



**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

2025-2026

Academic Program Description Form

University Name: URUK University

College / Institute: Engineering Technical College

Department: Medical Instrumentation Techniques Engineering

Academic or Professional Program Name: Bachelor's Degree

Final Degree Name: Bachelor's Degree in Medical Instrumentation Techniques Engineering

Study System: Annual (Fourth Level)

Date of Preparation of Description: 16-3-2026

Date of File Completion: 11-4-2026

Signature:

Signature:

Head of Department Name: Lect. Dr. Fadhil
Abbas Al-Qrimli

Date: 11/4/2026

Scientific Associate Name: Asst. Prof. Dr. Falih
Hamza Edan

Date: 11/4/2026



File Reviewed by

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Lect. Dr. Saadiyah Hasan Halos

Date: 11/4/2026

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Authentication by the Dean:

Prof. Dr. Waleed Ameen Al-Jawher

12/4/2026

1. Program Vision

Leadership and excellence in preparing medical device engineers through the provision of high-quality technical education that keeps pace with scientific and technological advancements, contributing to the improvement of healthcare through highly competent graduates and sustainable innovation.

2. Program Mission

To prepare specialized engineering personnel who possess the scientific and practical skills in diagnosing, maintaining, and developing medical devices, with a focus on creativity, adherence to international standards, and strengthening academic and community partnerships to ensure the quality of education and achieve continuous development in the field.

3. Program Objectives

- Graduate Specialized Engineering Competencies: Graduates will possess exceptional scientific and practical skills in diagnosing faults and repairing medical devices, enabling them to work efficiently in this vital field.
- Prepare Creative Engineers: Equipped with the ability to keep pace with rapid advancements in the medical device field, while acquiring the necessary skills to continuously develop and update these devices.
- Master Medical Device Installation and Operation: This includes both electronic and electromechanical devices, whether diagnostic or therapeutic, ensuring their optimal performance.
- Effectively Manage Maintenance and Calibration: Contributing to the maintenance of medical devices and supervising the necessary calibration processes to ensure their accuracy and efficiency.
- Design and Develop Alternative Solutions: Finding alternatives for certain parts related to medical devices, enhancing innovation and ensuring the continued excellent performance of the devices.
- Organize and Schedule Maintenance Work: Through programming and systematically managing regular maintenance work to ensure the devices operate at high efficiency.
- Enhance Performance Standards: By applying international standards in technical education and working on improving the quality of academic and professional outcomes.
- Stay Updated with Academic Developments: Regularly updating curricula to ensure students are equipped with the latest knowledge and skills in their field.
- Strengthen Community Engagement: By building strong and sustainable

relationships with various segments of the community to enhance cooperation and promote the academic program.

- Foster Connections with Scientific Institutions: Through continuous communication with local and international scientific institutions to keep up with the latest developments and innovations in the field.

4. Program Accreditation

The Department seeks to obtain Programmatic accreditation

5. Other External Influences

Twinning agreement between the Department of Medical Instrumentation Techniques Engineering / College of Technical Engineering / URUK University with the Middle Technical University / College of Electrical Engineering Technology / Baghdad /Iraq

6. Program Structure

Program Structure	Number of Courses	Credit Units	Percentage	Notes *
Institutional Requirements	2	4	3.05%	
College Requirements	16	42	32.06%	
Department Requirements	21	85	64.89%	
Summer Training	2	No Units		Training for the second and third years
Other				

7. Program Description

Year / Level	Course Code	Course Name	Credit Hours	
			Theoretical	Practical
Fourth Year	MITE401	Medical Devices/3	3	2
	MITE402	Control Systems	2	2
	MITE403	Radiation Devices Engineering	2	2
	MITE404	Medical Laser Systems	2	2
	MITE405	Advanced Digital Design	2	2
	MITE406	Project Management	-	2
	MITE407	Computer Applications	2	1

	MITE408	English Language/4	1	-
	MITE409	Professional Ethics	-	2
	MITE410	Project	-	6

8. Expected Learning Outcomes of the Program

Knowledge		
1	Understanding the fundamental principles of medical device design.	The ability to apply concepts of medical device design and operation in real-world work environments.
2	Acquiring extensive knowledge of biological systems and modern medical technologies.	The ability to comprehend and interpret biological systems and utilize modern medical technologies to enhance healthcare.
3	The ability to analyze medical data and derive conclusions.	The ability to interpret and analyze medical data results and provide precise scientific recommendations.
4	Studying the impact of medical devices on humans and the environment.	The ability to assess the effects of medical devices and propose solutions to mitigate any negative impacts
skills		
1	Developing skills in the use and maintenance of medical devices.	The ability to efficiently maintain and operate medical devices in real-world work environments.
2	The ability to conduct tests and scientific experiments on medical devices.	The ability to design and execute experiments and performance tests for medical devices to ensure their quality.
3	Developing programming and engineering analysis skills for medical devices.	The ability to effectively program and analyze the electronic systems of medical devices.
4	Applying theoretical knowledge to solve practical technical problems.	The ability to utilize skills and theoretical knowledge to solve complex engineering problems in medical devices.
Values		
1	Enhancing ethical and professional values in engineering practices.	The ability to practice medical engineering according to the highest ethical and professional standards.
2	Promoting awareness of the importance of safety and quality in design and maintenance.	The ability to ensure that engineering projects are executed with a focus on safety and work quality.

3	Developing a sense of social and environmental responsibility in engineering work.	The ability to apply engineering solutions that benefit society and preserve the environment.
4	Promoting commitment to ethical and professional standards in engineering projects.	The ability to work in accordance with ethical and professional standards throughout all years of the engineering project.

9. Teaching and Learning Strategies

1. **Faculty Staff:** Use of academically and practically qualified faculty members to deliver high-quality lectures.
2. **Lectures by Faculty Members:** Delivery of theoretical scientific content using innovative educational tools to engage students.
3. **College Library:** Providing scientific sources and academic references to support learning.
4. **Electronic Library:** Enabling students to access scientific references and research journals online.
5. **Textbooks:** Using approved textbooks that provide specialized scientific content aligned with educational objectives.
6. **Supplementary Books:** Providing additional books to support understanding and enhance practical application.
7. **Websites and Internet:** Utilizing the internet and educational websites to support self-research and learning through educational platforms.

10. Evaluation Methods

1. **Continuous Assessment (Formative Assessment)**
2. **Theoretical Tests**
3. **Practical Tests**
4. **Research Projects**
5. **Group Assessment**
6. **Interactive Assessment (Collaborative Assessment)**
7. **Simulation-Based Assessment**
8. **Technological Assessment**
9. **Final Assessment (Summative Assessment)**
10. **Self-Assessment and Peer Assessment**

11. Faculty

Full Name	Academic Title	Specialization		Requirements/Specific Skills (if any)	Faculty Preparation	
		General	Specialized		Staff	Lecturer
Fadhel Abbas Mahdi Al-Qrimli	Lecturer, PhD	Electrical and Electronic Engineering	Power Electronics		Staff	
Abdul Kareem Abdul Amir Abdul Razzaq	Assistant Professor, PhD	Mathematics	Differential Equations		Staff	
Falih Hamzah Eidan	Assistant Professor, PhD	Mechanical Engineering	Materials Engineering		Staff	
Mayada Salih Abdullah Mustafa	Assistant Professor, PhD	Communications Engineering	Communications Engineering		Staff	
Balsam Abdul Jabbar Mustafa	Lecturer (PhD)	Computer Science	Software Engineering		Staff	
Mohammed Safa Al-Din Taher	Lecturer (PhD)	Mechanical Engineering	Applied Mechanics		Staff	
Saadiyah Hasan Halos	Lecturer (PhD)	Physical Sciences	General Physics		Staff	
Saja Basim Lutfi	Lecturer (PhD)	Family Medicine	None		Staff	
Hussein Kasab Hashim	Assistant Lecturer	Physics	Materials Physics		Staff	

Zainab Abdul Kareem Abbas	Assistant Lecturer	Laser Science	Laser Technology & Applications		Staff	
Hawraa Fadhil Abbas	Assistant Lecturer	Control & Systems Engineering (MSc)	Computer Control Engineering			
Yusra Raed Mohammed	Assistant Lecturer	Physical Sciences	General Physics			Lecturer
Amna Jawad Kazim	Assistant Lecturer	Chemical Engineering	Industrial Units		Staff	
Duha Salam Jasim	Assistant Lecturer	Computer Science	Artificial Intelligence		Staff	
Noor Mohammed Jaafar	Assistant Lecturer	Chemical Engineering	Industrial Process Modeling		Staff	
Widad	Assistant Lecturer	Arabic Language	Arabic Language			Lecturer
Kamal Hassan Jawad	Assistant Lecturer	English Language	Linguistics			Lecturer
Farah Hasnain Basim	---	Medical Engineering	Medical Engineering		Staff	
Huda Jasim Muslim Mahdi	---	Physics	Medical Physics		Staff	
Nabil Khalil Ibrahim	---	Electrical Engineering	Electrical Engineering		Staff	
Eraheed Aram Hazim	---	Electrical Engineering	Electrical Engineering		Staff	
Marwa Adnan Tamer	---	Computer Communications Engineering	Computer Communications Engineering		Staff	
Maryam Razzaq Kazim	---	Biomedical Engineering	Biomedical Engineering		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

Program skills plan															
Education outputs required from the program															
Skills				Values				Knowledge				Essential or optional	Name of Rapporteur	Symbol of decision	Phase
D4	D3	D2	D1	C4	C3	C2	C1	A4	A3	A2	A1				
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Specialized	Medical equipment/3	MITE401	Fourth
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Specialized	Systems of control	MITE402	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Specialized	Engineering of radiation devices	MITE403	
			✓		✓	✓	✓	✓	✓	✓	✓	Specialized	Medical Laser Systems	MITE404	
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Specialized	Advanced digital design	MITE405	
			✓	✓	✓	✓	✓	✓	✓	✓	✓	general	Management of projects	MITE406	
			✓	✓	✓	✓	✓	✓		✓	✓	Assistance	Applications of Calculation	MITE407	
	✓	✓	✓			✓	✓			✓	✓	Assistance	English and 4	MITE408	
✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	Specialized One Semester	Ethics of profession	MITE409	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Specialized	The project	MITE410	

Description of the courses

Course Description (1)

1. Course Name or Topic:	Medical Devices/3
2. Course Code:	MITE401
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	150
7. Course Instructor(s):	
8. Course Objectives:	Understanding Medical Devices: Study of the medical device as a purely electronic device and understanding its differences from other electronic devices. Practical Training: Training on the internal electronic circuits of medical devices, their operation, and maintenance methods.
9. Teaching and Learning Strategies:	<ul style="list-style-type: none"> ○ Interactive Lectures: Theoretical explanation supported by practical examples. ○ Laboratory Practical Training: Hands-on use of surgical devices. ○ Simulation and Virtual Experiments: Training on devices using simulation software. ○ Problem-Based Learning: Studying clinical cases to identify the type of devices required. ○ Field Visits: Visiting hospitals and surgical centers to see devices in action.
10. Course Structure	
Week	Topic
1st-2nd	General Systems and Specialized Tools in General Surgery
3rd-5th	Specialized Systems and Tools
6th-7th	Surgical Instruments for Ophthalmology
8th-9th	Cardiovascular Surgery
10th	Heart-Lung Machine
11th-12th	Dialysis Machine
13th-14th	Surgical Diathermy
15th-17th	Prosthetic Organs (Internal and External)
18th-20th	Dental Systems
21st-22nd	Surgical Instruments for Gynecology
23rd-24th	Ultrasound-Assisted Devices
25th-26th	Hearing Surgery Systems
27th-28th	Anesthesia Units
29th-30th	Intensive Care Units

11. Assessment Method: Practical exams, theoretical exams, reports

12. Learning and Teaching Resources

Assigned Books (Curricular) if any:

- "Surgical Instrumentation: An Interactive Approach" – Renee Nemitz
- "Biomedical Instrumentation and Devices" – Anthony Y. K. Chan

Main References (Sources)

- "Medical Instrumentation: Application and Design" – John G. Webster
- "Handbook of Biomedical Instrumentation" – R. S. Khandpur

Supporting Books and References (Scientific Journals, Reports...):

- Published research in IEEE Transactions on Medical Devices
- Articles on modern surgical device technologies

Electronic References and Websites:

- PubMed
- ScienceDirect
- Specialized training courses on Coursera and edX

Course Description (2)

1. Course Name or Topic:	Control Systems
2. Course Code:	MITE402
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	120
7. Course Instructor(s):	
8. Course Objectives: Understanding control circuit components: Getting familiar with the components of control circuits, types of controllers, and their uses. Practical applications: Studying the practical circuits of controllers and how they are used in various systems.	
9. Teaching and Learning Strategies:	
<ul style="list-style-type: none"> ○ Interactive lectures: Presenting basic concepts with practical examples. ○ • Problem-solving training: Practical mathematical application to solve control problems. ○ • Simulation using software: Such as MATLAB and Simulink to analyze control systems. ○ • Case study analysis: Analyzing control systems used in medical and industrial applications. ○ • Project-based learning: Designing and implementing control systems using microcontrollers. 	
10. Course Structure	
Week	الموضوع
1st	Introduction to linear control engineering
2nd, 3rd	Mathematical background; lap lace transform, complex variable, matrices
4th, 5th, 6th	Transfer function, block diagram representation and reduction, signal flow diagram
7th, 8th, 9th	Time domain analysis, steady – state transient analysis
10th, 11th	Stability analysis; Routh, Nyquist
12th, 13th	Root locus technique
14th, 15th, 16th	Frequency domain analysis, Epimarginal, phase margin and bode plot
17th, 18th	Frequency domain synthesis, phase lead
19th, 20th	Compensation, phase – lag compensation lag – lead compensation
21st, 22nd, 23rd, 24th	PID controllers design
25th, 26th, 27th	State space representation and analysis
28th, 29th	State diagram; analogue computer
30th	Block diagram representation
11. Assessment Method: Practical exams, theoretical exams, reports	
12. Learning and Teaching Resources	
Assigned Books (Curricular) if any):	
<ul style="list-style-type: none"> • "Modern Control Engineering" – Katsuhiko Ogata • "Automatic Control Systems" – Benjamin C. Kuo 	
Main References (Sources):	
<ul style="list-style-type: none"> • "Control Systems Engineering" – Norman S. Nise • "Linear System Theory and Design" – Chi-Tsong Chen 	
Supporting Books and References (Scientific Journals, Reports...):	
<ul style="list-style-type: none"> • IEEE research on control systems • Articles on control systems in medical and industrial devices 	
Electronic References and Websites:	
<ul style="list-style-type: none"> • MIT Open Courseware – Control Systems • MATLAB Documentation • Coursera – Control Systems 	

Course Description (3)

1. Course Name or Topic:	Radiation Device Engineering
2. Course Code:	MITE403
3. Semester / Year:	Annual
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	120
7. Course Instructor(s):	
8. Course Objectives: Understanding atomic structure and radiation: Study of atomic structure, nuclear radiation, and their effects on the human body. Uses of radiation in medical devices: Learning how radiation is used in various medical devices.	
9. Teaching and Learning Strategies:	
<ul style="list-style-type: none"> ○ Delivering theoretical lectures to explain the basic principles of radiation. ○ Conducting practical experiments in medical physics laboratories. ○ Analyzing medical cases involving the use of radiation in treatment and diagnosis. ○ Small research projects on modern radiation technologies. ○ Computer simulations to study the effects of radiation on tissues. 	
10. Course Structure	
Week	الموضوع
1st, 2nd	Atomic structure and atomic radiation
3rd, 4th	The nuclear and nuclear radiation
5th, 6th	Interaction of radiation with matter
7th, 8th, 9th	Radiation detection & engineering of radiation detectors
10th, 11th, 12th	Engineering of radiation dosimetry and dosimeters
13th, 14th	Radiation protection
15th, 16th	Engineering of body scanners
17th, 18th	Production of X – rays
19th, 20th	Clinical radiation generators
21st, 22nd	Dose distribution and scatter analysis
23rd, 24th	A system of dosimetry calculations
25th, 26th	Treatment planning
27th, 28th	Engineering of electron beam therapy
29th, 30th	Brachy therapy
11. Assessment Method: Practical exams, theoretical exams, reports	
12. Learning and Teaching Resources	
Assigned Books (Curricular) if any):	
<ul style="list-style-type: none"> • Introduction to Radiological Physics and Radiation Dosimetry - Frank Herbert Attix 	
Main References (Sources):	
<ul style="list-style-type: none"> • The Physics of Radiology - Harold Elford Johns 	
Supporting Books and References (Scientific Journals, Reports...):	
<ul style="list-style-type: none"> • IEEE articles and research on medical radiation technology. 	
Electronic References and Websites:	
<ul style="list-style-type: none"> • International Atomic Energy Agency (IAEA) – www.iaea.org • Radiology Info – www.radiologyinfo.org 	

Course Description (4)

1. Course Name or Topic:	Medical Laser Systems
2. Course Code:	MITE404
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	120
7. Course Instructor(s):	
8. Course Objectives: Understanding Laser Generation: Study how different types of lasers are generated. Laser Transmission and Reception: Learn the methods of laser transmission and reception. Using Lasers in Medical Devices: Understand how lasers are used in various medical devices.	
9. Teaching and Learning Strategies: <ul style="list-style-type: none"> ○ Lectures: Theoretical sessions to explain the basic principles of laser operation and optical fibers. ○ Practical Experiments: Conduct experiments on laser generation and its propagation through optical fibers. ○ Medical Applications Analysis: Study medical applications of lasers for diagnosis and treatment. ○ Mini Research Projects: Investigate the latest laser technologies in medicine. ○ Computational Simulation: Use computer simulations to analyze the effects of different parameters on light transmission in fibers. ○ . 	
10. Course Structure	
Week	topic
1st, 2nd	Laser generation
3rd, 4th	Types of Lasers
5th, 6th, 7th	Light and light propagation in glass fiber
8th, 9th, 10th	Optical fiber wave guide, bandwidth distance product, dispersion and pulse spreading, maximum allowable data rate, fiber power losses
11th, 12th	Transmitter device and circuits (communication LEDs)
13th, 14th	Injection lasers, modulators
15th, 16th	Receiver devices and circuits, photo diode light detector
17th	PIN photo diodes, photo multiplier
18th, 19th	Avalanche photo diode (APD), receiver circuits
20th, 21st	Transmission technology, fiber technology, connectors
22nd, 23rd	Splices, couplers
24th, 25th, 26th, 27th	Types of medical applications of laser
28th- 29th- 30th	Laser hazards, the standard level for a safe working environment, lab safety
11. Assessment Method: Practical exams, theoretical exams, reports	
12. Learning and Teaching Resources Assigned Books (Curricular) if any): <ul style="list-style-type: none"> • Principles of Lasers - Orazio Svelto Main References (Sources): <ul style="list-style-type: none"> • Fiber-Optic Communication Systems - Govind P. Agrawal Supporting Books and References (Scientific Journals, Reports...): <ul style="list-style-type: none"> • Laser Physics - Peter W. Milonni Electronic References and Websites: <ul style="list-style-type: none"> • Laser Institute of America – www.lia.org • Optical Society of America – www.osa.org 	

Course Description (5)

1. Course Name or Topic:		Advanced Digital Design
2. Course Code:		MITE405
3. Semester / Year:		Fourth year
4. Date of Preparation:		5/2/2026
5. Available Attendance Formats:		In-person
6. Total Hours:		120
7. Course Instructor(s):		
<p>8. Course Objectives: Understanding Artificial Intelligence: Developing the ability to understand and design artificial intelligence systems. Microprocessor Technologies: Acquiring skills in microprocessor technology and VLSI systems.</p>		
<p>9. Teaching and Learning Strategies:</p> <ul style="list-style-type: none"> ○ Applying theoretical concepts in the medical field: Encouraging students to apply the theoretical concepts they study to solve medical problems and design medical devices. ○ Teamwork and scientific research: Encouraging students to work together in scientific research projects and solve problems related to the course materials. ○ Using practical examples: Using practical examples to explain theoretical concepts and connect them to medical applications. ○ Continuous assessment: Continuously assessing students through practical and theoretical tests and research projects. ○ Encouraging creativity and innovation: Encouraging students to think critically and creatively in solving problems and developing new ideas in the field of medical device technology engineering.. 		
10. Course Structure		
Week	Topic	
1	Artificial Intelligence	
2	Simulation and Modeling	
3	Control System	
4	Image Processing and Communications	
5	Real-Time System	
6	Microelectronics Technology	
7	VLSI System	
8	Topics in Electrical/Electronic Engineering	
9	Advanced Computer Architecture	
10	Topics in Computer Architecture	
11	Robotics and Automation	
12	Topics in Digital System	
13	Advanced Logic Design	
14 - 15	Topics in Computer Science	
16 - 17	Digital Control System	
18	Engineering Economic Analysis	
19	Signal Processing	
20	CAD/CAM	
21	Reliability Engineering	
22	Fault Diagnosis	
23	Microcomputer System Design	

24	Software Engineering
25	Parallel Processing
26	Operating System
27	Advanced Electronics
28	Maintenance Management
29	Nuclear & Radiation Equipment
30	Instruments & Operation Control

11. Assessment Method: Practical exams, theoretical exams, reports

12. Learning and Teaching Resources

Assigned Books (Curricular) if any):

- "Introduction to Artificial Intelligence" ↓ Stuart Russell و Peter Norvig.
- "Simulation Modeling and Analysis" ↓ Averill M. Law.
- "Modern Control Engineering" ↓ Katsuhiko Ogata.

Main References (Sources):

- Artificial Intelligence: A Modern Approach".
- "System Simulation: Theory and Applications".
- "Control Systems Engineering

Supporting Books and References (Scientific Journals, Reports...):

- Scientific journals like "Journal of Artificial Intelligence Research."
- • Research reports on applications of course topics.
- • "IEEE Transactions on Control Systems Technology."

Electronic References and Websites:

- Websites like "AI Magazine."
- "arXiv.org."
- "Control Tutorials for MATLAB and Simulink)

Course Description (6)

1. Course Name or Topic:	Project Management
2. Course Code:	MITE406
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	60
7. Course Instructor(s):	
8. Course Objectives:	Acquiring essential skills: Learning how to design, plan, execute, and monitor projects. Problem-solving: The ability to identify project issues and find appropriate solutions using project management tools and methods.
9. Teaching and Learning Strategies:	<ul style="list-style-type: none"> ○ Using case studies to analyze real-world projects. ○ Applying collaborative learning through workgroups to solve scheduling and control problems. ○ Conducting hands-on simulations using software like Microsoft Project or Primavera.
10. Course Structure	
Week	Topic
1	Introduction to project management: Objectives and trade-offs (Cost – Schedule – Performance).
2	Planning and control in projects: Planning, Scheduling, Controlling.
3	Scheduling methods.
4	Gantt chart.
5	Network methods.
6	Constant-time network.
7-8	PERT network.
9-10	Critical Path Method (CPM).
11	Precedence Diagramming Method.
12-13	Project phases: Choice of project location.
14	Process design.
15	Choice of technology.
16	Financial analysis: Purchase of new machine, Machine replacement.
17	Layout of facilities.
18	Managing the workforce in projects: Who manages the workforce?
19	Principles in decision-making for workforce management.
20	Japan's workforce management.
21	New approaches to performance evaluation.
22	Materials handling: Concepts of MRP system.
23	Elements of MRP system.
24	MRP vs. Order-point system, MRP vs. Just-in-Time system.
25	Activities in projects: Coordination of project activities, Activity breakdown.
26	Measuring project progress tools.

27	Methods study.
28	Types of work measurement.
29	Time study.
30	Time management.

11. Assessment Method: Practical exams, theoretical exams, reports

12. Learning and Teaching Resources

Assigned Books (Curricular) if any):

- "Project Management: A Systems Approach to Planning, Scheduling, and Controlling" - Harold Kerzner.
- "A Guide to the Project Management Body of Knowledge (PMBOK Guide)" - PMI.

Main References (Sources):

- "Effective Project Management: Traditional, Agile, Extreme" - Robert K. Wysocki.
- "Managing Projects: A Team-Based Approach" - Karen Brown, Nancy Lea Hyer.

Supporting Books and References (Scientific Journals, Reports...):

- Journals such as "International Journal of Project Management."
- Reports from organizations like PMI (Project Management Institute).
- Books on scheduling techniques such as CPM and PERT.

Electronic References and Websites:

- PMI website (www.pmi.org) for project management resources.
- Online courses on LinkedIn Learning or Udemy on project management.
- Coursera website: Project Management courses (such as Google Project Management Certificate)

Course Description (7)

1. Course Name or Topic:	Applications of Calculators
2. Course Code:	MITE407
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	90
7. Course Instructor(s):	

8. **Course Objectives:** Creating and formatting presentations. Creating and formatting text documents. Analyzing data and creating graphs. Creating, analyzing, and managing databases.

9. **Teaching and Learning Strategies:**

- **Practical Application: Focus on implementing presentations and hands-on training with software.**
- **Interactive Lectures: Presenting the material theoretically supported by explanatory presentations to simplify concepts.**
- **Project-Based Learning: Assigning students to create presentations or practical projects using the discussed software.**
- **Self-Training: Encouraging students to explore the features of the software independently and experiment with its different tools.**
- **Discussions and Problem-Solving: Engaging students in discussions about the challenges they may face while using the software in practice.**

10. **Course Structure**

Week	Topic
1 st – 10 th	PowerPoint Program: Concept of the program and its benefits, how to run it, and its components. <ul style="list-style-type: none"> • Creating a New Presentation: Using templates provided by the program or working directly, saving the presentation, making edits, and saving changes. • Slide Layout: Adding a new slide (Slide) with text (Text) or graphics (Graphics), adding notes, and adding main titles. • Adding Drawings: Using available drawing tools to add graphics, modifying text, and controlling slide layout. • Controlling Slide Colors and Backgrounds. • Adding Clip Art: Methods for resizing, cutting, and controlling images, adding photos and controlling them, adding charts from Excel, or data sheets from Access databases. • Using Presentation Commands: Timing settings, slide transitions, animation effects, and adding sound effects for narration.
11 th – 30 th	Advanced Customization Applications for CAD-CAM:

11. **Assessment Method:** Practical exams, theoretical exams, reports

12. **Learning and Teaching Resources**

Assigned Books (Curricular) if any):

- Microsoft PowerPoint Guide – Official guide for Microsoft PowerPoint.
- CAD-CAM: Principles and Applications – A book on advanced applications in computer-aided design and manufacturing.

Main References (Sources):

- "The Complete Guide to Microsoft PowerPoint" – A comprehensive book on all functions of the program.
- "CAD/CAM Theory and Practice" – A main reference outlining the fundamentals and software of CAD-CAM.

Supporting Books and References (Scientific Journals, Reports...):

- Specialized scientific journals in Information Technology.

- Research reports on the development of software in presentations and engineering design.

Electronic References and Websites:

- The official Microsoft website for updates and tutorials on PowerPoint.
- Educational courses on platforms like Coursera and Udemy to learn presentation techniques and CAD-CAM software.
- Specialized websites like ResearchGate and IEEE Xplore for accessing recent research on computer-aided design applications.

Course Description (8)

1. Course Name or Topic:	English /4	
2. Course Code:	MITE408	
3. Semester / Year:	Fourth year	
4. Date of Preparation:	5/2/2026	
5. Available Attendance Formats:	In-person	
6. Total Hours:	30	
7. Course Instructor(s):		
8. Course Objectives:	Developing English language skills in the field of biomedical engineering to facilitate effective communication in academic and industrial work environments. Equipping students with the essential medical and engineering terminology used in medical devices and healthcare technologies. Enhancing students' abilities in technical writing and scientific reports related to medical devices and modern technologies. Improving speaking and presentation skills through presenting projects and presentations on biomedical engineering topics. Introducing students to modern scientific and technological resources that support scientific research and practical applications in biomedical engineering.	
9. Teaching and Learning Strategies:	<ul style="list-style-type: none"> ○ Interactive learning – using presentations and classroom discussions to enhance understanding and comprehension. ○ Project-based learning – assigning students practical projects related to medical devices and modern technologies. ○ Problem-based learning – analyzing case studies and technical challenges to solve engineering and medical problems. ○ Self-learning and research assignments – encouraging students to explore scientific resources and provide analytical reports. ○ Simulation and practical training – using software and virtual models to demonstrate the operation of medical devices and their technologies. 	
10. Course Structure		
Week	Topic	Details
1st, 2nd	Review of Technical English & Research Writing	Revisiting key biomedical terms, technical writing basics, and academic reading strategies.
3rd, 4th	Advanced Scientific Writing	Structuring research papers, writing abstracts, and citing sources properly.
5th, 6th	Medical Device Regulations & Standards	Understanding FDA, ISO, and CE regulations related to biomedical devices.
7th, 8th	Patent Writing and Intellectual Property	Learning how to write and analyze patents for biomedical inventions.
9th, 10th	Literature Review & Research Methodology	Techniques for conducting literature reviews and summarizing key findings.
11th, 12th	Clinical and Technical Documentation	Writing clinical reports, user manuals, and technical specifications for devices.
13th, 14th	Ethics in Biomedical Engineering	Understanding bioethics, patient safety, and ethical considerations in research.
15th, 16th	Scientific Presentation & Public Speaking	Developing and delivering professional research presentations.
17th, 18th	Biomedical Case Studies & Innovations	Analyzing real-world case studies in medical device development.

19th, 20th	Regulatory Compliance and Risk Assessment	Writing risk analysis reports and regulatory compliance documents.
21st, 22nd	Data Analysis & Interpretation in Research	Understanding statistical reports, graphs, and interpreting experimental results.
23rd, 24th	Medical Research Proposal Writing	Structuring and writing research proposals for funding applications.
25th, 26th	Professional Communication & Industry Reports	Writing professional emails, reports, and business proposals in the biomedical industry.
27th, 28th	Peer Review & Scientific Criticism	Analyzing and critiquing scientific papers effectively.
29th, 30th	Final Research Paper & Oral Defense	Preparing the final research paper and practicing for oral defense presentations.

11. Assessment Method: Practical exams, theoretical exams, reports

12. Learning and Teaching Resources

Assigned Books (Curricular) if any:

- English for Medical and Engineering Purposes
- Technical English for Biomedical Engineers
- Medical Terminology for Health Professions

Main References (Sources):

- Handbook of Biomedical Engineering
- Introduction to Biomedical Technology
- Engineering in Medicine: Principles and Applications

Supporting Books and References (Scientific Journals, Reports...):

- Scientific journals: IEEE Transactions on Biomedical Engineering
- Reports: World Health Organization (WHO) reports on medical devices
- Research: Research published in PubMed and ScienceDirect

Electronic References and Websites:

- Educational websites: Coursera, edX (Courses on biomedical engineering and technical English)
- Scientific databases: PubMed, ScienceDirect, IEEE Xplore
- Academic platforms: ResearchGate, Google Scholar

Course Description (9)

1. Course Name or Topic:	Professional Ethics
2. Course Code:	MITE409
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	60
7. Course Instructor(s):	
8. Course Objectives: Understanding the Concept and Importance of Ethics: Students learn the concept of ethics and its significance in both professional and personal life. Applying Ethics in the Workplace: Students acquire skills to apply professional ethics in their work environment.	
9. Teaching and Learning Strategies:	
<ul style="list-style-type: none"> ○ problem-Based Learning: Encouraging students to analyze ethical dilemmas in medical and engineering professions and develop practical solutions to uphold ethical values in workplaces. ○ Interactive Learning: Using group discussions and presentations to enhance communication among students on ethical issues in engineering and medical fields. ○ Experiential Learning: Implementing simulations of real work environments to familiarize students with daily professional challenges and ethical decision-making. ○ Project-Based Learning: Assigning group projects focused on promoting and applying professional ethics in engineering and medical fields. ○ Self-Directed Learning: Encouraging students to conduct independent research on ethical topics relevant to their field through case studies and academic articles. 	
10. Course Structure	
week	Details of the Topics:
1 – 2	The concept of ethics and its origin. - General rules of ethics. - Sources of ethics. - Ethical values. - The importance of ethics for individuals and society.
3 – 4	Unit Two - Work and Profession. - Work and its importance. - Work behaviors. - The concept of profession. - Definition of profession. - The difference between the concepts of work, profession, and craftsmanship. - The foundations upon which a profession should be built.
4 – 5	Unit Three - Professional Ethics. - The nature of professional ethics. - The positive outcomes of adhering to professional ethics. - Characteristics of work ethics. - Attributes of professional ethics. - Steps to achieving an acceptable level of professional ethics.
5 – 6	Unit Four - Values and Professional Ethics. - Honesty. - Advising. - Justice. - Good conduct. - Work proficiency.
7 – 10	Unit Five - Unethical Behavior Patterns in the Profession. - Bribery. - The concept of bribery. - Types of bribery. - The difference between gifts and bribery. - The reasons and motivations behind bribery. - Fraud. - The concept of fraud. - The nature of fraud in the workplace. - Manifestations of fraud in job performance. - Administrative corruption. - Definition of administrative corruption. - Types of administrative corruption. - Unethical administrative behavior.
10- 13	Unit Six - Professional Ethics. - How to enhance ethical behavior at work according to (Kreiner & Kinicki). - Considerations when drafting a professional ethics charter. - Means and methods of establishing professional ethics. - Levels of building and reinforcing professional ethics. - Methods of instilling professional ethics values.
14 – 18	Unit Seven - Ethics of Arab Engineers. - The importance of fundamental pillars of the engineering profession charter. - The relationship of the engineer with their institution and engineering work. - The relationship of the engineer with the employer. - The

	relationship of the engineer with the engineering world and the engineering association they belong to. - The role of the engineer and their relationship with society. - The engineer's relationship with the environment, sustainable development, health, and public safety. - The engineer's relationship with laws, regulations, labor laws, and workers' rights. - The engineer's relationship with national, regional, and humanitarian issues.
19 – 22	Unit Eight - Engineering Professional Ethics (specific to technical engineering colleges). - The importance of engineers in society. - Definition of engineering ethics. - Conditions for a professional engineer. - Attributes of a professional engineer. - Examples of certain provisions of the engineering profession practice regulation in the Engineers' Syndicate. - The Islamic perspective on professional ethics compared to Western and American views.
23 – 24	Unit Nine - Ethics of Practicing the Engineering Profession. - The importance of engineers in society. - Definition of engineering ethics. - Conditions for a professional engineer. - Attributes of a professional engineer. - Examples of certain provisions of the engineering profession practice regulation in the Engineers' Syndicate. - The Islamic perspective on professional ethics compared to Western and American views.
24 – 25	Unit Nine - Ethics of Practicing the Medical Profession (specific to the College of Health and Medical Technology). - Characteristics and attributes of a medical technician. - Duties of the medical technician towards their profession, patients, and society.
26 – 27	Patient Rights. - Justice and equality. - Maintaining patient confidentiality. - Informed consent. - Comprehensive care. - Placing the patient's interest above all considerations. - Effective communication with patients. - The right to access medical records.
28 – 29	Professional Relationships: The relationship of the medical technician with colleagues in the healthcare institution. - Respect, cooperation, avoiding criticism in front of patients, accuracy, and honesty in performance.
30	Ethics and Medical Research: - Ethics of conducting medical experiments in Iraqi healthcare institutions. - The Helsinki Agreement on medical experiment ethics. - Ethics of writing medical research. - Ethics of teaching and learning through patients.

11. Assessment Method: Practical exams, theoretical exams, reports

12. Learning and Teaching Resources

Assigned Books (Curricular) if any):

- Ethics in the Medical and Engineering Professions – A textbook covering the principles of ethics in medical and engineering fields.
- Work and Profession in Medical Engineering – A book explaining the differences between work and profession in the engineering and medical contexts.
- Medical Professional Ethics – A guide addressing the ethical aspects of medical practice

Main References (Sources):

- Handbook of Medical Ethics – A primary reference on medical ethics.
- Engineering Ethics: Concepts and Cases – A key book explaining engineering ethics with case studies.
- The Ethics of Healthcare Technologies – A reference linking ethics and medical technology.

Supporting Books and References (Scientific Journals, Reports...):

- IEEE Transactions on Biomedical Engineering – Specialized journals in scientific research and ethics in biomedical engineering.
- Ethics in Medicine Journal – Professional journals focusing on ethical topics in medicine.
- World Health Organization (WHO) Reports – Periodic reports on healthcare ethics at the international level.

Electronic References and Websites:

- PubMed – A research database in medicine and medical ethics.
- IEEE Xplore – An academic library for scientific research in biomedical engineering.
- Google Scholar – An academic search engine for papers and research related to ethics in

Course Description (10)

1. Course Name or Topic:	project 1
2. Course Code:	MITE410
3. Semester / Year:	Fourth year
4. Date of Preparation:	5/2/2026
5. Available Attendance Formats:	In-person
6. Total Hours:	180
7. Course Instructor(s):	

8. **Course Objectives:** Self-Reliance: Developing self-reliance skills to demonstrate scientific competence. Setting and Analyzing Goals: The ability to identify key project goals and analyze work steps. Teamwork: Learning how to collaborate with a group of students to support teamwork.

9. **Teaching and Learning Strategies:**
- **Project-Based Learning:** Encourages students to apply acquired skills and knowledge while implementing practical projects, enhancing critical thinking and problem-solving.
 - **Collaborative Learning:** Through cooperation with supervisors and peers, knowledge and feedback are exchanged to improve the project.
 - **Self-Directed Learning:** Students conduct independent research and use electronic resources and prescribed books to obtain additional information supporting their project.
 - **Hands-On Learning:** By conducting experiments and testing models practically, students enhance their understanding of theoretical materials and achieve real-world results.
 - **Continuous Assessment:** Evaluating students at each stage of the project, allowing them to adjust and improve their projects based on feedback.

10. Course Structure

Week	Vocabulary
1	Assigning projects to students, reviewing with the supervising professor, and starting library research. Collecting information about the project, beginning theoretical study, and preparing the necessary designs.
2	Starting the implementation of proposed designs practically, conducting experiments and tests to obtain the practical model.
3	Conducting practical experiments, testing final board transfers, and obtaining final project results.
4	Discussing practical results, their alignment with real-world outcomes, and identifying necessary modifications to improve the phenomenon.
5	Organizing sections of the written report for each stage of the project in preparation for the final report. Submitting the final report in detail: <ul style="list-style-type: none"> • Project name. • Student's name. • Supervisor's name. • Chapter One: Introduction. • Chapter Two: Theoretical section. • Chapter Three: Practical section and results. • Chapter Four: Discussion of results, conclusions, and recommendations. • References.
6	Delivering the practical project model along with the final report for final testing and evaluation.

11. **Assessment Method:** Theoretical exams, reports.

12. Learning and Teaching Resources

Recommended Textbooks (if available):

- Scientific Research References: Books focusing on the fundamentals of scientific research and precise project preparation.

- Guide to Writing Academic Reports: A book explaining how to professionally structure and write scientific project reports.

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- Books on Engineering Project Design and Implementation: Including resources on designing medical devices, testing them, and analyzing results.

Main References (Sources):

- Scientific Research in Biomedical Engineering: A reference explaining how to conduct scientific research in the field of medical devices.
- The Complete Guide to Writing Research Reports: A primary resource for writing scientific research reports.
- Practical Engineering Projects in Biomedical Engineering: A reference highlighting how to apply designs in the field of medical devices.

Supporting Books and References (Journals, Reports, etc.):

- IEEE Transactions on Biomedical Engineering: Provides scientific research papers related to biomedical engineering technologies.
- Journal of Medical Engineering & Technology: A journal specializing in biomedical engineering technologies and related research.
- World Health Organization Reports: Reports that contribute to understanding health and technical issues that may impact engineering projects.

Electronic References and Websites:

- PubMed: A database offering research papers in medicine and biomedical engineering.
- IEEE Xplore: An academic library containing scientific articles and research related to biomedical engineering.
- Google Scholar: An academic search engine that students can use to find scientific papers and articles on biomedical engineering topics