Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department
Accreditation Division

Guide to Academic Program and Course Description

2025

Academic Program Description Template

University Name: Uruk University
College / Institute: College of Engineering Technology
Department: Medical Instrumentation Engineering Techniques
Academic or Professional Program Name: Bachelor's Degree
Final Degree Name: Bachelor's Degree in Medical Instrumentation Engineering Techniques
Study System: Bologna
Date of Preparation of Description: 30-1-2025
Date of File Completion: 8-2-2025

Signature:
Name of Department Head: Dr. Ali Ahmed
Date: 13/5/2025

Signature:
Name of Scientific Assistant:
Date:

File Reviewed by
Quality Assurance and University Performance Department
Name of Director of Quality Assurance and University Performance Department:
Date: 13/5/2025
Signature:
Dr. Mohammad Safaa

Authentication by the Dean:

31/5/2025
الكلية التقنية الهندسية
أ.م.د. علي حسين الحريري
العميد

1. **Program Vision**

The academic staff of the Medical Instrumentation Techniques Engineering Department / Technical Engineering College / University of Uruk aims to provide high-quality technical education that ensures distinguished and efficient learning outcomes by developing technical capabilities, critical thinking, social and personal skills, and strong work ethics within the ever-evolving medical healthcare environment.

The program prepares graduates to work efficiently in various medical instrumentation companies, with general knowledge of device categories, principles of operation, and maintenance. Small class sizes foster a close, supportive relationship between students and academic staff in an informal learning environment. The department aspires to be a technical leader and innovator in delivering high-quality educational programs and services in a highly competitive local and global high-tech environment.

2. **Program Mission**

The academic staff of the Medical Instrumentation Techniques Engineering Department / Technical Engineering College / University of Uruk is committed to delivering a comprehensive academic and technical education that equips students with fundamental knowledge in medical instrumentation technologies, along with in-depth expertise in selected specialized areas.

The curriculum and academic advising are designed to prepare graduates for professional careers as efficient engineering personnel capable of operating, maintaining, and troubleshooting vital medical equipment, or for pursuing postgraduate studies in the field of Medical Instrumentation Techniques Engineering.

Additionally, the program supports researchers by providing the essential theoretical and practical knowledge needed to develop and design biomedical equipment that meets the evolving needs of modern healthcare. The department aims to prepare distinguished and innovative professionals in terms of scientific, technical, and ethical competencies, keeping pace with international standards and offering community services through advanced academic programs, thereby fostering a high-quality educational environment.

3. **Program Objectives**

- To provide graduates with the scientific and practical skills necessary to diagnose malfunctions in biomedical devices.

- To qualify students to understand and effectively interact with various components of medical equipment, while staying updated with technological advancements.

- To equip students with comprehensive knowledge of modern technologies used in medical device engineering.

- To develop the graduates' ability to implement necessary updates and modifications to medical devices in accordance with healthcare institution needs.

- To strive towards achieving academic quality standards in alignment with the available resources.

4. Program Accreditation

5. Other External Influences

Ministry of Higher Education and Scientific Research, Iraq

6. Program Structure

Category	Number of Courses	Credit Units (ECTS)	Percentage	Notes
Basic Courses (Introductory / Scientific Basics)	14	66	27.5%	
Core Specialized Courses (Program Core)	26	146	60.8%	
Supporting / Related Courses	5	16	6.7%	
Elective Courses	3	12	5%	
Summer Training	2	No credit units	—	Training in 2nd and 3rd stages

7. Program Description

Semester 1 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET1101	Fundamental of Electrical Engineering	102	108	7	C	—
MIET1102	Computer Applications (IC3)	88	92	6	B	—
MIET1103	Differential Mathematics	73	77	5	B	—
MIET1104	Engineering Drawing	59	91	5	B	—
MIET1105	Human Rights and Democracy	59	61	4	S	—
MIET1106	English Language (Beginner)	45	45	3	S	—

Semester 2 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET1201	Medical Physics	60	120	6	B	—
MIET1202	Medical Chemistry	60	120	6	B	—
MIET1203	Mechanics	45	105	5	B	—
MIET1204	Integral Mathematics	73	77	5	B	Differential Mathematics
MIET1205	Engineering Workshops	60	90	5	B	—
MIET1206	Arabic Language	45	45	3	S	—

Semester 3 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET2101	Laboratory Medical Instrumentation I	74	106	6	C	—
MIET2102	Electronics Circuits I	74	106	6	C	Fundamental of Electrical Eng.
MIET2103	Electrical Machines	74	76	5	C	Fundamental of Electrical Eng.
MIET2104	Engineering Mathematics	73	77	5	B	Integral Mathematics

MIET2105	Anatomy & Physiology	74	76	5	B	—
MIET2106	Computer Programming and Applications (MATLAB-beginner)	46	44	3	B	—

Semester 4 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET2201	Electronics Circuits II	74	106	6	C	Electronics Circuits I
MIET2202	Laboratory Medical Instrumentation II	74	106	6	C	Laboratory Medical Instrumentation I
MIET2203	Digital Electronics	74	76	5	C	Electronics Circuits I
MIET2204	Clinical Chemistry Instrumentation	60	90	5	C	—
MIET2205	Biomedical Transducers and Sensors	60	90	5	C	Fundamental of Electrical Engineering
MIET2206	English Language (Intermediate)	45	45	3	B	English Language (Beginner)

Semester 5 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET3101	Medical Diagnostic Instrumentation I	74	136	7	C	Anatomy & Physiology
MIET3102	Microprocessor	88	92	6	C	Digital Electronics
MIET3103	Electromagnetic Fields	74	106	6	C	Engineering Mathematics
MIET3104	Signals and Systems	60	60	4	C	Engineering Mathematics
MIET3105	Computer Programming (C++ programming)	60	60	4	B	—
MIET3106	English Language (Advanced)	45	45	3	B	English Language (Intermediate)

Semester 6 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET3201	Medical Diagnostic Instrumentation II	74	136	7	C	Medical Diagnostic Instrumentation I
MIET3202	Medical Electronic Systems	74	106	6	C	Electronics Circuits II

MIET3203	Medical Communication Systems	60	120	6	C	Signals and Systems
MIET3204	Power Electronics	74	76	5	C	Electronics Circuits I
MIET3205	Project I	30	60	3	C	—
MIET3206	Project Management	45	45	3	S	—

Semester 7 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET4101	Medical Therapeutic Instrumentation I	74	136	7	C	Anatomy & Physiology
MIET4102	Medical Laser Systems	74	76	5	C	Anatomy & Physiology
MIET4103	Control Systems	74	76	5	C	Engineering Mathematics
MIET4104	Project II	44	106	5	C	Project I
MIET4105	Biomedical Signal Processing	60	60	4	C	Signals and Systems
MIET4106	Elective I	60	60	4	E	—

Semester 8 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MIET4201	Medical Therapeutic Instrumentation II	74	136	7	C	Medical Therapeutic Instrumentation I
MIET4202	Engineering of Radiation Instrumentation	74	106	6	C	—
MIET4203	Artificial Limbs	88	92	6	C	Control Systems
MIET4204	Elective II	60	60	4	E	—
MIET4205	Elective III	60	60	4	E	—
MIET4206	Professional Ethics	45	45	3	S	—

Code	Module Name in English	SSWL	USSWL	ECTS	module type	
MIET4106	Microcontrollers	60	60	4	E	Computer Programming and Applications (C++

						programming)
MIET4107	Artificial Neural Engineering	60	60	4	E	MATLAB (beginner) + Microprocessor
MIET4205	Programmable Logic Devices	60	60	4	E	Digital Electronics
MIET4206	Biomedical Sensors Networks	60	60	4	E	Medical Communication Systems
MIET4207	Biomedical Image Processing	60	60	4	E	Biomedical Signal Processing
MIET4208	Statistics for Biomedical Engineering	60	60	4	E	Engineering Mathematics

8. Expected Learning Outcomes of the Program

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 open-minded, 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.

9. Teaching and Learning Strategies

1. **Interactive Lectures:**
   Used to present fundamental and applied concepts, and to explain theoretical aspects using digital presentation tools and real-world examples.
2. **Laboratory and Practical Work:**
   Involves applying technical skills using real medical devices and equipment, which enhances hands-on experience and develops practical and technical competencies.
3. **Project-Based Learning:**
   Students are assigned individual or group projects to solve real-world engineering problems, fostering critical thinking, innovation, and teamwork.
4. **Class Discussions and Workshops:**
   Used to develop communication and analytical skills, and to facilitate the exchange of ideas and perspectives between students and instructors.
5. **Self-Directed Learning:**
   Students are encouraged to explore and investigate by reviewing scientific sources, articles, and journals, and by utilizing digital learning tools.
6. **Presentations and Technical Reports:**
   Enhance students' written and oral communication skills in English and prepare them to engage effectively with technical and clinical teams.
7. **Site Visits and Summer Training:**
   Provide students with exposure to real working environments in hospitals and medical centers, reinforcing the link between academic learning and practical application.

10. Evaluation Methods

The assessment methods employed in the Medical Instrumentation Engineering Techniques program are designed to measure the extent to which students have achieved the intended learning outcomes at both the course and program levels. A variety of assessment tools are used to evaluate students' cognitive, practical, analytical, and communication skills. These include:

- Written examinations to assess theoretical understanding.
- Laboratory assessments to evaluate practical skills and technical proficiency.
- Project-based evaluations to measure critical thinking, innovation, and problem-solving abilities.
- Oral presentations and technical reports to assess communication skills in both individual and group contexts.
- Assignments and homework tasks to promote self-learning and consistent academic engagement.
- Participation and performance in workshops, discussions, and seminars.

These methods ensure that students are continuously monitored and guided toward achieving both academic and professional excellence.

11. Faculty

Full Name	Academic Title	Specialization		Requirements/ Specific Skills (if any)	Faculty Preparation	
		General	Specialized		Staff	Lecturer
Ali Ahmed Abdul Hamid	Lecturer, PhD	Electrical Engineering	Communications		Staff	
Fadhel Abbas Mahdi Al-Qarmali	Lecturer, PhD	Electrical and Electronic Engineering	Power Electronics		Staff	
Abdul Kareem Abdul Amir Abdul Razzaq	Assistant Professor, PhD	Mathematics	Differential Equations		Staff	
Saja Basim Latif	Assistant PhD	Family Medicine	N/A		Staff	
Hooria Fadhel Abbas	Assistant Lecturer	Master in Control Systems and Networks	Master in Computer Control Engineering		Staff	
Hussein Kasab Hashim	Assistant Lecturer	Physics	Materials Physics		Staff	
Adel Bader Abdul Hussein Al-Riyahi	Lecturer, PhD Engineer	Mechanical Engineering	Engineering Project Management		Staff	
Mazin Shakir Jassim Al-Zayouri	Assistant Professor	Physics	Digital Image Processing		Staff	
Batool Abdul	Assistant	Arabic	Arabic Language /		Staff	

Abbas Hamoud	**Lecturer**	**Language / Language**	**Language / Morphological Semantics**			
Yusra Ra'ed Muhammad	**Assistant Lecturer**	**Physical Sciences**	**General Physics**			**Instructor**
Amna Jawad Kazim	**Assistant Lecturer**	**Chemical Engineering**	**Industrial Units**		**Staff**	
Waleed Hamid Habib	**Lecturer**	**Electrical Engineering**	**Electronic Engineering and Communications**		**Staff**	
Zahraa Shukur Rahimeh	**Assistant Lecturer**	**Techniques of Electrical Engineering**	**Techniques of Electrical Power Engineering**			**Instructor**
Samer Abdul Tarish	**Lecturer, PhD**	**Physics**	**Nanotechnology**		**Staff**	
Zeinab Mohammad Khazal	**Assistant Lecturer**	**English Language**	**Linguistics**		**Staff**	
Mohammed Safaa Al-Din Tahir	**Lecturer, PhD**	**Mechanical Engineering**	**Applied Mechanics**		**Staff**	

12. Professional Development

Orientation for New Faculty Members

The college adopts a comprehensive approach for orienting new faculty members. A thorough orientation program is provided to facilitate their integration into the academic and administrative environment. This program includes focused introductory sessions that familiarize new members with the organizational structure, teaching and learning strategies employed by the college, academic and administrative systems, as well as campus services. Academic mentors are assigned to guide new faculty members individually, focusing on continuous support and answering their inquiries to ensure their swift adaptation to the academic work environment. For visiting and full-time faculty members, detailed information is provided about their expected academic tasks and available resources to ensure the highest levels of success and effectiveness in performing their duties.

Professional Development for Faculty Members

The college aims to enhance the continuous professional growth of faculty members through a comprehensive plan focused on developing teaching strategies, innovating teaching and learning methods, and evaluating learning outcomes in line with the latest global academic trends. The plan includes organizing regular workshops and training courses covering various topics such as improving teaching efficiency, utilizing modern technologies in education, innovative assessment methods, and developing research skills. The college also encourages participation in local and international academic conferences and seminars to promote the exchange of experiences and specialized knowledge. In addition, a comprehensive evaluation mechanism is implemented to assess the performance of faculty members, including feedback from students and colleagues, which contributes to offering tailored training opportunities based on individual needs. In this context, the college ensures to provide a learning environment that supports continuous professional development and contributes to improving academic performance quality.

13. Admission Criteria

The student is accepted into the college through the central admission process of the Ministry of Higher Education and Scientific Research.

14. Main Sources of Information about the Program

1. Faculty staff in the college.
2. Lectures by faculty members.
3. College library.
4. Electronic library.
5. Textbooks.
6. Supplementary books.
7. Websites and the internet.

15. Program Development Plan

1. Presence of E-Learning
2. Training in Hospitals and Medical Equipment Companies
3. Academic Training in Hospitals
4. Preparation of Graduation Projects, Following Up, and Discussing Them in a Manner that Simulates University Theses and Dissertations to Strengthen the Research Skill Aspect of the Student

Program Skills Diagram

Semester	Code module	Module Name	module type	Outcome1	Outcome2	Outcome3	Outcome4	Outcome5	Outcome6	Outcome7	Outcome8
Semester 1	MIET1101	Fundamental of Electrical Engineering	Core learning activity	✓		✓	✓	✓			
	MIET1102	Computer Applications (IC3)	Basic learning activities	✓					✓		✓
	MIET1103	Differential Mathematics	Basic learning activities	✓			✓	✓			
	MIET1104	Engineering Drawing	Basic learning activities	✓		✓			✓		
	MIET1105	Human Rights and Democracy	Support or related learning activity	✓	✓				✓	✓	
	MIET1106	English Language (Beginner Level)	Support or related learning activity		✓				✓		
Semester 2	MIET1201	Medical Physics	Basic learning activities	✓		✓	✓	✓			
	MIET1202	Medical Chemistry	Basic learning activities	✓			✓	✓	✓		
	MIET1203	Mechanics	Basic learning activities	✓		✓	✓	✓			
	MIET1204	Integral Mathematics	Basic learning activities	✓			✓	✓			
	MIET1205	Engineering Workshops	Basic learning activities	✓		✓			✓	✓	
	MIET1206	Arabic Language	Support or related learning activity		✓				✓		
Semester 3	MIET2101	Laboratory Medical Instrumentation I	Core learning activity	✓		✓		✓	✓	✓	
	MIET2102	Electronics Circuits I	Core learning activity	✓		✓	✓	✓			
	MIET2103	Electrical Machines	Basic learning activities	✓		✓	✓	✓		✓	
	MIET2104	Engineering Mathematics	Basic learning activities	✓			✓	✓			
	MIET2105	Anatomy & Physiology	Basic learning activities	✓		✓	✓		✓		
	MIET2106	Computer Programming and Applications (MATLAB-beginner)	Basic learning activities			✓	✓	✓	✓		✓
Semester 4	MIET2201	Electronics Circuits II	Core learning activity	✓		✓	✓	✓			
	MIET2202	Laboratory Medical Instrumentation II	Core learning activity	✓		✓		✓	✓	✓	
	MIET2203	Digital Electronics	Core learning activity	✓		✓	✓	✓			
	MIET2204	Clinical Chemistry Instrumentation	Core learning activity	✓		✓	✓	✓	✓		
	MIET2205	Biomedical Transducers and Sensors	Core learning activity	✓		✓	✓	✓	✓		
	MIET2206	English Language (Intermediate Level)	Basic learning activities		✓				✓		
Semester 5	MIET3101	Medical Diagnostic Instrumentation I	Core learning activity	✓		✓	✓	✓		✓	
	MIET3102	Microprocessor	Core learning activity	✓		✓	✓	✓	✓		
	MIET3103	Electromagnetic Fields	Core learning activity	✓			✓	✓			
	MIET3104	Signals and Systems	Core learning activity	✓			✓	✓			
	MIET3105	Computer Programming and Applications (C++ programming)	Basic learning activities			✓	✓	✓	✓		✓
	MIET3106	English Language (Advanced Level)	Basic learning activities		✓				✓		✓
Semester 6	MIET3201	Medical Diagnostic Instrumentation II	Core learning activity	✓		✓	✓	✓	✓	✓	
	MIET3202	Medical Electronic Systems	Core learning activity	✓		✓	✓	✓	✓		
	MIET3203	Medical Communication Systems	Core learning activity		✓				✓		
	MIET3204	Power Electronics	Core learning activity	✓		✓		✓			
	MIET3205	Project I	Core learning activity			✓	✓	✓		✓	
	MIET3206	Project Management	Support or related learning activity						✓	✓	✓
Semester 7	MIET4101	Medical Therapeutic Instrumentation I	Core learning activity	✓		✓		✓	✓	✓	
	MIET4102	Medical Laser Systems	Core learning activity	✓		✓	✓	✓			
	MIET4103	Control Systems	Core learning activity	✓		✓	✓	✓			
	MIET4104	Project II	Core learning activity			✓	✓	✓	✓	✓	
	MIET4105	Biomedical Signal Processing	Core learning activity	✓		✓	✓	✓			
	MIET4106	Microcontrollers	Elective learning activity	✓		✓		✓	✓		✓

	MIET4107	Artificial Neural Engineering	Elective learning activity	✓			✓	✓			✓
Semester 8	MIET4201	Medical Therapeutic Instrumentation II	Core learning activity	✓		✓		✓	✓	✓	
	MIET4202	Engineering of Radiation Instrumentation	Core learning activity	✓		✓	✓	✓	✓		
	MIET4203	Artificial Limbs and Robotics	Core learning activity	✓		✓	✓	✓			
	MIET4205	Programmable Logic Devices	Elective learning activity			✓	✓	✓			✓
	MIET4206	Biomedical Sensors Networks	Elective learning activity	✓		✓		✓	✓		✓
	MIET4207	Biomedical Image Processing	Elective learning activity	✓			✓	✓	✓		
	MIET4208	Statistics for Biomedical Engineering	Elective learning activity	✓			✓	✓			
	MIET4204	Professional Ethics	Support or related learning activity		✓				✓	✓	✓

Description of the courses.

Module	Module 1
Code	MIET1101
Course/Module Title	Fundamental of Electrical Engineering
ECTS	7
Semester	1
Class (hr/w)	3
Lect./Lab./Prac./Tutor	4
SSWL (hr/sem)	102
USSWL (hr/w)	108
Description	
This module covers the fundamental concepts and principles of electrical networks and their applications. Students comprehensively understand electrical engineering, including their symbols, units, ohms law, network methods, network theorems, delta-star and circuit analysis. They learn to analyze, solve, draw connect and simplify different complicated circuits. Topics include DC and AC basic subjects like: The direct–current network (Kirchhoff's law & their use in network), Conversion of delta–connected resistance into an equivalent Wye connection & vice versa, Power sources are connected in parallel, Circuit analysis methods, Circuit analysis Theorems, Generation of alternating current, Sinusoidal current, The mean values of current and voltage, The effective values of current and voltage, The vector diagram, The instantaneous power and mean power of A.C, relative and apparent power, transient circuit and RC transient circuit, 3-Phase system, and magnetic circuits.	

Module	Module 2
Code	MIET1102
Course/Module Title	Computer Applications (IC3)
ECTS	6
Semester	1
Class (hr/w)	2
Lect./Lab./Prac./Tutor	4
SSWL (hr/sem)	88
USSWL (hr/w)	92
Description	
This module provides a foundation in computer hardware, software, operating systems, and peripherals. It covers understanding operating systems, computer hardware, power options, and utilizing the control panel. Learners will explore software types, Microsoft Office (Word, Excel, PowerPoint and Outlook), and popular applications like G-Suite (Docs, Sheets, Slides, Gmail, Calendar).	

Module	Module 3
Code	MIET1103
Course/Module Title	Differential Mathematics
ECTS	5
Semester	1
Class (hr/w)	3
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	73
USSWL (hr/w)	77
Description	
Differential mathematics is a branch of calculus that focuses on the concept of differentiation. It involves finding rates of change, slopes of curves, and optimizing functions. Differential equations are used to model various phenomena and solve problems in fields such as physics, and engineering.	

Module	Module 4
Code	MIET1104
Course/Module Title	Engineering Drawing
ECTS	5
Semester	1
Class (hr/w)	
Lect./Lab./Prac./Tutor	4
SSWL (hr/sem)	59
USSWL (hr/w)	91
Description	
This course teaches engineering drawing fundamentals and AutoCAD usage, covering menus, toolbars, commands, and dimensioning techniques. Students learn to create accurate drawings following engineering drawing conventions and apply them in AutoCAD. They also explore the valuable utilities offered by AutoCAD for engineering drawing and study orthogonal projection in both traditional geometry and AutoCAD.	

Module	Module 5
Code	MIET1105
Course/Module Title	Human Rights and Democracy
ECTS	4
Semester	1
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	59
USSWL (hr/w)	61
Description	
This course provides a comprehensive understanding of democracy as a way of life, its relationship with freedom, different public freedoms, and the traits, advantages, elements, and forms of democracy. It also covers election procedures and potential manipulation, Iraq's election laws, the development of democracy, constitutional and legal rights, human rights, and fostering a culture of dialogue and acceptance.	

Module	Module 6
Code	MIET1106
Course/Module Title	English Language (Beginner Level)
ECTS	3
Semester	1
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	45
USSWL (hr/w)	45
Description	
The beginner English language course introduces essential language skills for beginners. It covers basic grammar, vocabulary, listening, speaking, reading, and writing exercises. The course focuses on developing foundational English proficiency and building confidence in using English in everyday situations.	

Module	Module 7
Code	MIET1201
Course/Module Title	Medical Physics
ECTS	6
Semester	2
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	120
Description	
This module provides physics background for medical instrumentation engineers, covering forces in the body, physics of the skeleton, energy, work, and power. It explores the physics behind organ functions like respiratory, urinary, and cardiovascular systems, and introduces related instruments. It also includes the physics of hearing and highlights radiation therapy.	

Module	Module 8
Code	MIET1202
Course/Module Title	Medical Chemistry
ECTS	6
Semester	2
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	120
Description	
This course represents an introduction to the principles of chemistry, the definition of matter, systems of units of measurement, how to write chemical formulas and reaction equations and balance them for later use in mathematical calculations, in addition to the various ways to express the concentration of a substance and the decomposition constants of acids, bases, and poorly soluble salts as the theoretical basis for the qualitative and quantitative analysis of the practical approach. Moreover, focus on statistical treatments of the results of analyzes or to assess the efficiency of an analytical device or method. In addition to studying the interrelationship between chemistry and physics and the consequent laws, it also aims to study the states of matter and methods of conversion from one state to another with the properties of each of them and what is looking at the conversion of energy into work or vice versa, as well as the study of heat resulting from chemical reactions. The various working principles and components of devices used for analytical purposes in chemistry, with a focus on spectrophotometers.	

Module	Module 9
Code	MIET1203
Course/Module Title	Mechanics
ECTS	5
Semester	2
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	45
USSWL (hr/w)	105
Description	
This module covered the fundamental concepts and principles of mechanics, and their applications in statics loads. Students comprehensively understand mechanics, including their forces, result of force, stress and strain, moment of force, friction, bending force, selective of materials, welding joint, and load distribution in trusses and bridge. They learn mechanical design, development, and various mechanical tests. Topics include mechanics/statics basics, mechanical properties, and mechanical test of materials.	

Module	Module 10
Code	MIET1204
Course/Module Title	Integral Mathematics
ECTS	5
Semester	2
Class (hr/w)	3
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	73
USSWL (hr/w)	77
Description	
Integral mathematics is a branch of calculus that deals with the concept of integration. It involves finding the area under curves, calculating accumulated quantities, and solving differential equations. Integrals are used to analyze continuous functions and provide a framework for solving a wide range of mathematical and real-world problems.	

Module	Module 11
Code	MIET1205
Course/Module Title	Engineering Workshops
ECTS	5
Semester	2
Class (hr/w)	
Lect./Lab./Prac./Tutor	4
SSWL (hr/sem)	60
USSWL (hr/w)	90
Description	
The Mechanical, Electrical and Electronic Workshop module aims to provide students with hands-on experience and theoretical knowledge in mechanical and electrical engineering. Overall, this module aims to provide students with practical skills and a theoretical understanding of Mechanical, Electrical and Electronic engineering, enabling them to work with machinery, manipulate metals, and work with electronic components and circuits.	

Module	Module 12
Code	MIET1206
Course/Module Title	Arabic Language
ECTS	3
Semester	2
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	45
USSWL (hr/w)	45
Description	
The course introduces the basic rules of the Arabic language, which can be used in the academic environment. The module involves teaching the concept of the Arabic language as a tool and means of communication between individuals. Introducing the student to the method of forming sentences using the tools of the Arabic language. Enabling the student to write using correct and basic linguistic and grammatical rules and their scientific applications.	

Module	Module 13
Code	MIET2101
Course/Module Title	Laboratory Medical Instrumentation I
ECTS	6
Semester	3
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
This module covers the fundamental concepts and principles of medical instrumentation. The topics explained in this module: Definition of medical instruments, Introduction to medical instruments and Classification of medical instrumentation. Explain the Design of hospitals and the design of operating rooms. One of the most important topics is Patient Safety. Medical Laboratory Instruments and Tools. Calibration of Medical Laboratory Instruments. Introduction to Balance. Balance and their types. Wax bath and Water bath.	

Module	Module 14
Code	MIET2102
Course/Module Title	Electronics Circuits I
ECTS	6
Semester	3
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
This module covers various topics related to electrical circuits and semiconductor devices. Students learn about sinusoidal excitation, semiconductor materials, diode applications, bipolar junction transistors (BJTs), DC biasing of BJTs, field-effect transistors (FETs) and MOSFETs, FET biasing, BJT AC analysis, and small-signal AC analysis of BJT amplifiers. The module equips students with the knowledge and skills to design and analyze electronic circuits and devices.	

Module	Module 15
Code	MIET2103
Course/Module Title	Electrical Machines
ECTS	5
Semester	3
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	76
Description	
This course covers the basic concepts and principles of electricity technology and its applications. Where students understand and help them know the types of transformers, their applications, and designs, as well as the designs of electrical machines such as generators and motors, with direct current and alternating current and their components. It also deals with the methods of finding the appropriate design for the places used and their applications in medical devices and the results of mathematical quantities in designs through solving mathematical and mathematical problems for various applications. The students were also able to develop their capabilities in dealing with electrical parts in medical devices and methods of checking, maintaining, and repairing them.	

Module	Module 16
Code	MIET2104
Course/Module Title	Engineering Mathematics
ECTS	5
Semester	3
Class (hr/w)	3
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	73
USSWL (hr/w)	77
Description	
Engineering mathematics is the application of mathematical principles and techniques to solve engineering problems. It encompasses various mathematical topics, including calculus, differential equations, linear algebra, probability theory, and numerical methods. Engineering mathematics provides a foundation for analyzing and designing engineering systems, from structures to electrical circuits.	

Module	Module 17
Code	MIET2105
Course/Module Title	Anatomy & Physiology
ECTS	5
Semester	3
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	74
USSWL (hr/w)	76
Description	
In this course, the student is prepared to study and understand medical devices by explaining the physiological changes, especially the electrical ones, that occur when the bodyâ??s various organs perform their function and their relationship to the devices used to measure and diagnose various phenomena and diseases. Moreover, the module prepares the student to study and understand medical devices by clarifying the physiological changes, especially the electrical ones, that occur when the bodyâ??s various organs perform their function and their relationship to the devices used to measure and diagnose various phenomena and diseases.	

Module	Module 18
Code	MIET2106
Course/Module Title	Computer Programming and Applications (MATLAB-beginner)
ECTS	3
Semester	3
Class (hr/w)	1
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	46
USSWL (hr/w)	44
Description	
This module covers the fundamental concepts of MATLAB programming language environment. The students will understand and learn how to use MATLAB as an effective programming language to solve different mathematical and engineering problems as well as using plotting functions and design projects using codes or GUI. Students will acquire the knowledge of basic MATLAB syntax such as: variables, input, output, vectors, matrices, functions, plotting, and GUI, and these topics will be illustrated using some examples. The students will gain the necessary skills to design and implement appropriate algorithms that solve problems dealing with different mathematical and engineering applications.	

Module	Module 19
Code	MIET2201
Course/Module Title	Electronics Circuits II
ECTS	6
Semester	4
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
The Electronics Circuits II course delves into advanced concepts in electronic circuits. Topics covered include amplifiers, oscillators, feedback systems, filters, and analog integrated circuits. Students learn to analyze, design, and optimize complex electronic circuits for applications in communication systems, audio amplification, and signal processing, furthering their understanding of electronic circuit theory and practical implementation.	

Module	Module 20
Code	MIET2202
Course/Module Title	Laboratory Medical Instrumentation II
ECTS	6
Semester	4
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
This module covers the fundamental concepts and principles of medical instruments and their classification. The main topics: introduction to the laboratory Design and part from laboratory devices like centrifuges, the definition of microscopes, and Types of Microscopes. Polymerase chain reaction (pcr), definition of Laboratory incubators, types of Laboratory Incubators, ovens, and their medical application. Autoclave and its medical application. Water distillation, definition of the Rehabilitation System. Classification of Medical Rehabilitation System.	

Module	Module 21
Code	MIET2203
Course/Module Title	Digital Electronics
ECTS	5
Semester	4
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	76
Description	
This module covers the basic concepts and fundamental principles of digital electronic circuits. The students understand comprehensively the applications of digital electronic circuits; including the work principles of medical instruments, which include these digital circuits. Furthermore, they can learn how to design, to develop, and to maintain these instruments. The subject of digital electronic circuits covers numbers of systems, digital codes, arithmetical processes, flip-flop circuits and arithmetical circuits. In addition, students learn designing of electronic counters and their work principles, shift-registers, and conversion process from digital to analog.	

Module	Module 22
Code	MIET2204
Course/Module Title	Clinical Chemistry Instrumentation
ECTS	5
Semester	4
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	90
Description	
This module covers the introduction of clinical chemistry and studies the chemical and biochemical mechanism of the human body in relation to disease. Students comprehensively understand clinical chemistry instrumentation: spectrophotometer types, Auto-analyzer types, Electrophoresis, Elisa, Body mass index. They learn to explain their principal work, operation, maintenance, and faults. Topics include protein, fats, minerals, enzymes, and their importance in the human body. They understand the immunology concept and their effects on the human body.	

Module	Module 23
Code	MIET2205
Course/Module Title	Biomedical Transducers and Sensors
ECTS	5
Semester	4
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	90
Description	
The Biomedical Transducers and Sensors course explores the principles and applications of transducers and sensors in the biomedical field. Topics covered include sensor technologies, signal conditioning, measurement techniques, and the interface between sensors and biological systems. Students learn to select, design, and analyze biomedical sensors for accurate and reliable data acquisition in healthcare and research settings.	

Module	Module 24
Code	MIET2206
Course/Module Title	English Language (Intermediate Level)
ECTS	3
Semester	4
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	45
USSWL (hr/w)	45
Description	
The intermediate English language course, based on the New Headway Plus, develops language skills at an intermediate level. It covers grammar, vocabulary, listening, speaking, reading, and writing exercises. The course emphasizes building a solid foundation in English communication, comprehension, and expression, fostering confidence in everyday conversations and interactions.	

Module	Module 25
Code	MIET3101
Course/Module Title	Medical Diagnostic Instrumentation I
ECTS	7
Semester	5
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	136
Description	
This module covers the fundamental concepts and principles of many medical diagnostic equipment and instrumentations that are used in hospitals and clinics. Students will understand the different parts of medical diagnostic instrumentation and the idea behind these parts as well as their operation. The student will be able to get the necessary knowledge to diagnose faults, manage repairs, and propose alternatives in emergencies. Covers a wide range of devices including ECG, EEG, VCG, and others. Also introduces measurement and analysis techniques.	

Module	Module 26
Code	MIET3102
Course/Module Title	Microprocessor
ECTS	6
Semester	5
Class (hr/w)	2
Lect./Lab./Prac./Tutor	4
SSWL (hr/sem)	88
USSWL (hr/w)	92
Description	
This module covers the fundamental concepts and principles of microprocessors and their applications. Students learn to design, develop, and program microprocessor-based systems, including I/O interfacing, instruction sets, timing, and memory architecture.	

Module	Module 27
Code	MIET3103
Course/Module Title	Electromagnetic Fields
ECTS	6
Semester	5
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
The electromagnetic fields course explores electrostatics, magnetostatics, electromagnetic waves, Maxwellâ??s equations, and their application in engineering problems such as telecommunications, antennas, and electromagnetic compatibility.	

Module	Module 28
Code	MIET3104
Course/Module Title	Signals and systems
ECTS	4
Semester	5
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
The signals and systems course introduces fundamental concepts and mathematical tools for analyzing continuous and discrete-time signals and systems. Topics covered include signal representation, Fourier analysis, convolution, Laplace and Z-transforms, and system characterization. The course focuses on understanding the behavior and properties of signals and systems in both time and frequency domains.	

Module	Module 29
Code	MIET3105
Course/Module Title	Computer Programming and Applications (C++ programming)
ECTS	4
Semester	5
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
This module introduces beginners to computer programming and applications using the C++ programming language. Students learn the basics of C++ syntax, data types, control structures, functions, and object-oriented programming concepts. They gain hands-on experience through coding exercises and projects to develop practical programming skills and problem-solving abilities.	

Module	Module 30
Code	MIET3106
Course/Module Title	English Language (Advanced Level)
ECTS	3
Semester	5
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	45
USSWL (hr/w)	45
Description	
The advanced English language course enhances language proficiency at an advanced level. It covers complex grammar structures, vocabulary expansion, idiomatic expressions, and advanced reading and writing skills. The course focuses on improving fluency, accuracy, and communication abilities in English.	

Module	Module 31
Code	MIET3201
Course/Module Title	Medical Diagnostic Instrumentation II
ECTS	7
Semester	6
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	136
Description	
Covers modern imaging systems, telemedicine technologies, and performance analysis of diagnostic equipment. Includes X-ray, CT, MRI, ultrasound, and thermal imaging systems.	

Module	Module 32
Code	MIET3202
Course/Module Title	Medical Electronic Systems
ECTS	6
Semester	6
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
Explores principles, technologies, and design of electronic systems in healthcare. Topics include amplifiers, filters, data acquisition, and regulatory compliance.	

Module	Module 33
Code	MIET3203
Course/Module Title	Medical Communication Systems
ECTS	6
Semester	6
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	120
Description	
Covers communication techniques such as public speaking, business writing, and nonverbal skills for professional healthcare interaction.	

Module	Module 34
Code	MIET3204
Course/Module Title	Power Electronics
ECTS	5
Semester	6
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	76
Description	
Topics include rectifiers, inverters, UPS, converters, and switch-mode power supplies. Covers application in various biomedical devices.	

Module	Module 35
Code	MIET3205
Course/Module Title	Project I
ECTS	3
Semester	6
Class (hr/w)	1
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	60
USSWL (hr/w)	90
Description	
Students define and plan a solution to a biomedical problem. Emphasis on teamwork, critical thinking, and design documentation.	

Module	Module 36
Code	MIET3206
Course/Module Title	Project Management
ECTS	3
Semester	6
Class (hr/w)	2
Lect./Lab./Prac./Tutor	
SSWL (hr/sem)	45
USSWL (hr/w)	45
Description	
Covers planning, scheduling, cost estimation, and feasibility for medical engineering projects using international standards.	

Module	Module 37
Code	MIET4101
Course/Module Title	Medical Therapeutic Instrumentation I
ECTS	7
Semester	7
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	136
Description	
Focuses on therapeutic medical devices such as electrosurgical units, dialysis machines, and dental chairs. Emphasizes fault detection and maintenance.	

Module	Module 38
Code	MIET4102
Course/Module Title	Medical Laser Systems
ECTS	5
Semester	7
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	76
Description	
Covers laser generation, medical applications, fiber optics, and programming laser devices like CO2 and semiconductor types.	

Module	Module 39
Code	MIET4103
Course/Module Title	Control Systems
ECTS	5
Semester	7
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	76
Description	
Teaches feedback control design (PD, PI, PID), stability evaluation, and real-world implementation using smart medical devices and robots.	

Module	Module 40
Code	MIET4104
Course/Module Title	Project II
ECTS	5
Semester	7
Class (hr/w)	-
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	44
USSWL (hr/w)	106
Description	
Students build, test, and document biomedical prototypes using engineering methods, working with healthcare professionals and presenting their results.	

Module	Module 41
Code	MIET4105
Course/Module Title	Biomedical Signal Processing
ECTS	4
Semester	7
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Introduces techniques for analyzing biomedical signals. Covers signal acquisition, random signals, averaging, sampling theorem, windowing, and interpretation. Applies concepts to diagnostics, monitoring, and research.	

Module	Module 42
Code	MIET4106
Course/Module Title	Microcontrollers (Elective I)
ECTS	4
Semester	7
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Explores Arduino-based microcontroller systems for biomedical use. Covers C/C++, MATLAB, analog/digital inputs, sensors, wireless (Wi-Fi, GSM, Bluetooth), sleep modes, and IoT applications. Focus on programming and signal handling for biomedical devices.	

Module	Module 43
Code	MIET4107
Course/Module Title	Artificial Neural Engineering (Elective I)
ECTS	4
Semester	7
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Focuses on artificial neural networks inspired by the human brain. Topics include design, pattern recognition, data analysis, and decision-making for complex biomedical systems.	

Module	Module 44
Code	MIET4201
Course/Module Title	Medical Therapeutic Instrumentation II
ECTS	7
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	136
Description	
Covers therapeutic devices used in hospitals such as artificial organs, ventilators, anesthesia machines, and radiotherapy systems. Emphasis on troubleshooting and emergency alternatives.	

Module	Module 45
Code	MIET4202
Course/Module Title	Engineering of Radiation Instrumentation
ECTS	6
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	3
SSWL (hr/sem)	74
USSWL (hr/w)	106
Description	
Focuses on radiation-related instrumentation: radiation detection, dosimetry, generators, beam therapy, and safety. Includes hands-on design and implementation in nuclear science and medical imaging.	

Module	Module 46
Code	MIET4203
Course/Module Title	Artificial Limbs and Robotics
ECTS	6
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	4
SSWL (hr/sem)	88
USSWL (hr/w)	92
Description	
Covers robotic surgical systems and artificial limbs, including endoscopic and teleoperated robotics. Includes anatomy, kinematics, dynamics, sensors, and robotic applications for rehabilitation and surgery using systems like Zeus and da Vinci.	

Module	Module 47
Code	MIET4205
Course/Module Title	Programmable Logic Devices (Elective II)
ECTS	4
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Covers programmable logic devices (PLDs), including RAMs, ROMs, FPGAs, CPLDs, logic arrays (PLA, PAL), logic gates, and VHDL programming. Students learn to design digital systems using logic gates, encoders, decoders, memory types, and implementation techniques.	

Module	Module 48
Code	MIET4206
Course/Module Title	Biomedical Sensors Networks (Elective II)
ECTS	4
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Explores Biomedical Sensor Networks and their biomedical applications including wireless sensor systems, IoT integration, localization, energy optimization, data analytics, and machine learning. Students design and implement networks for biomedical use.	

Module	Module 49
Code	MIET4207
Course/Module Title	Biomedical Image Processing (Elective III)
ECTS	4
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Covers image acquisition and enhancement, segmentation, registration, and feature extraction. Teaches algorithms for improving image quality and extracting meaningful medical information for diagnosis and research.	

Module	Module 50
Code	MIET4208
Course/Module Title	Statistics for Biomedical Engineering (Elective III)
ECTS	4
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	2
SSWL (hr/sem)	60
USSWL (hr/w)	60
Description	
Provides foundation in statistical methods: sampling, probability, confidence intervals, hypothesis testing, and error propagation. Emphasizes application in research, business, and biomedical decision-making.	

Module	Module 51
Code	MIET4204
Course/Module Title	Professional Ethics
ECTS	3
Semester	8
Class (hr/w)	2
Lect./Lab./Prac./Tutor	1
SSWL (hr/sem)	45
USSWL (hr/w)	45
Description	
Covers ethical values in professional contexts: integrity, confidentiality, responsibility, and decision-making. Students analyze real-world dilemmas, develop reasoning, and foster ethical behavior in technical professions.	