

Academic Program Description Form
(2024-2025)

University Name: **Al Mustaqbal University**

Faculty/Institute: **College of Engineering, and Technology**

Scientific Department: **Medical Instrumentation Techniques Engineering.**

Academic or Professional Program Name:

Medical Instrumentation Techniques Engineering

Final Certificate Name:

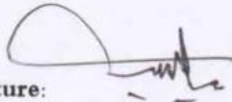
B.Sc. in Medical Instrumentation Techniques Engineering

Academic System: **annual Program**

Description Preparation Date: **12/2/ 2025**

File Completion Date: **12/2/ 2025**

Signature:



Head of Department Name:

Prof. Dr. Bayan Mahdi Sabbar

Date: **12/2/ 2025**

Signature:



Scientific Associate Name: **Dr. Ahmad H. Al-Badri**

Date: **12/02/2025**

The file is checked by:

Quality Assurance and University Performance Division

Director of the Quality Assurance and University Performance Division :

Dr. Zahra Hashim Kareem

Date: **12-2-2025**

Signature:




Approval of the Dean

1. Program Vision

The department seeks to provide academic programs that ensure leadership and excellence in the field of medical instrumentation technologies and scientific research at the local, regional and international levels.

2. Program Mission

Providing a sober academic education based on quality standards, promoting scientific research and innovation, and providing a stimulating educational environment that contributes to the preparation of distinguished engineering cadres in the field of medical instrumentation technologies, in cooperation with various health sector institutions, and with a sustainable approach that keeps pace with scientific developments at the local, regional and international levels.

3. Program Objectives

- 1 –Facilitating administrative procedures and providing psychological and educational guidance to ensure the development of the relationship between students and teachers.
- 2 –Supporting scientific research and encouraging leadership and innovation.
- 3 –Modernizing existing laboratories and developing new laboratories to keep pace with the development in the field of medical instrumentation as well as classrooms and other material supplies.
- 4 –Continuous development of teaching and technical cadres through engaging in training courses, scientific visits and local and international conferences.

5 –Keeping up with the scientific development in modern fields related to the field of medical instrumentation through the development and updating of curricula and the use of artificial intelligence and other technologies in this field.

6 –Enhancing the links between the department and various segments of society through the provision of community services and the provision of consultations.

7– Openness and communication with corresponding scientific institutions locally and regionally.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

The department is currently working on completing the requirements for program accreditation, and according to the department's planned schedule, the accreditation files will be submitted by the end of June 2025.

5. Other external influences

The Medical Instrumentation Engineering Department Techniques program is designed and developed based on the requirements of institutions that employ graduates in the job market, such as public and private hospitals, healthcare centers, and medical equipment sales and maintenance companies. The program is also guided by continuous feedback from employers to identify the skills and knowledge demanded by the local and regional labor markets. These entities serve as key pillars in shaping learning outcomes and ensuring their alignment with the needs of the healthcare sector, thereby enhancing graduate readiness and facilitating their integration into the professional work environment.

6. Program Structure				
Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	9	24	%12.18	
College Requirements	2	6	%3	
Department Requirements	29	167	%84.77	
Summer Training	2	Requirement without units		
Other				

7. Program Description					
Credit hours		Course code	Course name	Year/Level	
practical	theoretical				
3	2	MU0241001	Fundamental of Electrical Engineering	First Year	
0	3	MU0241002	Mathematics /1		
2	2	MU0241003	Medical Chemistry		
2	2	MU0241004	Medical Physics		
2	2	MU0241005	Computer Applications		
0	2	MU0241006	Mechanics		
0	2	MU0241007	Democracy and Human rights		
4	0	MU0241008	Engineering Drawing		
4	0	MU0241009	Workshops		
0	1	MU0241010	English		
3	2	MU0242001	Medical devices/1	Second Year	Academic Program (Annual System)
2	2	MU0242002	Electronic components and circuits		
2	2	MU0242003	Medical Measurements and Transformers		
0	3	MU0242004	Mathematics/2		
2	2	MU0242005	Anatomy and physiology		
2	2	MU0242006	Clinical Chemistry Equipment		
2	2	MU0242007	Digital technologies		
2	1	MU0242008	Computer Applications/2		
0	1	MU0242009	English language II		

0	1	MU0242010	The crimes of the Baath Regiem in Iraq	Third Year	
0	1	MU0242011	Arabic language		
3	2	MU0243001	Medical devices/2		
2	2	MU0243002	Processor and microcomputer		
2	2	MU0243003	Power electronics		
2	2	MU0243004	Medical Communication Systems		
2	2	MU0243005	Electronic medical systems		
2	2	MU0243006	digital signal processing		
2	2	MU0243007	Electrical Technology		
2	1	MU0243008	Computer Applications /3		
0	1	MU0243009	English language III	Fourth Year	
3	2	MU0244001	Medical devices/3		
2	2	MU0244002	Control systems		
2	2	MU0244003	Radiation engineering		
2	2	MU0244004	Medical Laser Systems		
2	2	MU0244005	Advanced digital design		
0	2	MU0244006	Project management		
2	1	MU0244007	Computer Applications		
0	1	MU0244008	English language IV		
0	2	MU0244009	Professional Ethics		
6	0	MU0244010	Graduation Project		

8. Expected learning outcomes of the program

Knowledge and Understanding

1– Learning Outcomes

- A–1. The ability to design, develop, and attempt to find alternatives for certain parts related to medical devices.
- A–2. The ability to segment and analyze the parts of a medical device and the function of each part.
- A–3. The ability to diagnose malfunctions in medical devices, develop an appropriate plan for medical device maintenance, and schedule and program periodic maintenance work.
- A–4. The ability to prepare and study the appropriate conditions for each device.

Topic and specific skills

2-Learning Outcomes	B-1 Training and development of engineering personnel in the calibration, operation, and maintenance of medical devices. B-2 Designing highly efficient and cost-effective medical devices. B-3 Providing scientific and practical consultations in the field of medical devices. B-4 Installation, operation, and maintenance of electronic and .electromechanical medical devices, both diagnostic and therapeutic
Ethics and Thinking Skills	
3-Learning Outcomes	C-1. The ability to work within a multidisciplinary team (engineers, physicians, technicians) to improve the performance of medical .devices C-2. Commitment to professional ethics and safety standards when .dealing with patients and medical data C-3. Possess effective communication skills when explaining medical .device technologies to non-specialists C-4. Openness and communication with peer scientific institutions locally and regionally, and strengthening ties with various segments of society.
General and Transferable Skills	
4- Learning Outcomes	D-1 Possess leadership skills and the ability to effectively manage work teams. D-2 Ability to lead, innovate, and conduct scientific research in the field of medical devices. D-3 Ability to continuously develop oneself and keep up with developments in the field of specialization. D-4 Ability to use modern software in designing and simulating medical devices.

9. Teaching and Learning Strategies

1 .Knowledge and Understanding:

Demonstrate knowledge of fundamental concepts related to digital biomedical systems, such as bio signal processing, vital data transmission, and integration with smart healthcare technologies.

2 .Intellectual Skills:

Analyze and understand the impact of biomedical devices on disease diagnosis, vital signs monitoring, and accurate clinical data management.

3 .Applied Skills:

Perform practical tasks using engineering simulation software and specialized tools for testing and maintaining biomedical devices such as ECG machines, monitors, and imaging systems.

4 .Transferred Skills

Communicate specialized scientific content using visual and interactive educational tools, and actively participate in workshops or seminars that blend theory with practice in continuous medical education.

10. Evaluation methods

Discussion–Daily Evaluation semester evaluation – practical evaluation – final – evaluation – presentation– Quizzes – weekly reports

11.Faculty

Faculty members

Number of the teaching staff		Special requireme nts/skills (if any)	Specialization		Academic rank
Lecturer	staff		Special	General	
1	2	–	1	2	Pof.

–	2	–	2	–	Asst.Prof
1	7	–	5	3	Lec. Dr
–	2	–	1	1	Lecturer
1	9	–	5	5	Asst.Lecturer
3	22	–	14	11	Total

Faculty members by degree, academic title, and specialization

NO	Name	Certificate	Academic title	Specialization		Faculty preparation	
				general	private	Staff	lecturer
1	bayan mahd sabbar	PhD	Professor	Electrical Engineering	digital signal processor	✓	
2	Adnan Hussein Ali	PhD	Professor	Laser Engineering	Optical Communications		✓
3	Alaa Hussein Ali	PhD	Professor	Laser Engineering and Optical Electronics	Optical Fibers	✓	
4	Saad Mutasher Abbas Fares	PhD	Assistant Professor	Electrical Engineering	Electronic Engineering and Medical Electronics	✓	
5	Hasan Hamad Ali	PhD	Assistant Professor	Mechanical Engineering	Control - Fluid Flow	✓	
6	Rami Qays malik	PhD	lecturer	Electrical Engineering	wireless communications	✓	
7	Maysar Munther Adnan	PhD	lecturer	Computer Engineering	artificial intelligence	✓	
8	Amal Ibrahim Mahmoud	PhD	lecturer	Biomedical Engineering	Biomedical Engineering		✓
9	tarik raoof hasan	PhD	lecturer	Electrical and Electronic Engineering	Electrical and electronic power	✓	
10	Osamah Jaber Ghayyib	PhD	lecturer	Electrical Engineering	Communications Engineering	✓	
11	Zahraa hashim kareem	PhD	lecturer	Electrical Engineering	General Electricity	✓	
12	Zeyad Taha yaseen	PhD	lecturer	communication	Optical communications	✓	

13	Ahed Hamid Jaaz	PhD	lecturer	Physics	renewable energy	✓	
14	jaber hamid majeed	Master's	lecturer	Electronics	Electronics and communications	✓	
15	hameed nida hameed	Master's	lecturer	Industrial Engineering	Industrial Management	✓	
16	Luban hamdi hamid	Master's	Assistant Lecturer	Biomedical Engineering	Biomedical Engineering		✓
17	shahlaa yaseen younus	Master's	Assistant Lecturer	Electrical Engineering	communication	✓	
18	Ahmed Hilmi Kadhim	Master's	Assistant Lecturer	Medical Device Engineering	medical devices	✓	
19	Amir Mohammed Khalaf	Master's	Assistant Lecturer	Project Management	Engineering Project Management	✓	
20	ali kareem obaid	Master's	Assistant Lecturer	information technology	Software	✓	
21	Huda Wasfi Hassoun	Master's	Assistant Lecturer	Electrical Engineering	industrial electronics	✓	
22	Zahraa Eisa Mohammed	Master's	Assistant Lecturer	Electrical Engineering	Electronics	✓	
23	Elaf Hussein Hadil	Master's	Assistant Lecturer	Electrical Engineering	Electronics	✓	
24	Hude Asaad abdalimir	Master's	Assistant Lecturer	Electrical Engineering	communication	✓	
25	alaa khalid abdalreda	Master's	Assistant Lecturer	Materials Engineering	metallurgy	✓	

12. Professional development

Orientation of new faculty members

The orientation of new faculty members aims to provide the necessary support and guidance to ensure their success in the academic environment. This is achieved through the preparation of a comprehensive orientation program that includes workshops focusing on modern teaching methods, classroom management, and student assessment techniques. Additionally, experienced faculty members are appointed as mentors to accompany the new members, offering continuous advice and support. Periodic meetings are also organized to discuss the challenges they face and to exchange ideas and educational resources.

Professional development for faculty members

Professional development is the cornerstone for improving the quality of academic education. It helps faculty members stay updated with the latest medical and engineering technologies and develop their skills in using modern devices and analysis and design software. It also enhances teaching and assessment methods to align with labor market requirements and strengthens their abilities to supervise graduation projects and scientific research. Faculty members are encouraged to participate in workshops and training courses, undertake field visits, and engage in industrial collaborations, which allow them to better understand market needs and apply them within the educational environment.

13. Acceptance Criteria

The Department of Biomedical Equipment Technology Engineering admits the following categories of applicants:

- General Secondary School Graduates – Scientific Branch (Biological and Applied Sciences Eligible for admission to the first academic year with a minimum average of 60% for the morning study and 58% for the evening study
- Industrial Secondary School Graduates – Specializations in Electronics, Control, and Medical Devices Eligible for admission with a minimum average of 63% for the morning study and 58% for the evening study.
- Vocational Industrial Secondary School Graduates – Medical Devices Department for admission to the first academic year with a minimum average of 63% for the morning study and 58% for the evening study.

– Technical Institute Graduates – Medical Devices Department Eligible for admission to the first academic year with a minimum average of 63% for the morning study and 58% for the evening study.

14. The most important sources of information about the program

Website of the Medical Instrumentation Engineering Techniques Department– College of Engineering and Engineering Technologies / Al-Mustaqbal University

<https://uomus.edu.iq/DefaultDep.aspx?depid=18>

Guide of the Department, College, and University

Website of the corresponding department to the Medical Instrumentation Engineering Techniques Department (Middle Technical University / Electrical Technical College)

<https://eetc.mtu.edu.iq/>

15. Program development plan

1. Curriculum Update:

- Keeping up with technological advancements in the field of medical devices by updating existing course materials and introducing new subjects that align with rapid technological development and the ever-changing demands of the job market.

2. Enhancing Practical Training:

- Upgrading laboratories with simulators and modern technologies, and expanding the department's partnerships with hospitals and medical device companies to ensure intensive hands-on training for students.

3. Academic and Research Collaboration:

- Establishing partnerships with local and international universities and research centers to exchange expertise and promote applied research in this field.

4. Quality Assurance and Accreditation:

- The program is aligned with both local and international quality and accreditation standards, such as ABET. Performance is regularly evaluated through surveys conducted among graduates and employers to continuously enhance and improve the learning outcomes

Program Skills Map																			
Required learning outcomes of the program																			
Year / Level				knowledge				Skills				Ethics				General and transferable skills			
General and transferable skills	General and transferable skills	General and transferable skills	General and transferable skills	A 1	A 2	A 3	A 4	B 1	B 2	B 3	B 4	C 1	C 2	C 3	C 4	D 1	D 2	D 3	D 4
First Year	MU0241001	Principles of Electrical Engineering	Basic	√	√	√	√	√	√		√	√					√	√	
	MU0241002	Mathematics 1	Basic	√					√			√					√		√
	MU0241003	medicinal chemistry	Basic	√					√			√	√	√			√	√	
	MU0241004	Medical Physics	Basic	√	√		√		√					√			√	√	

	MU0241005	Computer Applications	Basic	√		√			√			√					√		√
	MU0241006	Mechanics	Basic	√	√		√	√	√	√			√		√	√	√	√	
	MU0241007	Democracy and human rights	Basic									√	√		√	√			
	MU0241008	Engineering drawing	Basic							√				√				√	
	MU0241009	Workshops	Basic		√	√	√							√	√		√	√	
	MU0241010	English language	Basic					√		√	√	√	√	√		√		√	√
Second year	MU0242001	Medical devices/1	Basic	√					√						√				√
	MU0242002	Electronic components and circuits	Basic										√			√			

MU0242003	Medical Measurements and Transformers	Basic							√	√		√			√			
MU0242004	Mathematics/2	Basic									√					√		
MU0242005	Anatomy and physiology	Basic										√				√		
MU0242006	Clinical Chemistry Equipment	Basic	√	√	√		√		√	√	√		√		√		√	√
MU0242007	Digital technologies	Basic	√				√									√		
MU0242008	Computer Applications/2	Basic													√			√
MU0242009	English language	Basic										√			√			
MU0242010	The crimes of the Baath Regiem in Iraq	Basic										√			√			
MU0242011	Arabic language	Basic										√			√			

Third year	MU0243001	Medical devices/2	Basic	√	√	√		√		√		√					√	√	
	MU0243002	Processor and microcomputer	Basic	√						√		√							√
	MU0243003	Power electronics	Basic	√				√				√				√		√	
	MU0243004	Medical Communication Systems	Basic	√						√		√					√		
	MU0243005	Electronic medical systems	Basic		√			√				√				√			
	MU0243006	digital signal processing	Basic	√				√				√					√		
	MU0243007	Electrical Technology	Basic			√					√		√					√	
	MU0243008	Computer Applications/3	Basic			√		√							√		√		
	MU0243009	English language	Basic											√				√	
	MU0244001	Medical devices/3	Basic	√	√	√	√	√	√	√	√	√	√	√			√	√	

Fourth year	MU0244002	Control systems	Basic	√	√	√		√	√		√	√					√	√	
	MU0244003	Radiation engineering	Basic	√					√			√					√	√	
	MU0244004	Medical Laser Systems	Basic	√					√			√					√	√	
	MU0244005	Advanced digital design	optional	√					√				√					√	
	MU0244006	Project management	Basic									√	√	√	√	√			
	MU0244007	Computer /4pplicationsA	Basic	√					√			√					√	√	√
	MU0244008	English language	Basic											√	√				
	MU0244009	Professional ethics	Basic										√						
	MU0244010	Graduation Project	Basic	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√