical clinical engineering problems and evaluate its performance
- b6- Apply appropriate computer based concepts for modeling and analyzing system and biomedical engineering problems

c- Professional Skills

- c1- Design, Conduct, and document experiments involving biological systems and evaluate their accuracy and validity
- c2- Design system, devices and/or process for use in medical, biological or control applications
- c3- Solving problems in medical signals and image processing
- c4- Apply knowledge of sciences and ICT to solve biomedical engineering problems within economical and time constraints
- c5- Use appropriate mathematical methods for modeling and controlling of system
- c6- Apply technical knowledge and understanding to improve methods, designs, products and services in biomedical engineering

d- General Skills

- d1- Identify and work towards collective goals
- d2- Create, maintain and enhance productive working relationships, and resolve conflicts

6- Programme courses

-Fourth Year / الهندسه الكهربيه / الهندسه الطبيه / الهندسه الطبيه أ) الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٤٢٥	Biomedical Electronics and Instruments	3	3	2	1	First Semster
ك ١٤٤٣	Digital Control	3	3	2	1	First Semster
ك ١٥٥١	Nuclear And Radiological Equipments	3	3	1	2	First Semster
ك ١٤٥٣	Hospital Equipments	2	2	1	1	First Semster
ك ١٤٠١	Field Training	1	0	0	2	First Semster

ك ١٥٠٠	Project	2	2	0	6	First Semster
ك ١٤٥١	Biomedical Statistics	3	3	1	2	First Semster
ك ١٥٢٨	Image Processing And Pattern Recognition	3	3	1	2	Second Semster
ك ١٤٥٢	Management of Medical Equipments	3	3	1	2	Second Semster
ك ١٤٠٨	Engineering Economy	1	2	0	0	Second Semster
ج ١٤٠٠	Legislation And Contracts	2	2	0	0	Second Semster
ك ١٥٠٠	Project	2	2	0	6	Second Semster
ك ١٤٥٤	Life Aid Equipments	3	3	1	2	Second Semster
ك ١٤٥٦	Biomedical Modeling and Simulation	3	3	1	2	Second Semster

b- Optional :

الائحة الداخلية لكلية) الهندسه الطبيه ب / الهندسه الطبيه / الهندسه الكهربيه / Fourth Year-
(الهندسة ببنها

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٤٥١	Biomedical Statistics	3	3	1	2	First Semster
ك ١٤٥٣	Hospital Equipments	2	2	1	1	First Semster
ك ١٤٢٥	Biomedical Electronics and Instruments	3	3	2	1	First Semster
ك ١٤٤٣	Digital Control	3	3	2	1	First Semster
ك ١٥٠٠	Project	2	2	0	6	First Semster
ك ١٤٠١	Field Training	1	0	0	2	First Semster
ك ١٥٥٣	Optical Electronics					First Semster
ك ١٤٥٤	Life Aid Equipments	3	3	1	2	Second Semster
ك ١٤٥٦	Biomedical Modeling and Simulation	3	3	1	2	Second Semster
ك ١٤٥٢	Management of Medical Equipments	3	3	1	2	Second Semster
ك ١٤٠٨	Engineering Economy	1	2	0	0	Second Semster
ك ١٥٠٠	Project	2	2	0	6	Second Semster
ج ١٤٠٠	Legislation And Contracts	2	2	0	0	Second Semster
ك ١٥٥٤	Artificial Intelligence	3	3	1	2	Second Semster

b- Optional :

(الائحة الداخلية لكلية الهندسة ببنها) الفرقة الثالثة / الهندسه الطبيه / الهندسه الكهربيه-

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٣٠١	Acoustics and Ultrasound	3	3	1	2	First Semster
ك ١٣٢١	Microprocessor Based Systems A	3	3	1	2	First Semster
ك ١٣٣٩	Electrical Power and Machines	3	3	2	1	First Semster
ك ١٣٠٥	Technical Report	0	0	0	2	First Semster

م ١٣٣٣	Environment and Pollution	1	1	1		First Semster
ك ١٣٥٣	Anatomy and Physiology					First Semster
ك ١٣٥١	Biomedical Electronics	3	2	2	2	First Semster
ك ١٣٢٢	Microprocessor Based Systems B	3	3	1	2	Second Semster
ك ١٣٢٠	Presentation and Communication	2	2			Second Semster
ك ١٣٥٤	Analytical Instruments and Bioanalysis	3	2	1	1	Second Semster
ك ١٣٣٦	Power Electronics	3	3	2	1	Second Semster
ك ١٣٠٢	Safety in Electrical Environment	1	1	1	1	Second Semster
ك ١٣٤٢	Control Engineering 2	6	3	1	2	Second Semster
ك ١٣٥٢	Biomechanics	3	3	1	2	Second Semster

b- Optional :

7- Programme admission requirements

1- The students from the Egyptian secondary education or equivalent certificate with major in mathematics.

8- Regulations for progression and programme completion

Benha university|Faculty of Engineering at benha| الهندسه الكهربيه/الهندسه الطبيه/الهندسه الطبيه Fourth Year|

- 1- a- The student is considered successful if he passes the examinations in all courses of his class.,b- The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes. ,c- In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite. ,d- The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade. ,e- The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark ,f- The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark.,g- The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.,h- The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

Benha university|Faculty of Engineering at benha| الهندسه الكهربيه/الهندسه الطبيه/الهندسه الطبيه Fourth Year|ب

- 2- a- The student is considered successful if he passes the examinations in all courses of his class. ,b- The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes. ,c- In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to

the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite. ,d- The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade. ,e- The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark ,f- The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark. ,g- The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum. ,h- The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

- 3- a- The student is considered successful if he passes the examinations in all courses of his class. ,b- The student is promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes. ,c- In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc. degree is a prerequisite. ,d- The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade. ,e- The grades of the successful student in a course and in the general grade are evaluated as follows: Distinction: from 85% of the total mark and upwards. Very good: from 75% to less than 85% of the total mark. Good: from 65% to less than 75% of the total mark. Pass: from 50% to less than 65% of the total mark ,f- The grades of a failing student in a course are estimated in one of the following grades: Weak: from 30% to less than 50% of the total mark. Very weak: less than 30% of the total mark. ,g- The B.Sc. general grade for students is based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum. ,h- The student is awarded an honor degree if his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should not have failed in any examination he has sat in any class other than the preparatory year.

9- Assessment rules enrolled in the program

No	**Method**	**As measured from the intended learning outcomes**
1-	Written exams	Knowledge & Understanding skills - Intellectual skills
2-	Oral exams	Knowledge & Understanding, Intellectual, General skills
3-	Practical exams	Knowledge & Understanding skills - Profesional skills - General & transferable skills.
4-	Scientific projects	Practical and professional skills
5-	Reports and essays	General skills

6-	Lecture discussions	Knowledge & Understanding skills - Intellectual skills - Profesional skills - General & transferable skills.

10- Methods of assessment program

No	Evaluator	Tool	Sample
1-	1- Senior Students	Evaluation sheet & Seminars & Final projects	
2-	2- Alumni	Evaluation sheet	
3-	3- Stakeholders (Employers)	Evaluation sheet	
4-	4- External Evaluator	Seminars	
5-	5- Others	projects	

11- Matrix of knowledge and skills

-Fourth Year / الهندسه الطبيه أ / الهندسه الطبيه / الهندسه الكهربيه (الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Biomedical Electronics and Instruments		b14		d1,d7
2-	Digital Control	Course do not need specification			
3-	Nuclear And Radiological Equipments				d1,d7
4-	Hospital Equipments	a1,a2,a5,a6,a7	b3,b4,b5,b6	c1,c2,c3,c4, c5	d1,d2
5-	Field Training	Course do not need specification			
6-	Project	Course do not need specification			
7-	Biomedical Statistics	P0a1,P0a2,P0a 3,a1,a5,a6,a8,P 0a5,P0a7	P0b1,P0b2,P 0b3	P0c1,P0c2,P 0c3,P0c5	P0d1,P0d2, P0d3,P0d7
8-	Image Processing And Pattern Recognition	Course do not need specification			
9-	Management of Medical Equipments		b14		
10-	Engineering Economy	Course do not need specification			
11-	Legislation And Contracts	Course do not need specification			
12-	Project	Course do not need specification			
13-	Life Aid Equipments	P0a1,P0a2,P0a 3,P0a4,P0a5,P0 a8,P0a12	P0b1,P0b2,P 0b3,P0b11,P 0b9,P0b12	P0c1,P0c2,P 0c4	P0d1,P0d2, P0d3,P0d6, P0d7,P0d8
14-	Biomedical Modeling and Simulation	P0a1,P0a2,P0a 3,P0a4,a3,a5,a8 ,P0a5,P0a7	P0b1,P0b2,P 0b3,P0b4	P0c1,P0c2,P 0c3,P0c4	P0d1,P0d2, P0d3

b- Optional :

-Fourth Year / الائحة الداخلية لكلية) الهندسه الطبيه ب / الهندسه الطبيه / الهندسه الكهربيه (الهندسة ببنها

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Biomedical Statistics	Course do not need specification			
2-	Hospital Equipments	Course do not need specification			
3-	Biomedical Electronics and Instruments	Course do not need specification			
4-	Digital Control	Course do not need specification			
5-	Project	Course do not need specification			
6-	Field Training	Course do not need specification			
7-	Optical Electronics	Course do not need specification			
8-	Life Aid Equipments	Course do not need specification			
9-	Biomedical Modeling and Simulation	Course do not need specification			
10-	Management of Medical Equipments	Course do not need specification			
11-	Engineering Economy	Course do not need specification			
12-	Project	Course do not need specification			
13-	Legislation And Contracts	Course do not need specification			
14-	Artificial Intelligence	P0a1,P0a2,P0a4, P0a5,P0a8,P0a9, P0a10	P0b5,P0b7,P0b9, P0b11,P0b12	P0c1,P0c2,P0c3,P0c4,P0c6,P0c7,P0c8,P0c9,P0c10,P0c11,P0c12	P0d1,P0d2,P0d3,P0d4,P0d5

b- Optional :

-(الائحة الداخلية لكلية الهندسة ببنها) الفرقة الثالثة / الهندسه الطبيه / الهندسه الكهربيه

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Acoustics and Ultrasound	P0a1,P0a2,P0a3, P0a4,P0a5,P0a8, P0a12	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2,P0c3	P0d1, P0d2, P0d3
2-	Microprocessor Based Systems A	Course do not need specification			
3-	Electrical Power and Machines	Course do not need specification			
4-	Technical Report	Course do not need specification			
5-	Anatomy and Physiology	Course do not need specification			

6-	Biomedical Electronics				d1,d7
7-	Microprocessor Based Systems B	Course do not need specification			
8-	Presentation and Communication	Course do not need specification			
9-	Analytical Instruments and Bioanalysis				d1,d7
10-	Power Electronics	P0a5	P0b2,P0b4	P0c2	P0d2, P0d6
11-	Safety in Electrical Environment	Course do not need specification			
12-	Control Engineering 2	Course do not need specification			
13-	Biomechanics		b14		P0d1, P0d2, P0d6, P0d9, P0d8

b- Optional :

Program Coordinators :

الدكتور

Open Description