الجامعة التقنية الشمالية

Northern Technical University

الكلية التقنية الهندسية الموصل

Technical Engineering College of Mosul

بكالوريوس هندسة تقنيات الأجهزة الطبية

Bachelor's degree in Medical Instrumentation Techniques Engineering

Undergraduate Degree Program Catalogue

2025-2026

دليل البرنامج الدراسي

Program Catalogue Form

University Name: Northern Technical University.....

Faculty/Institute: Technical Engineering College Mosul.....

Scientific Department: Medical Instrumentation Techniques Engineering

Academic or Professional Program Name: Bachelor of Medical Instrumentation Techniques Engineering

Final Certificate Name: Bachelor of Medical Instrumentation Techniques Engineering

Academic System: Bologna Process.....

Description Preparation Date: 2/9/2025

File Completion Date: 2/9/2025

Signature:

Head of Department Name:
Dr. Zaid Hisham Dahham

Date: 2/9/2025

Signature:

Scientific Associate Name:
Prof. Dr. Mohammed Sabah Jarjees

Date: 25/9/2025

Ministry of Higher Education and Scientific Research
Northern Technical University
Technical Engineering College - Mosul

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

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Approval of the Dean

Table of Contents

1. Vision and Mission Statements……3
2. Program Specification……..3
3. Program (Objectives) Goals……3
4. Program Student Learning Outcomes……..4
5. Academic Staff……5
6. Credits, Grading and Grade Point Averag……...…6
7. Modules and Curriculum……7

1. Vision and Mission Statements

Vision Statement

The vision of the department of medical instrumentation engineering techniques is to be a distinguished global center for the education and training of students, graduates, and specialized professionals in the fields of medicine and biomedical technologies, and to be a pioneer in research and development in this field.

Mission Statement

The department of medical instrumentation engineering techniques trains its students on the design, development, and maintenance of modern medical devices used in the healthcare field. The department strives to enhance its students' skills and provide them with the necessary knowledge to keep up with the latest advancements in this field, as it plays a crucial role in improving the quality of healthcare in the health and medical institutions.

The department offers courses in areas such as medical engineering, medical electronics, medical imaging, biomedical devices, control and automation, engineering design, industrial design, advanced manufacturing, and other related fields. Additionally, the department employs the latest teaching techniques and methods, providing a supportive learning environment that encourages students to be creative and innovative.

2. Program Specification

Program Code	BTech Med Inst Eng	ECTS	240
Duration	4 levels, 8 Semesters	Method of Attendance	Full Time

The specification of medical instrumentation techniques engineering programme defines the knowledge and skills needed for a career installing, calibrating, and maintaining medical instruments. This programme emphasises the development of technical expertise in the medical device sector, new medical techniques, hospital administration, and medical device maintenance. Typically, the programme consists of classroom lectures, practical training, and on-site work.

Additionally, the programme emphasises the development of technical skills such as electrical circuit design, computer-aided design, microcontroller programming, estimation, and medical project management. The programme aims to provide graduates with the skills necessary to work as medical instrument engineers, team leaders of medical engineering teams, medical device inspectors, cost estimators, and other technical positions in the medical engineering field.

3. Program (Objectives) Goals

Medical instrumentation techniques engineering is one of the modern disciplines concerned with the design, development, and maintenance of medical devices and equipment used in healthcare for diagnosis, treatment, monitoring, and

analysis. It is one of the most essential departments, providing technical assistance to medical institutions and healthcare facilities. The general objectives of the department are:

1. Conducting scientific research in biomedical fields of study, with an emphasis on applied research, in order to keep up with the rapid development of science and te chnology.
2. Continuous communication with graduates contributes to their ongoing developm ent and provides input for the department's curriculum development in response to the labour market.
3. Design and develop cutting edge medical devices and instruments that enhance the quality of patient care and facilitate optimal diagnosis and treatment.
4. Design and develop modern medical devices and tools that help improve the quality of healthcare and provide optimal diagnosis and treatment for patients.
5. Training and qualifying medical technicians and providing them with the necessary skills and knowledge to deal with modern medical devices, maintain and operate them properly.
6. Collaborating with physicians and healthcare institutions to provide the necessary technical support for operating medical devices correctly and effectively.

4. Program Student Learning Outcomes

Medical instrumentation techniques engineering program's unique goals and objectives that have an impact on the learning results for its students. The program student learning outcomes are:

1. **Knowledge of medical materials and methods:** Students can be able to demonstrate a strong understanding of medical materials and methods, including their properties, advantages, and limitations.
2. **Knowledge of medical devices:** Students can be able to demonstrate a strong understanding of using , calibrating, maintenance of medical devices.
3. **Ability to read and interpret blueprints:** Students should be able to read and interpret service manual catloge, as well including elevations, sections, and details.
4. **Communication and teamwork:** Students should be able to effectively communicate with medical staff, clients, patients and end user of medical devices, in addition to work collaboratively in a team environment.
5. **Safety:** students will be aware of safety in the medical sectors, such as the hazards of high electrical voltage, and potential hazards on a job site,such as, contacts with patients, and the spread of viruses, and risks of some medical devices such as radiation instruments.

5. Academic Staff

Name	Degree	Postion	General specialize	Prersize specialize	Academic email
Mohammed Sabah Jarjees	PhD	Assistant Professor	Medical Instrumentation Engineering	Biomedical Engineering	mohammed.s.jarjees@ntu.edu.iq
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Wameedh Baraq Edress	PhD	Lecturer	Physics	Plasma	wameedh.adress@ntu.edu.iq
Zaid Husham Dahham	PhD	Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	Zaidalsawaff@ntu.edu.iq
Anfal Abdulsalam Daoud	Master	Lecturer	Biology	Zoology	anfalsalam@ntu.edu.iq
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Tahani Ghanim Mahmood	Master	Assistant Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	tahani.ghanim@ntu.edu.iq
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Omar Taher Osman	Master	Assistant Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	omarosman@ntu.edu.iq
Warqaa Hashim Mahmood	Master	Assistant Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	warqaa.hashim@ntu.edu.iq
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Ali Rakan Hasan Ahmed	Master	Assistant Lecturer	Medical Instrumentation Engineering	Medical Instrumentation Engineering	ali.rakan@ntu.edu.iq
Osamah Basheer Noori	Master	Assistant Lecturer	Electrical Engineering /Power and Machine	Control Engineering	usamaengeng@ntu.edu.iq
Aseel Thamer Ebrahem	Master	Assistant Lecturer	Computer Engineering	Computer Engineering	aseelthamer@ntu.edu.iq
Hussein Ali Hussein Kwasme	Master	Assistant Lecturer	Electrical Engineering	Communication Engineering	hussein.kwasme@ntu.edu.iq
Azza Qays Abduljabar	Master	Assistant Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	azzakays@ntu.edu.iq
Ahmed Saeed Ibrahim	Master	Assistant Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	ahmedsaeed@ntu.edu.iq
Entisar Younis Abduljabar	Master	Assistant Lecturer	Medical instrumentation engineering	Medical instrumentation engineering	entisar.al-iraqi1979@ntu.edu.iq
Layth Taha Khudhuir	Master	Assistant Lecturer	Science in Mathematics	Mathematics Pure	Layth.t.k@ntu.edu.iq

6. Credits, Grading and Grade Point Averag

Credits in the medical istruemnation techniques engineering department are based on Bologna process with the European Credit Transfer System (ECTS). The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 student workloads, including structured and unstructured workload.

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

GRADING SCHEME			
Group	**Grade**	**Marks %**	**Definition**
Success Group (50-100)	Excellent	90-100	Outstanding Performance
	Very Good	80-89	Above Average with Some Errors
	Good	70-79	Sound Work with Notable Errors
	Satisfactory	60-69	Fair But with Major Shortcomings
	Sufficient	50-59	Work Meets Minimum Criteria
Fail Group (0-49)	FX-Fail	45-49	More Work Required But Credit Awarded
	F-Fail	0-44	Considerable Amount of Work Required
NB 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 Grade Point Average (GPA)

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

GPA of 4-year B.tech. degrees:

GPA = [(1st module score × ECTS) + (2nd module score × ECTS) + ……] / 240

7. Modules and Curriculum

Level	First	Semester	First		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 101	Direct Current Circuit Analysis	8	4	4	
MIE 102	Physics	8	4	4	
MIE 103	Mathematics	6	6	0	
MIE 110	Engineering Drawing	4	0	4	
NTU101	English Language	2	2	0	
NTU100	Democracy and Human Rights	2	2	0	
Total		30	18	12	

Level	First	Semester	Second		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 107	Alternating Current Circuit Analysis	8	4	4	
MIE 108	Mechanics	4	4	0	
MIE 109	Medical Physics	7	4	3	
NTU102	Computer	3	1	2	
MIE 111	Chemistry	6	3	3	
NTU103	Arabic Language	2	2	0	
Total		30	18	12	

Level	Second	Semester	First		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 201	Medical Laboratory Instrumentation	7	4	3	
MIE 202	Programming Languages	3	1	2	
MIE 203	Principles of Electronic Circuits	6	3	3	
MIE 209	Clinical Chemistry Techniques	6	3	3	
MIE 205	Anatomy and Physiology	4	2	2	
NTU201	English language	2	2	0	
NTU200	Baath's Crimes in Iraq	2	2	0	
Total		30	17	13	

Level	Second	Semester	Second		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 207	Logic Circuits	6	3	3	
MIE 208	Measurements and Medical Transducers	6	3	3	
MIE 204	Engineering Mathematics	6	6	0	
NTU202	Computer	3	1	2	
MIE 211	Electronic Circuits	7	4	3	
NTU203	Arabic Language	2	2	0	
Total		30	19	11	

Level	Third	Semester	First		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 301	Medical Diagnostic Instrumentation	7	4	3	
MIE 302	Power Electronics	4	2	2	
MIE 303	Signal Processing	6	3	3	
MIE 304	Principles of Electronic Systems	6	3	3	
MIE 305	English Language	3	3	0	
MIE 306	Computer	4	1	3	
Total		30	16	14	

Level	Third	Semester	Second		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 307	Medical Diagnostic Imaging System	6	3	3	
MIE 308	Communication Engineering	6	3	3	
MIE 309	Microprocessors	6	3	3	
MIE 310	Digital Signal Processing	6	3	3	
MIE 311	Medical Electronic Systems	6	3	3	
Total		30	15	15	

Level	Forth	Semester	First		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 401	Medical Therapeutic Instrumentation	7	4	3	
MIE 402	Medical Laser Systems	6	4	2	
MIE 403	Digital Image Processing	6	3	3	
MIE 404	Research Methodology	3	3	0	
MIE 405	Object Oriented Programing	4	1	3	
TEMO 400	Project 1	4	0	4	
Total		30	15	15	

Level	Forth	Semester	Second		Bachelor's Degree in Medical Instrumentation Techniques Engineering
Module Code	Module Name in English	ECTS	Theoretical Hour/Week	Practical Hour/Week	
MIE 407	Radiation Engineering in Medical Applications	7	4	3	
MIE 408	Artificial Intelligence	6	2	4	
MIE 409	Control Systems	6	3	3	
MIE 410	English Language	3	3	0	
MIE 411	Engineering Management	4	4	0	
TEMO 401	Project 2	4	0	4	
Total		30	16	14	

1. Contact Information

Program Manager:
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