IRAQI UNIVERSITY OF SCIENCE

جامعة العلوم العراقية

Bachelor's Degree (B.Sc.)
Medical Instrumentation Engineering Techniques
بكالوريوس - هندسة تقنيات الاجهزة الطبية

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1. Mission & Vision Statement

Vision Statement

The academic staff of the Medical Instrumentation Engineering Techniques (MIET) program at the **Technical College / Iraqi University of Science** is committed to providing high-quality technical education that enhances the effectiveness and outcomes of the educational process. The program focuses on developing students' technical competencies, critical thinking abilities, social and interpersonal skills, and professional work values to meet the demands of an ever-evolving healthcare environment.

Graduates are prepared for careers in the medical instrumentation sector, including companies that provide a wide range of technical services. The program ensures that students acquire solid knowledge of medical device classifications, principles of operation, and maintenance practices.

Small class sizes within the MIET program promote close interaction between academic staff and students, creating a supportive and engaging learning environment. This approach aims to develop graduates who are capable of becoming technical leaders and innovators, equipped to contribute effectively in a highly competitive, global, high-technology landscape.

Mission Statement

The Medical Instrumentation Engineering Techniques (MIET) program at the **Technical College / Iraqi University of Science** provides students with a strong foundation in medical instrumentation technology, along with specialized knowledge in key areas of the field.

The program is designed to prepare graduates for professional careers in maintaining, troubleshooting, and managing medical devices, as well as for pursuing advanced studies. It also supports innovation and research in developing modern biomedical equipment that meets the evolving needs of healthcare systems.

Additionally, the program is committed to developing skilled, knowledgeable, and professionally responsible graduates, while aligning its curriculum with international standards and contributing to

community service.

2. Program Specification

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

The Medical Instrumentation Engineering Techniques (MIET) program at the Technical College / Iraqi University of Science is designed to equip students with the knowledge and skills required for careers in medical instrumentation. Students gain a solid foundation in mathematics, medical physics and chemistry, electrical and electronic circuits, and medical instrumentation, along with essential computer applications.

The curriculum prepares graduates to operate, maintain, and support medical devices, with a strong understanding of device classifications, principles of operation, and system components.

The program is structured across four levels. Level 1 focuses on fundamental engineering concepts, while Level 2 develops core subject knowledge. Levels 3 and 4 emphasize advanced topics and research-oriented learning. Students study a wide range of subjects, including biomedical signal processing, medical communication systems, sensors and transducers, control systems, power electronics, and professional ethics.

Practical learning and research are integral to the program, supported through laboratory work, seminars, and field training. Students complete a compulsory field course in Level 1 and undertake an independent research project in Level 4, preparing them for professional practice and lifelong learning.

3. Program Goal

1. To equip MIET graduates with the scientific and practical skills required to diagnose and troubleshoot medical device malfunctions.
2. To develop graduates' ability to understand medical device components and stay updated with technological advancements.
3. To provide comprehensive knowledge of modern technologies in medical device engineering.
4. To enable graduates to effectively update, maintain, and improve medical equipment.
5. To achieve quality standards in education in alignment with available resources.

4. Student Learning Outcomes

Graduates of the Medical Instrumentation Engineering Techniques (MIET) program at the **Technical College / Iraqi University** of Science possess a strong foundation in medical instrumentation, preparing them for diverse career opportunities in the field.

They are equipped with the knowledge and skills to design, test, operate, and maintain medical devices, while understanding the critical role of technology in modern healthcare systems. Graduates are also proficient in using information and communication technologies to prepare professional reports and presentations.

In addition, they demonstrate effective communication skills in both their native language and a second language, enabling them to engage with diverse audiences, including both specialists and non-specialists.

Outcome 1

Understanding of allied knowledge

Graduates demonstrate a strong understanding of labor market requirements, including the necessary knowledge, skills, and competencies. They are also aware of ongoing technological advancements and evolving industry trends.

Outcome 2

Oral and Written Communication

Graduates are able to formally communicate medical device troubleshooting results effectively through both written and oral communication skills.

Outcome 3

Technical and cognitive skills

Graduates are able to design circuits for medical equipment according to specified requirements and develop applications to visualize and control system outputs.

Outcome 4

Critical thinking and analytical skills

Graduates are able to identify emerging problems and apply logical and critical thinking to develop solutions using modeling, design, and forecasting techniques.

Outcome 5

Appropriate research tools and techniques

Graduates are capable of applying basic research methods in scientific and technical contexts. They can also adapt and acquire new skills to achieve desired outcomes effectively.

Outcome 6

Communications and IT skills

Graduates can share technical information with engineering teams to support effective solutions and use modern communication and internet technologies. They are able to read and interpret medical device manuals and documentation.

They can communicate clearly with both experts and non-experts, using appropriate medical terminology and English language skills.

Outcome 7

Group/team leadership

Graduates are self-motivated and able to collaborate effectively with professionals from diverse disciplines and backgrounds to solve problems. They can perform under pressure in complex situations and demonstrate strong awareness of 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

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Email:

Mobile no.:

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6. Credits, Grading and GPA

Credits

The **Technical College / Iraqi University of Science** follows the Bologna Process and adopts the European Credit Transfer System (ECTS). The total requirement for the degree is 240 ECTS, with 30 ECTS per semester. One ECTS corresponds to approximately 30 hours of total student workload, including both structured and independent learning activities.

Grading

Student performance is evaluated by classifying results into two categories: pass and fail. The grading system is applied independently of students who fail a course and is defined according to established academic standards.

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:

   CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET1101	Fundamentals of Electrical Engineering (DC)	79	71	6.00	C	
MIET1102	Computer Applications (IC3)	49	26	3.00	B	
MIET1103	Differential Mathematics	78	47	5.00	S	
MIET1104	Engineering Drawing	63	62	5.00	S	
MIET1105	Democracy and Human Rights	33	17	2.00	B	
MIET1106	English Language I	33	17	2.00	B	
MIET1107	Medical Chemistry	94	81	7.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET1201	Fundamentals of Electrical Engineering (AC)	79	71	6.00	C	MIET1101
MIET1202	Medical Physics	64	61	5.00	S	
MIET1203	Mechanics	48	52	4.00	S	
MIET1204	Integral Mathematics	78	47	5.00	S	MIET1103
MIET1205	Engineering Workshops	63	62	5.00	S	
MIET1206	Computer Programming and Applications I	49	26	3.00	S	
MIET1207	Arabic Language	33	17	2.00	B	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET2101	Laboratory Medical Instrumentation I	94	81	7.00	C	
MIET2102	Electronics Circuits I	79	71	6.00	C	MIET1201
MIET2103	Electrical Machines	79	71	6.00	C	MIET1201
MIET2104	Engineering Mathematics	78	47	5.00	S	MIET1204
MIET2105	Anatomy & Physiology	64	36	4.00	S	
MIET2106	The crimes of the Ba'ath Regiem in Iraq	33	17	2.00	B	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET2201	Laboratory Medical Instrumentation II	94	81	7.00	C	MIET2101
MIET2202	Electronics Circuits II	79	71	6.00	C	MIET2102
MIET2203	Digital Electronics	79	46	5.00	C	MIET2102
MIET2204	Clinical Chemistry Instrumentation	64	61	5.00	C	
MIET2205	Biomedical Transducers and Sensors	64	61	5.00	C	MIET1201
MIET2206	English Language II	33	17	2.00	B	MIET1106

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET3101	Medical Diagnostic Instrumentation I	79	96	7.00	C	MIET2105
MIET3102	Microprocessor	94	56	6.00	C	MIET2203
MIET3103	Electromagnetic Fields	79	46	5.00	C	MIET2104
MIET3104	Signals and Systems	64	61	5.00	C	MIET2104
MIET3105	Computer Programming and Applications II	64	36	4.00	S	
MIET3106	Project Management	48	27	3.00	S	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET3201	Medical Diagnostic Instrumentation II	79	96	7.00	C	MIET3101
MIET3202	Medical Electronic Systems	79	71	6.00	C	MIET2202
MIET3203	Medical Communication Systems	64	61	5.00	C	MIET3104
MIET3204	Power Electronics	79	46	5.00	C	MIET2202
MIET3205	Project I	33	42	3.00	S	
MIET3206	Advanced Computer Programming	79	21	4.00	S	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET4101	Medical Therapeutic Instrumentation I	79	96	7.00	C	MIET2105
MIET4102	Medical Laser Systems	79	46	5.00	C	MIET2105
MIET4103	Control Systems	79	46	5.00	C	MIET2104
MIET4104	Biomedical Signal Processing	64	36	4.00	C	MIET3104
MIET4105	Project II	48	77	5.00	C	MIET3205
MIET41XX	Elective I	64	36	4.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET4201	Medical Therapeutic Instrumentation II	79	96	7.00	C	MIET4101
MIET4202	Engineering of Radiation Instrumentation	79	71	6.00	C	
MIET4203	Artificial Limbs and Robotics	94	56	6.00	C	MIET4103
MIET42XX	Elective II	64	36	4.00	E	
MIET42XX	Elective III	64	36	4.00	E	
MIET4204	Professional Ethics	48	27	3.00	B	

Electives | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET4106	Microcontrollers	64	36	4.00	E	MIET3105
MIET4107	Artificial Neural Engineering	64	36	4.00	E	MIET1206, MIET3102
MIET4205	Programmable Logic Devices	64	36	4.00	E	MIET2203
MIET4206	Biomedical Sensors Networks	64	36	4.00	E	MIET3203
MIET4207	Biomedical Image Processing	64	36	4.00	E	MIET4104
MIET4208	Statistics for Biomedical Engineering	64	36	4.00	E	MIET2104

8. Contact

Program Manager:

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Program Coordinators:

Department Coordinator: