

Al-Bayan University الجامعة البيان



First Cycle – Bachelor's Degree (B.Sc.) - Department of Medical Instruments Technical Engineering

بكالوريوس - قسم هندسة تقنيات الاجهزة الطبية (الدورة الأولى)

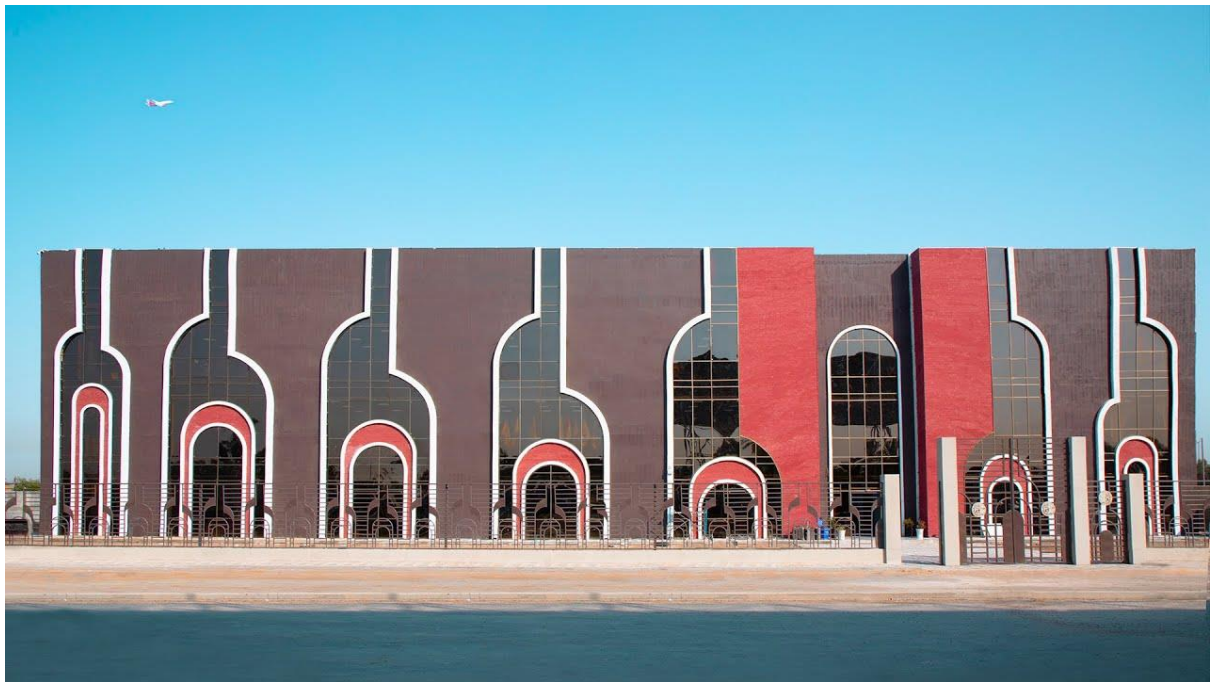


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1. Mission & Vision Statement

Vision Statement

The vision of the Medical Instruments Technical Engineering Department is to qualify the student to be an applied engineer familiar with modern technologies in the field of medical equipment engineering. In addition to that, providing an academic environment and community services that keep pace with the rapid development in the field of medical devices, and providing the latest study programs to keep pace with the scientific departments corresponding to the Department of Medical Equipment Technology Engineering in reputable Arab and international universities.

Mission Statement

The mission of the Medical Instruments Technical Engineering Department is to provide an educational, technical and research environment for students through modern educational programs and curricula that demonstrate the importance of this specialization. Providing scientific and practical approaches and advanced applied research to simulate the needs of the labor market, openness to health institutions, and contribute to improving the health situation at the international and regional levels.

2. Program Specification

Programme code:	BSc- MIET	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

MIET program is designed to provide students with the skills to improve themselves by preparing them for a career in medical instrumentation. Students will learn how to administer and support the medical instrumentation technology and design. The curriculum consists of an integrated set of courses in mathematics, medical physics and chemistry, fundamentals of electric and electronic circuits, medical instrumentations. Students will have the opportunity to know the principles of computer applications and they will be prepared for careers in companies of medical instrumentation dealing with the services, demonstrating general knowledge of medical devices categories and principal of operation. Moreover, the students will learn the various components of medical equipment.

Level 1 exposes students to the fundamentals of MIET, suitable for progression in engineering fundamentals. Programme-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. MIET graduates are therefore trained to appreciate how research informs teaching, according to the University and School Mission statements.

At Levels 2, 3 and 4 MIET students understand the subject area and the professional fields of engineering mathematics, anatomy and physiology, electronic circuits, computer programming, medical instrumentations, electrical machines, digital electronics, english language, biomedical signal processing, medical communication systems, biomedical transducers and sensors, control systems, artificial limbs, elective subjects, medical laser systems, power electronics, and professional ethics which can be obtained during the course of study.

The research ethos is developed and fostered from the start via practical's, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3 and 4. At Level 4 all students carry out an independent research project.

3. Program Goals

1. Graduating of an engineering staff with scientific and practical skills in diagnosing and repairing malfunctions resulting in medical devices.
2. Preparing qualified engineers who have the ability to keep pace with the rapid development in the field of medical devices and provide them with the necessary skills to develop and modernize medical devices.
3. Installing and operating various electronic and electromechanical medical devices, both diagnostic and therapeutic.
4. Contributing and supervising the maintenance, maintenance and calibration of various medical devices.
5. Designing, developing and trying to find alternatives for some parts related to medical devices.
6. Carrying out scheduling and programming of periodic maintenance work.

4. Student Learning Outcomes

Students who complete the MIET program will have a strong foundation in medical instrumentation, with various employment options and occupations in mind. Graduates are knowledgeable and skilled in creating, designing, testing, and maintaining medical devices and equipment. Additionally, they can pinpoint the crucial role that medical technology developments have played in developing the modern healthcare system. They can use information, the internet, and communication technologies to gather accurate and pertinent information for reports, presentations, etc., that satisfy academic criteria. They possess the ability to interact in a second language. Additionally, they possess the capacity to communicate both verbally and in writing with various audiences. Moreover, the capacity for openminded, interactive communication with non-experts.

Outcome 1

Understanding of allied knowledge

Graduates will be able to show a thorough understanding of the market's requirements for knowledge, skills, and expertise. They are also aware of how the market and technological advancement are moving.

Outcome 2

Oral and Written Communication

Graduates will be able to formally communicate the medical device troubleshooting results using oral and written communication skills.

Outcome 3

Technical and cognitive skills

Graduates can design circuits for medical equipment based on specific criteria and develop applications to view or control the outcomes.

Outcome 4

Critical thinking and analytical skills

Graduates will be able to identify emerging problems and try to solve them with approaches based on logical and critical thinking using modeling, designing, and forecasting.

Outcome 5

Appropriate research tools and techniques

Graduates will be capable of carrying out various scientific applications using fundamental research procedures. The graduate can adapt and acquire new skills to produce the desired results.

Outcome 6

Communications and IT skills

Graduates can share information with the technical team to find the optimal solution. Additionally, they can use the internet, communication, and information technologies. Graduates can read and comprehend user manuals and directions for various medical equipment. They communicate with non-experts showing awareness of diverse informational levels and different perspectives with various medical terms in English.

Outcome 7

Group/team leadership

Graduates will be self-motivated, cooperate effectively with other professionals in different disciplines, backgrounds, and interests to solve problems, work lucidly in confusing situations under pressure, and demonstrate knowledge of and commitment to following safety procedures for themselves and others.

Outcome 8

Own professional development

Graduates can make decisions, plan, problem-solving, and stay updated professionally.

5. Academic Staff

Mohamad Sameer Jabbar Kadam| Ph.D. in Networks and Communication| Assistant Professor
Email: mohanad.s@albayan.edu.iq
Mobile no.: +9647719112700

Yasmen Abdulaziz Mustafa| Ph.D in Environmental Engineering| Assistant Professor
Mobile no.: +9647811122325

Asaad AbdAlhussain Mozan AlZubaidi| Ph.D. in Physics| Lecturer
Email: asaad.a@albayan.edu.iq
Mobile no.: +9647505615926

Sami Hasan| Ph.D. in Electronics Engineering| Lecturer
Email: sami.hasan@albayan.edu.iq
Mobile no.: +9647500238913

Istabraq M. Al-Joboury| Ph.D. in Information and Communication Engineering| Lecturer
Email: istabraq.m@albayan.edu.iq
Mobile no.: +9647730000687

Noof T. Mahmood| Ph.D. in Electronic and Communications Engineering| Lecturer
Email: noof.t@albayan.edu.iq
Mobile no.: +96407860432699

Saif Mohamed Baraa Mohamed| Ph.D. in Electrical and Computer Engineering| Lecturer
Email: saif.mb@albayan.edu.iq
Mobile no.: +9647702798908

Safa Layth Gailan| Ph.D. in Biomedical Engineering| Lecturer
Email: safa.l@ albayan.edu.iq
Mobile no.: +9647709497178

Aqeel Nafea Abdulateef| Ph.D in Electronics and Communication| Lecturer
Email: aqeel.n@albayan.edu.iq
Mobile no.: +9647705324550

Muhammed Emad Abd Alkhalec| M.Sc. in Information Technology| Assistant Lecturer
Email: Muhammed.e@albayan.edu.iq
Mobile no.:+9647735393688

Ali Mustafa Salman| M.Sc. in Networks Engineering| Assistant Lecturer

Email: ali.m@albayan.edu.iq
Mobile no.: +9647717919216

Ahmed Mahmood Farhan| M.Sc. in Electrical and Computer Engineering| Assistant Lecturer
Email: ahmed.m@ albayan.edu.iq
Mobile no.: +96477032-6287

6. Credits, Grading and GPA

Credits

Al-Bayan University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 30 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$\text{CGPA} = [(1^{\text{st}} \text{ module score} \times \text{ECTS}) + (2^{\text{nd}} \text{ module score} \times \text{ECTS}) + \dots] / 240$$

8. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET1101	Fundamentals of Electrical Engineering (DC)	79	71	6	C	
2	MTU1004	Computer Principles	49	26	3	B	
3	MIET1103	Differential Mathematics	78	47	5	B	
4	EETC102	Engineering Drawing	63	62	5	B	
5	MTU1006	Democracy and Human Rights	33	17	2	S	
6	MTU1002	English Language 1	33	17	2	S	
7	MIET1107	Medical chemistry	94	81	7	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET1202	Medical Physics	64	61	5	B	
2	MIET1201	Fundamentals of Electrical Engineering (AC)	79	71	6	C	07011101
3	MIET1203	Mechanics	48	52	4	B	
4	MIET1204	Integral Mathematics	78	47	5	B	07011103
5	EETC101	Engineering Workshops	63	62	5	B	
6	MTU1001	Arabic Language 1	33	17	2	S	
7	MIET1206	Computer Programming and Applications I	49	26	3	s	

Semester 3 | 30 ECTS | 1 ECTS = 30 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET2101	Laboratory Medical Instrumentation I	74	106	6	C	
2	MIET2102	Electronics Circuits I	74	106	6	C	Fundamentals of Electrical Engineering
3	MIET2103	Electrical Machines	74	76	5	C	Fundamentals of Electrical Engineering
4	MIET2104	Engineering Mathematics	73	77	5	B	Integral Mathematics
5	MIET2105	Anatomy and Physiology	74	76	5	B	
6	MTU1005	Computer Programming and Applications (MATLAB-beginner)	46	44	3	B	
7	MTU1007	The Crimes of the Ba'ath Regime in Iraq	33	17	2	B	

Semester 4 | 30 ECTS | 1 ECTS = 30 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET2202	Electronics Circuits II	74	106	6	C	Electronics Circuits I
2	MIET2201	Laboratory Medical Instrumentation II	74	106	6	C	Laboratory Medical Instrumentation I
3	MIET2203	Digital Electronics	74	76	5	C	Electronics Circuits I
4	MIET2204	Clinical Chemistry Instrumentation	60	90	5	C	
5	MIET2205	Biomedical Transducers and Sensors	60	90	5	C	Fundamentals of Electrical Engineering
6	MTU1003	English Language II (Intermediate Level)	45	45	3	B	English Language (Beginner Level)

7	MTU1009	Arabic Language II	17	33	2	B	
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Semester 5 | 30 ECTS | 1 ECTS = 30 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET3101	Medical Diagnostic Instrumentation I	74	136	7	C	Anatomy and Physiology
2	MIET3102	Microprocessor	88	92	6	C	Digital Electronics
3	MIET3103	Electromagnetic Fields	74	106	6	C	Engineering Mathematics
4	MIET3104	Signal and Systems	60	60	4	C	Engineering Mathematics
5	MIET3105	Computer Programming and Applications II (C++ Programming)	60	60	4	B	
6	MIET3106	Project Management	48	27	3	S	

Semester 6 | 30 ECTS | 1 ECTS = 30 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET3201	Medical Diagnostics Instrumentation II	74	136	7	C	Medical Diagnostic Instrumentation I
2	MIET3202	Medical Electronic Systems	74	106	6	C	Electronics Circuits II
3	MIET3203	Medical Communication Systems	60	120	6	C	Signals and Systems
4	MIET3204	Power Electronics	74	76	5	C	Electronics Circuits I
5	MIET3205	Project I	30	60	3	C	
6	MIET3206	Advanced Computer Programming	79	21	4	S	

Semester 7 | 30 ECTS | 1 ECTS = 30 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET 4101	Medical Therapeutic Instrumentation I	79	69	7	C	Anatomy and Physiology
2	MIET 4102	Medical Laser Systems	79	46	5	C	Anatomy and Physiology
3	MIET 4103	Control Systems	79	46	5	C	Engineering Mathematics
4	MIET 4105	Project II	48	77	5	C	Project I
5	MIET 4104	Biomedical Signal Processing	64	36	4	C	Signals and System
6	MIET 4106	Elective I	64	36	4	E	

Semester 8 | 30 ECTS | 1 ECTS = 30 hrs

No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
1	MIET 4201	Medical Therapeutic Instrumentation II	79	69	7	C	Medical Therapeutic Instrumentation I
2	MIET 4202	Engineering of Radiation Instrumentation	79	71	6	C	
3	MIET 4203	Artificial Limbs and Robotics	94	56	6	C	Control Systems
4	MIET 4204	Elective II	64	36	4	E	
5	MIET 4205	Elective III	64	36	4	E	
6	MTU1008	Professional Ethics	48	27	3	S	

The selective curriculum

	No.	Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
Seven	1	0701410x	Microcontrollers	60	60	120	E	Computer Programming and Applications
	2	0701410x	Artificial Neural Engineering	60	60	120	E	Computer Programming and Applications (MATLAB-beginner) + Microprocessor
Eight	3	0701420x	Programmable Logic Devices	60	60	120	E	Digital Electronics
	4	0701420x	Biomedical Sensors Networks	60	60	120	E	Medical Communication System
	5	0701420x	Biomedical Image Processing	60	60	120	E	Biomedical Signal Processing
	6	0701420x	Statistics for Biomedical Engineering	60	60	120	E	Engineering Mathematics

8.Contact

Program Manager:

Noof T. Mahmood| Ph.D. in Electronic and Communications Engineering| Lecturer

Email: noof.t@albayan.edu.iq

Mobile no.: +96407860432699

Program Coordinator:

Noof T. Mahmood| Ph.D. in Electronic and Communications Engineering| Lecturer

Email: noof.t@albayan.edu.iq

Mobile no.: +96407860432699