

Academic Program Description (English Version)

Ministry of Higher Education and Scientific Research – Scientific Supervision and Evaluation Apparatus – Department of Quality Assurance and Academic Accreditation

Academic Program Description Form for Colleges and Institutes

Item	Details
University	Shatt Al-Arab University
College / Institute	Engineering Technical College
Scientific Department	Medical Instrumentation Techniques Engineering
Date of filling the file	2/7/2026
Head of Department	Asst. Prof. Dr. Ali Mahdi
Scientific Assistant Dean	Lect. Essam Khalil Ibrahim
File checked by	Quality Assurance and University Performance Unit
Approved by the Dean	Asst. Prof. Dr. Mazin Abdul-Ilah Alwan

Academic Program Description

This academic program description provides a concise summary of the main features of the program and the learning outcomes that students are expected to achieve, demonstrating whether the program has made the best use of the available opportunities. It is accompanied by a description of each course within the program.

No.	Item	Details
1	Educational institution	Engineering Technical College
2	Scientific department / centre	Department of Medical Instrumentation Techniques Engineering
3	Academic or professional program name	Medical Instrumentation Techniques Engineering
4	Final degree awarded	Bachelor of Technical Engineering – Medical Instrumentation Techniques Engineering
5	Study system (annual / courses / other)	Courses (Bologna system) – semester-based: eight semesters (four stages), 30 credits per semester
6	Accreditation program	ABET
7	Other external influences	Labour market: consultation with hospitals, health centres, medical laboratories, medical equipment suppliers and biomedical engineering centres on the academic and applied content, and making use of their feedback. Universities and colleges with similar specializations: through joint working mechanisms that enable communication between teaching staff and students, to reach a shared vision and set plans for developing the academic content.
8	Date of preparing the description	1/9/2025

9. Academic Program Objectives

The program aims to graduate students specialized in Medical Instrumentation Techniques Engineering and to prepare them to:

1. Work in hospitals, health centres and medical laboratories in the operation, maintenance and calibration of diagnostic, therapeutic and laboratory medical devices.
2. Work in companies that supply and manufacture medical devices, providing technical support, device installation and after-sales services.
3. Design and develop medical electronic circuits and systems, and biomedical signal and image processing systems.
4. Deal with laser and radiation technologies, prosthetics and medical robotics in line with occupational safety requirements and medical standards.
5. Manage engineering projects and biomedical engineering departments, and keep pace with continuous developments in medical device technologies.

10. Required Program Outcomes and Teaching, Learning and Assessment Methods

A. Knowledge objectives

- A1: Knowledge and understanding of the fundamentals of electrical, electronic and digital engineering, and of electrical circuits and machines.
- A2: Knowledge and understanding of the basic medical and biological sciences (anatomy and physiology, medical physics and chemistry) and their relation to medical devices.
- A3: Knowledge and understanding of the operating principles of diagnostic and laboratory medical devices and clinical chemistry instruments.
- A4: Knowledge and understanding of the operating principles of therapeutic devices, laser systems, radiation devices, prosthetics and robotics.
- A5: Knowledge and understanding of signals and systems, biomedical signal and image processing, control systems and sensors.
- A6: Knowledge and understanding of microprocessors and microcontrollers, programming languages and computer applications in medical systems.

B. Program-specific skill objectives

- B1: Writing and implementing programs for medical systems, controllers and engineering algorithms.
- B2: Designing and implementing medical electronic circuits and systems, measurement systems and medical communication systems.
- B3: Diagnosing and repairing faults in medical devices and their accessories, and maintaining and calibrating them.
- B4: Acquiring, processing and analyzing biomedical signals and images.

Teaching and learning methods

- Academic lectures: provide the solid foundation on which students' knowledge is developed.
- Practical laboratories and workshops: provide students with the experience needed to develop their practical skills, establish the principles needed to carry out practical projects correctly, and follow occupational safety steps to reduce harm to people and property.

- Curricular training: provides students with direct exposure to the labour market (hospitals, health centres and supplying companies), so they can understand the practical application of the curricula they have studied.

Assessment methods

- Interactive assessment: carried out directly between the student and the instructor; it is one of the main sources of feedback that teaching staff rely on to evaluate the teaching and learning process.
- Periodic written tests: show the instructor how well students follow the academic content and respond to the information and notes given to them.
- Semester exams: the middle stage for assessing the student's engagement with the material received during the semester, in both its academic and practical aspects.
- Final exams: the final stage for assessing the student's engagement with the material received during the semester, in both its academic and practical aspects.

C. Affective and value objectives

- C1: Fostering a spirit of creativity in students and encouraging them to find innovative solutions to various problems.
- C2: Developing students' ability to work collaboratively in effective teams that achieve outstanding results.
- C3: Developing students' sense of responsibility and their psychological readiness to bear the duties placed on them, with due regard for professional ethics and patient safety.
- C4: Developing the values of diligence and perseverance in completing work to reach satisfactory results.

Teaching and learning methods

- Presenting scientific problems and asking students to find more than one solution using different scientific methods, to stimulate their creativity.
- Forming work teams whose results are evaluated and whose membership changes periodically, to build a spirit of cooperation and motivate students to make every effort needed to work under different conditions and with different people.

Assessment methods

- Direct assessment: carried out directly by teaching staff through observing students' engagement and the application of the department's affective objectives, and recording their observations.
- Practical projects and graduation projects: assess the student's ability to achieve, innovate and work in teams, and the results and solutions reached for the scientific problems students face.

D. General and transferable skills (other skills related to employability and personal development)

- D1: Operating and calibrating diagnostic, therapeutic and laboratory medical devices in accordance with approved safety procedures.
- D2: Designing and fabricating electronic and printed circuits for medical systems.
- D3: Installing and interfacing medical devices and systems and medical communication systems.
- D4: Preventive and corrective maintenance skills for medical devices and their accessories.

Teaching and learning methods

- Practical laboratories and workshops: provide students with the experience needed to develop their practical skills, establish the principles needed to carry out practical projects correctly, and follow occupational safety steps to reduce harm to people and property.
- Curricular training: provides students with direct exposure to the labour market, so they can understand the practical application of the curricula they have studied.

Assessment methods

- Interactive assessment: carried out directly between the student and the instructor; it is one of the main sources of feedback that teaching staff rely on to evaluate the teaching and learning process.
- Semester exams: the middle stage for assessing the student's engagement with the material received during the semester, in both its academic and practical aspects.
- Final exams: the final stage for assessing the student's engagement with the material received during the semester, in both its academic and practical aspects.

11. Program Structure

The program consists of eight semesters (four stages) totalling 240 credits (30 credits per semester) under the Bologna system. The courses listed below are for the academic year 2025 – 2026.

First Stage – Semester One

No.	Code	Course	Theory	Practical	Credits
1	MIET1101	Fundamentals of Electrical Engineering (DC)	2	2	6
2	MTU1004	Computer Principles	1	2	3
3	MIET1103	Differential Mathematics	3	–	5
4	EETC102	Engineering Drawing	–	4	5
5	MTU1006	Democracy & Human Rights	2	–	2
6	MTU1002	English Language I	1	–	2
7	MIET1107	Medical Chemistry	3	2	7
		Total	12	10	30

First Stage – Semester Two

No.	Code	Course	Theory	Practical	Credits
1	MIET1201	Fundamentals of Electrical Engineering (AC)	2	2	6
2	MIET1202	Medical Physics	2	2	5
3	MIET1203	Mechanics	2	–	4
4	MIET1204	Integral Mathematics	3	–	5
5	EETC101	Engineering Workshops	–	4	5
6	MIET1206	Computer Programming and Applications I	1	2	3
7	MTU1001	Arabic Language I	2	–	2
		Total	12	10	30

Second Stage – Semester Three

No.	Code	Course	Theory	Practical	Credits
1	MIET2101	Laboratory Medical Instrumentation I	2	2	7
2	MIET2102	Electronics Circuits I	2	2	5
3	MIET2103	Electrical Machines	2	2	5
4	MIET2104	Engineering Mathematics	3	–	4
5	MIET2105	Anatomy & Physiology	2	2	4
6	MTU1007	The Crimes of the Baath Regime in Iraq	2	–	2
7	MTU1005	Computer Applications	2	2	3
		Total	15	10	30

Second Stage – Semester Four

No.	Code	Course	Theory	Practical	Credits
1	MIET2201	Laboratory Medical Instrumentation II	2	2	6
2	MIET2202	Electronics Circuits II	2	2	5
3	MIET2203	Digital Electronics	2	2	5
4	MIET2204	Clinical Chemistry Instrumentation	2	2	5
5	MIET2205	Biomedical Transducers and Sensors	2	2	5
6	MTU1003	English Language II	1	–	2
7	MTU1009	Arabic Language II	2	–	2
		Total	13	10	30

Third Stage – Semester Five

No.	Code	Course	Theory	Practical	Credits
1	MIET1301	Medical Diagnostic Instrumentation I	2	2	7
2	MIET1302	Microprocessor	2	2	6
3	MIET1303	Electromagnetic Fields	2	2	5
4	MIET1304	Signals and Systems	2	2	5
5	MIET1305	Computer Programming and Applications II	2	2	4
6	MIET1306	Project Management	2	–	3
		Total	12	10	30

Third Stage – Semester Six

No.	Code	Course	Theory	Practical	Credits
1	MIET3201	Medical Diagnostic Instrumentation II	2	2	7
2	MIET3202	Medical Electronic Systems	2	2	6
3	MIET3203	Medical Communication Systems	2	2	5
4	MIET3204	Power Electronics	2	2	5

No.	Code	Course	Theory	Practical	Credits
5	MIET3205	Project I	1	–	3
6	MIET3206	Advanced Computer Programming	2	2	4
		Total	11	10	30

12. Personal Development Planning

The approved academic and practical program gives students a basic body of knowledge that enables them to develop themselves continuously. Teaching staff also build students' self-reliance by encouraging them to look for problems within their field (such as common faults in medical devices, or developing measurement and diagnostic systems) and work on solving them, under staff supervision and follow-up, providing the advice and guidance needed to establish sound foundations for personal development.

13. Admission Criteria (regulations for enrolment in the college or institute)

Admission criteria are set annually by specialized committees of the Ministry of Higher Education and Scientific Research. Students are admitted from:

1. Graduates of the scientific stream (applied and biological) with an average of no less than 57% (as determined by the Ministry for the academic year).
2. Graduates of industrial secondary schools (according to the percentage and relevant specializations determined by the Ministry).
3. Graduates of technical institutes.

14. Main Sources of Information about the Program

1. Specialized scientific books.
2. Academic research.
3. The internet.
4. The accumulated scientific expertise of the department's staff.
5. Feedback from the labour market (hospitals and medical equipment suppliers).

Curriculum Skills Map

Please tick the boxes corresponding to the individual program learning outcomes subject to assessment (A: knowledge objectives, B: program-specific skill objectives, C: affective and value objectives, D: general and transferable skills).

[illegible]

[illegible]