



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

Academic Program and Course Description Guide

Semester System
(For the Fourth and Fifth Years)

2026-2025

Academic Program Description Form

University Name: University of Warith Al-Anbiyaa

Faculty/Institute: Faculty of Engineering

Scientific Department: The biomedical Engineering Department

Academic or Professional Program Name: The biomedical engineering

Final Certificate Name: Bachelor of science (B.Sc.) in Biomedical Engineering

Academic System: Semester

Description Preparation Date: 2025 / 10 / 1

File Completion Date: 2025 / 10 / 15

Signature:



Head of Department Name:

Dr. Osama Abdulbari, Assistant Professor

Date: 2025/ 10 / 25

Signature:



Scientific Associate Name:

Dr. Hassan Talib, Assistant Professor

Date: 2025/ 11 / 10

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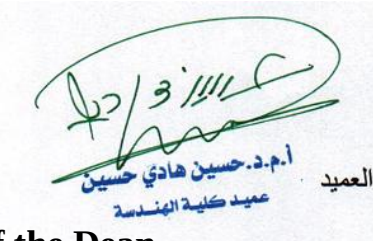


Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 2025/11/10

Signature:



أ.م.د. حسين هادي حسين
عميد كلية الهندسة

Approval of the Dean

Introduction:

The academic program of the Department of Biomedical Engineering constitutes an integrated educational system that combines theoretical and practical courses within a well-structured curriculum. The program aims to prepare graduates with scientific competencies and practical skills that meet the evolving demands of the labor market. It undergoes annual review and evaluation in accordance with quality assurance standards through both internal auditing and external evaluation mechanisms, including the External Examiner System.

This Academic Program Description provides a clear overview of the program learning outcomes and the competencies and skills it seeks to develop in students, based on its approved educational objectives. It serves as a fundamental document in the process of obtaining program accreditation. The document is prepared collaboratively by the academic staff under the supervision of the departmental scientific committees.

This guide presents an updated description of the academic program in the Department of Biomedical Engineering following the revision of the curriculum to align with recent developments in the Iraqi higher education system. It also covers the curricula of the traditional annual and semester-based study systems for the fourth and fifth academic years, while taking into account the instructions issued by the Department of Studies under Official Letter No. 2906/3, dated 5 March 2023, concerning programs based on the Bologna Process.

In this context, we emphasize that preparing an accurate and comprehensive description of academic programs and course specifications is a fundamental step toward ensuring the quality of the educational process and achieving its objectives with efficiency and effectiveness.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: It provides a brief overview of the course content, its characteristics, and the intended learning outcomes, in alignment with the academic program description and its requirements.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the department members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

1. Program Vision

To achieve leadership and excellence in biomedical engineering education, scientific research, innovation, and the development of medical devices and technologies in accordance with international standards.

2. Program Mission

To prepare biomedical engineers with scientific, practical, and ethical competencies who are capable of keeping pace with technological advancements, meeting the needs of the healthcare sector, and serving the community in accordance with quality standards.

3. Program Objectives

- Prepare graduates with scientific, engineering, professional, and ethical competencies who can keep pace with advancements in medical technologies and serve the healthcare sector.
- Equip students with the knowledge and skills to design, develop, operate, and maintain medical devices and systems, while applying engineering principles to provide innovative healthcare solutions.
- Develop students' ability to apply modern technologies, including artificial intelligence and neural networks, in medical data and image analysis, motion analysis, diagnosis support, rehabilitation, and biomedical engineering applications.
- Enable students to apply biomedical engineering in biomaterials, tissue engineering, prosthetics and artificial joints, and hospital design, while adhering to professional ethics, teamwork, and community service.

4. Program Accreditation

In progress.

5. Other external influences

The Biomedical Engineering Program is influenced by several external factors, including the rapid advancements in biomedical engineering and medical technologies, the needs of society and the labor market, as well as the regulations and instructions issued by the Ministry of Higher Education and Scientific Research, the Holy AL-Hussaini Shrine, and the University of Warith Al-Anbiyaa.

6. A. Program Structure

Program Structure	Number of Courses	Course Unit	Percentage	Reviews*
Institution Requirements	-	-	-	
College Requirements	-	-	-	
Department Requirements	29	76	100%	Core courses
Summer Training	1	Met / Not Met		It includes two hours of summer training for fourth-year students over a period of one month.
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Fourth – First Semester			
Practical	Theoretical	Course Name	Course Code
3	3	Biomechanics I	WBM-41-01
0	2	Biomaterials I	WBM-41-02
3	3	Communications I	WBM-41-03
2	3	Medical Instrumentation	WBM-41-04
2	2	Thermo-Fluid Mechanics I	WBM-41-05
2	3	Digital Electronics I	WBM-41-06
0	2	Pathology	WBM-41-07

Fourth – Second Semester			
Practical	Theoretical	Course Name	Course Code
3	2	Biomechanics II	WBM-42-01
0	2	Biomaterials II	WBM-42-02
3	2	Communications II	WBM-42-03
0	2	Analytical Mechanics	WBM-42-04
2	2	Therapeutic Instrumentation	WBM-42-05
3	2	Digital Electronics II	WBM-42-06
2	2	Thermo-Fluid Mechanics II	WBM-42-07

Fifth – First Semester			
Practical	Theoretical	Course Name	Course Code
4	0	Project	WBM-51-01
0	2	Elective I	WBM-51-02
2	3	Diagnostic Instrumentation	WBM-51-03
2	3	Control I	WBM-51-04
2	2	Image Processing	WBM-51-05
2	2	Microprocessor	WBM-51-06
0	2	Hospital System & Design	WBM-51-07

Fifth – Second Semester			
Practical	Theoretical	Course Name	Course Code
4	0	Project	WBM-52-01
0	2	Elective II	WBM-52-02
0	2	Elective III	WBM-52-03
3	2	Control II	WBM-52-04
0	2	Computer Network	WBM-52-05
0	2	Bio tribology	WBM-52-06
0	2	Neural Networks	WBM-52-07

Program Description (Semester system)				
Year	Course Code	Course Name	Theoretical (hr/w)	Practical (hr/w)
4 th	WBM-41-01	Biomechanics I	2	3
4 th	WBM-41-02	Biomaterials I	2	0
4 th	WBM-41-03	Communications I	2	3
4 th	WBM-41-04	Medical Instrumentation	2	2
4 th	WBM-41-05	Thermo-Fluid Mechanics I	2	2
4 th	WBM-41-06	Digital Electronics I	2	3
4 th	WBM-41-07	Pathology	2	0
4 th	WBM-42-01	Biomechanics II	2	3
4 th	WBM-42-02	Biomaterials II	2	0
4 th	WBM-42-03	Communications II	2	3
4 th	WBM-42-04	Analytical Mechanics	2	0
4 th	WBM-42-05	Therapeutic Instrumentation	2	2
4 th	WBM-42-06	Digital Electronics II	2	3
4 th	WBM-42-07	Thermo-Fluid Mechanics II	2	2
5 th	WBM-51-01	Project	0	4
5 th	WBM-51-02	Elective I	2	0
5 th	WBM-51-03	Diagnostic Instrumentation	2	2
5 th	WBM-51-04	Control I	2	2
5 th	WBM-51-05	Image Processing	2	2
5 th	WBM-51-06	Microprocessor	2	3
5 th	WBM-51-07	Hospital System & Design	2	0
5 th	WBM-52-01	Project	0	4
5 th	WBM-52-02	Elective II	2	0
5 th	WBM-52-03	Elective III	2	0
5 th	WBM-52-04	Control II	2	3
5 th	WBM-52-05	Computer Network	2	0
5 th	WBM-52-06	Bio tribology	2	0
5 th	WBM-52-07	Neural Networks	2	0
5 th	WBM-52-08	Biomedical Sensor	2	0

8. Expected learning outcomes of the program

Learning Outcomes 1 (Knowledge)	An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.
Learning Outcomes 2 (Knowledge)	An ability to apply engineering design process to produce solutions that meet specified needs with consideration of public health, safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline.
Learning Outcomes 3 (Skills)	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw a conclusion.
Learning Outcomes 4 (Skills)	An ability to communicate effectively with a range of audiences.
Learning Outcomes 5 (Ethical)	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments which must consider the impact of engineering solutions in global, economic, environment, and social context.
Learning Outcomes 6 (Skills)	An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge
Learning Outcomes 7 (Skills)	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

9. Teaching and Learning Strategies

Research and Development: The department promotes scientific research in biomedical engineering, with a focus on modern technologies, medical devices, medical imaging, tissue engineering, and biological modeling.

Collaboration with the Healthcare Sector and Industry: The department strengthens collaboration with healthcare institutions and medical device companies to provide practical training, support joint projects, and connect students with the professional environment.

Professional Development: The department supports students' professional development through participation in conferences, workshops, and scientific activities, while encouraging them to acquire professional skills and certifications.

Environmental and Health Responsibility: The department promotes sustainability in the design and development of medical technologies while fostering environmental awareness and the efficient use of resources.

Teaching is delivered through theoretical lectures supported by modern instructional tools, including data projectors and smart boards, as well as simulation software, laboratory training, seminars, discussion sessions, self-directed learning, and course-related mini projects to enhance theoretical understanding, develop practical skills, and achieve the intended learning outcomes.

10. Evaluation methods

- Midterm Examinations
- Final Examinations
- Practical Assessment
- Quizzes
- Assignments
- Technical Reports
- Projects
- Seminars and Presentations

11.Department

Department teaching stuff

Academic Rank	Specialization		Special Requirements/Skills applicable)		Staff/Lecturer	
	General	Special			Staff	Lecturer
Assistant Professor	Material Engineer	Biomaterial				
Assistant Professor	Electrical Engineering	Power				
Assistant Professor	Biomedical Engineering	Biomedical engineering				
Assistant Professor	Biomedical Engineering	Biomedical engineering				
Assistant Professor	Biomedical Engineering	Biomedical engineering				
Lecturer	Medical Instrumentation Techniques	Electronic med instrumentation technologies				
Lecturer	Biomedical Engineering	Biomaterials				
Lecturer	Biomedical Engineering	Biomedical Engineering				
Lecturer	Electrical Engineering	Communications electronics				
Lecturer	Communications electronics	Artificial intelligence				

Lecturer	Computer Engineering	Computer network and artificial intelligence				
Lecturer	Electrical Engineering	Communications				
Lecturer	Biomedical Engineering	Bioelectricity				
Lecturer	Biomedical engineering	Biomedical engineering				
Lecturer	Electromagnetic systems engineering	Microsystems nanotechnology				
Lecturer	Biomedical Engineering	Bioelectricity				
Lecturer	Biomedical Engineering	Biomedical engineering				

Professional Development

Mentoring new department members

- Comprehensive Orientation Program:**
 Organized upon the appointment of a new department member, this program introduces the institutional organizational structure, academic regulations, assessment policies, e-learning mechanisms, and available services for students and department members.
- Academic and Administrative Mentorship:**
 An experienced department member is assigned to mentor the new staff member during the first semester, assisting with course planning, syllabus preparation, and understanding quality assurance and academic accreditation processes.
- Specialized Training Workshops:**
 Courses are held on using e-learning systems (such as Moodle or Blackboard), writing learning outcomes, developing active learning strategies, and assessing student performance.

Integration into Teamwork:

New members are encouraged to participate in departmental and student activities to enhance their engagement with the work environment

Professional development of department members**➤ Annual Professional Development Plan:**

Prepared based on the college's needs and strategic directions, this plan includes identifying required skills, priority topics, and allocating necessary resources.

➤ Workshops and Training Courses:

Organized periodically to cover areas such as:

- Modern teaching methods and active learning.
- Assessment of learning outcomes and analysis of student performance.
- Use of digital technologies and electronic classroom management tools.
- Scientific publishing and academic research.
- Development of leadership and administrative skills for department members.

➤ Encouraging External Participation:

Department members are supported to attend national and international conferences, seminars, and workshops, as well as specialized training courses both inside and outside the institution.

➤ Evaluation and Follow-up:

All professional development activities are subject to regular evaluation through satisfaction surveys and feedback, and the results are used to improve future programs.

Professional Development Record:

An individual record is maintained for each department member, documenting the development activities they have participated in, as part of their academic file and annual performance evaluation.

11. Acceptance Criterion

- Admission requirements are determined in accordance with the regulations issued by the Ministry of Higher Education and Scientific Research (Central Admission System).
- Applicants must be medically fit for the selected specialization.
- Fulfillment of the admission requirements for the scientific branch.
- Admission is based on the student's preference and merit.
- Secondary school graduation average.
- The admission capacity of the scientific department.

12. The most important sources of information about the program

- The website of the university of Warith Al-Anbiyaa- Collage of Engineering: (<https://uowa.edu.iq/english/eng>) (https://uowa.edu.iq/arabic/eng/medical-eng/?page_slag=scientific)
- References adopted by international universities.
- College of Engineering Guide.
- Labor market needs.
- Studies and surveys.
- Specialized seminars and workshops conducted in collaboration with stakeholders.

13. Program Development Plan

The biomedical engineering program at the university of Warith Al-Anbiyaa has a development plan that could enrich the educational environment. The plan is represented by the following highlights:

- Updating curricula and academic content.
- Promoting scientific research and innovation.
- Developing the scientific and teaching capabilities of department members.
- Establishing an expert council consisting of experienced professionals from public and private sector companies.
- Relying on student and graduate surveys.
- Improving infrastructure and laboratories.
- Expanding partnerships with the public and private sectors.

Program Skills Outline										
Courses				Required program Learning outcomes						
Year	Course Code	Course Name	Basic or optional	1	2	3	4	5	6	7
4 th	WBM-41-01	Biomechanics I	C	x	x					x
4 th	WBM-41-02	Biomaterials I	C		x	x			x	
4 th	WBM-41-03	Communications I	C	x	x				x	
4 th	WBM-41-04	Medical Instrumentation	C	x	x				x	
4 th	WBM-41-05	Thermo-Fluid Mechanics	C	x		x				
4 th	WBM-41-06	Digital Electronics I	C	x	x	x				
4 th	WBM-41-07	Pathology	C			x			x	
4 th	WBM-42-01	Biomechanics II	C	x	x					x
4 th	WBM-42-02	Biomaterials II	C		x	x			x	
4 th	WBM-42-03	Communications II	C	x	x				x	
4 th	WBM-42-04	Analytical Mechanics	C	x	x					
4 th	WBM-42-05	Therapeutic Instrumentation	C	x	x					
4 th	WBM-42-06	Digital Electronics II	C	x	x	x				
4 th	WBM-42-07	Thermo-Fluid Mechanics	C			x			x	
5 th	WBM-51-01	Project	C			x		x	x	x
5 th	WBM-51-02	Elective I	E							
5 th	WBM-51-03	Diagnostic Instrumentation	C	x	x	x				
5 th	WBM-51-04	Control I	C	x	x	x				
5 th	WBM-51-05	Image Processing	C	x		x				
5 th	WBM-51-06	Microprocessor	C	x	x	x				
5 th	WBM-51-07	Hospital System & Design	C	x	x					
5 th	WBM-52-01	Project	C			x	x	x	x	x
5 th	WBM-52-02	Elective II	E							
5 th	WBM-52-03	Elective III	E							
5 th	WBM-52-04	Control II	C	x	x	x				

5 th	WBM-52-05	Computer Network	C	x		x				
5 th	WBM-52-06	Bio tribology	C		x		x			
5 th	WBM-52-07	Neural Networks	C	x					x	
5 th	WBM-52-08	Biomedical Sensor	C	x	x	x				

B	Basic Learning Activity
C	Core Learning Activity
S	Supporting or Related Learning Activity
E	Elective Learning Activity