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

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

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: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

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 faculty 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.

Academic Program Description Form

University Name: University of Basrah

Faculty/Institute: College of engineering

Scientific Department: Materials engineering department

Academic or Professional Program Name: Bachelor of Science in Materials Engineering

Final Certificate Name: B.Sc. in Materials Engineering

Academic System: Semester System (Credit Hours)

Description Preparation Date: September 2025

File Completion Date: September 2025

Signature:	**Signature:**
Head of Department Name:	**Scientific Associate Name:**
Assist.Prof.Dr.Haider mahdi laath	**Prof. Dr. Muneer A. Ismael**
Date:	**Date:**

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

1. Program Vision

The vision of the Department of Materials Engineering lies in being one of the departments concerned with developing the engineering reality in Iraq by creating renewable and distinguished programs that are recognized locally and globally. Also, the department's vision is to provide a high-quality engineering and educational environment and scientific research that enriches this specialization engineer that contributes to building and serving the country.

2. Program Mission

Preparing qualified engineering equipped with modern knowledge and technology in various engineering fields. Associated with academic education and a research environment under international standards and effective community partnership. The institutional values espoused by the College of Engineering:

1. Professional
2. Responsibility
3. Justice
4. honesty
5. Transparency
6. Creativity
7. Teamwork

3.Program Objectives

The department aims to prepare an engineer to work and participate in the following fields:

1- Preparing an engineer who can deal with metallic and non-metallic materials successfully, and has knowledge of the sciences and techniques of their manufacture and uses.

2- Leading the production processes at the initial and final operations in factories, especially:

- Factories for extracting aluminum, sulfur, and phosphate.
- Steel manufacturing plants.
- Steel Pipe industry and plastic pipe manufacturing plants.
- Oil industries, including production and refining.
- Cement industry.
- Manufacture of glass, ceramics, plastics, and polymers.
- General periodic maintenance and engineering inspection.

3- Standardization and quality control of the product of various industrial processes that include water, various liquids, and solids, and calibrating them according to

scientific standardization systems through conducting destructive and non-destructive tests for different materials in laboratories or at work sites.
4- Supervising on casting works for metallic and non-metallic materials and metal cutting operations.
5- Supervising the implementation of heat treatment programs for different metals.
6- Designing of cathodic protection systems.
7- Study the problems of mechanical and chemical corrosion of different equipment.
8- Studying cases of mechanical failure of various industrial equipment, such as: -
• Heat exchangers and pumps.
• Boilers and turbines.
• RO reverse osmosis units.
• Ion exchange units (salt removers).
9- Providing engineering advice in the design and selection of appropriate metallic and non-metallic materials for engineering applications.

4.Program Accreditation

The Department of Materials has not yet obtained program accreditation.

5. Other external influences

Global Technological Development:
The need to update curricula to keep pace with advances in advanced fields, technological diversity, and smart technologies.
Labor Market Needs:
Demand for engineering materials is growing in the oil, gas, metals, energy, aviation, and medical industries**.**
Economic Contribution:
Integrating infrastructure for investment opportunities and national and regional industrial projects.
Research and Scientific Directions:
The Department's role in promoting applied scientific research, including new advances, with national priorities.
Academic-like and Global Quality:
It must adhere to academic accreditation standards in addition to quality in engineering education.
Social Factors:
Working with sustainability, environmental protection, and addressing issues related to the impact of industrial alcohol and wine.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
6	5	11	6%	
College Requirements	7	42	7%	
Department Requirements	27	187	77.5%	
Summer Training	Summer Training The Materials Engineering curriculum requires students to complete one month of summer training at private industries or governmental firms. This training is a compulsory component of graduation requirements. It is supervised by the Summer Training Committee of the department.			
Other	MAE Curriculum / Units Requirements 4 - Years Program (Full - Time Study) 148 Units for the Materials Engineering included: Mathematics and basic Science: 22 Units. Engineering Topics: 120 Units. General Education: 6 Units.			

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
3rd Year	MAE312	Behavior of Engineering Materials	3	
3rd Year	MAE313	Heat Treatments of Ferrous metals	2	
3rd Year	MAE314	Engineering Materials Technology	2	
3rd Year	MAE315	Ceramic Materials	2	
3rd Year	MAE316	Corrosion (I)	2	
3rd Year	MAE317	Conduction Heat Transfer	2	
3rd Year	MAE318	Laboratories (I)		3
3rd Year	E311	Engineering Analysis	2	2

3rd Year	E321	Numerical Analysis	2	1
3rd Year	MAE322	Failure of Engineering Materials	3	
3rd Year	MAE323	Heat Treatments of non-ferrous metals	2	
3rd Year	MAE324	Welding and Cutting	2	
3rd Year	MAE325	Polymers Engineering	2	
3rd Year	MAE326	Corrosion (II)	2	
3rd Year	MAE327	Convection Heat Transfer	2	
3rd Year	MAE328	Laboratories (II)	2	
4th year	E407	Engineering Project	1	2
4th Year	MAE411	Mechanical Design	2	
4th Year	MAE412	Non-Destructive Testing	2	
4th Year	MAE413	Composite Materials	2	
4th Year	MAE414	Powder Metallurgy	2	
4th Year	MAE415	CAD & CAM	2	
4th Year	MAE416	Industrial Engineering	2	1
4th Year	MAE418	Laboratories (I)		3
4th Year	MAE421	Selection of Engineering Materials for Design	2	1
4th Year	MAE422	X-Ray Diffraction and Microscopy	2	
4th Year	MAE423	Advance Materials	2	
4th Year	MAE424	Stress Analysis and Plasticity	2	
4th Year	MAE425	Nano Materials	2	
4th Year	MAE426	Project Management	2	2
4th Year	MAE428	Laboratories (II)		3

8. Expected learning outcomes of the program

Knowledge	
A- Knowledge and Understanding A1. An ability to apply knowledge of mathematics, science, and engineering A2. An ability to design and conduct experiments, as well as to analyze	By the end of the program, the student will be able to: 1. Apply fundamental knowledge of mathematics, science, and engineering in solving engineering problems.

and interpret data. A3. An ability to identify, formulate, and solve engineering problems. A4. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	2. Design and conduct experiments, and effectively analyze and interpret data to draw meaningful conclusions. 3. Identify, formulate, and solve a wide range of engineering problems using systematic approaches. 4. Utilize modern engineering tools, techniques, and skills essential for professional engineering practice.
Skills	
B. Subject-specific skills B1. The ability to select engineering materials for scientific and industrial applications. B2. The ability to think about solving problems related to the use of engineering materials and methods of avoiding them. B3. Writing scientific reports, reading blueprints and analyzing engineering materials. B4. The ability to keep pace with developments in engineering materials and their properties.	By the end of the program, the student will be able to: 1. Select appropriate engineering materials for various scientific and industrial applications. 2. Analyze and solve problems related to the use of engineering materials and propose effective methods to avoid them. 3. Prepare scientific reports, accurately interpret blueprints, and analyze the properties of engineering materials. 4. Keep up with advancements in engineering materials and their properties, and apply this knowledge in practical contexts.
Ethics	
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, environmental, and societal contexts.	By the end of the program, the student will be able to: • Recognize ethical and professional responsibilities in engineering practice, and make well-informed judgments that consider the global, economic, environmental, and societal impacts of engineering solutions.

9. Teaching and Learning Strategies

1- Explanation and clarification through lectures. 2- Display scientific materials with projectors: data show, smart boards, plasma screens. 3- Self-learning through homework and mini-projects within the lectures. 4- Laboratories. 5- Graduation projects. 6- Scientific visits. 7- Seminars held in the department. 8- Summer training

11. Faculty Faculty Members Academic Rank	Specialization	Special Requirements/Skills (if applicable)	Number of the teaching staff

	General	Special			Staff	Lecturer
Professor	4				4	
Assist. Prof.	6				6	2
Lecture	9				9	5
Assist. Lecturer	2				2	

10. Evaluation methods

1- Short exams (Quiz). 2- Homework. 3- Semester and final exams for theoretical and practical subjects. 4- Small projects within the lesson. 5- Interaction within the lecture. 6- Reports.

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

Professional Development

Mentoring new faculty members

1.Orientation Phase (First Week)
o Introduction to the Department and Program:
Introduce the department structure and objectives of the Materials Engineering program.
Introduce the students to ABET standards and their importance to the program.
Present the program plan and learning outcomes.
o Available Resources:
 Introduce the students to the laboratories, equipment, and available software (such as MATLAB, scanning devices).
Provide a guide to using the library and electronic resources.
o Administrative Procedures:
How to obtain system privileges (email, system login).
Introduce the students to the university and department systems.

2. Academic Training Phase (Two Weeks)
o Teaching Methods:
A workshop on the teaching strategies applied in the department (lectures, active learning, projects).
Training on the use of e-learning tools (Moodle, Google Classroom).
o Assessment and Measurement:
How to design tests and assessments aligned with learning outcomes.
Use various assessment tools (exams, projects, reports, participation).
o Student Support:
Mechanisms for dealing with students with special needs.
How to provide academic advising.
3.Practical Application Phase (During the First Semester)
o Laboratory Training:
Familiarizing them with laboratory equipment and how to conduct experiments (e.g., tensile tests, hardness, electron microscopy).
Laboratory Safety.
o Participation in Scientific Research:
Familiarizing them with the department's research areas (e.g., corrosion, nanomaterials, heat treatments).
Encouraging them to participate in research projects or publish papers.
o Field Visits:
Arranging visits to industrial companies (e.g., oil refineries, ceramic factories) to connect teaching with practical realities.
4. Continuous Follow-up and Support Phase
o Academic Advisor:
Assigning a senior faculty member as a "mentor" to each new faculty member for one academic semester.

Professional development of faculty members

Objectives:
• Enhancing the quality of teaching and scientific research.
• Keeping pace with developments in the field of materials engineering.
• Meeting academic accreditation requirements (such as ABET).
• Linking skills to labor market needs.

Main Strategic Plan for Departmental Development
1. Teaching Development
Training Workshops:
Active learning strategies (Project-Based Learning, Case Studies)
Use of modern educational technologies (Virtual Reality, Simulations)
Designing assessments aligned with learning outcomes
Training on E-Learning Platforms:
Moodle, Google Classroom, and remote interaction tools
Peer Observation:
Classroom visits among faculty members to provide constructive feedback
2. Research Development
Research Paper Writing Workshops:
How to publish in indexed journals (Scopus, Web of Science)
Applying for Research Grants:
Writing competitive research proposals
Establishing Research Groups:
Encouraging collaboration among members in fields such as:
Nanomaterials
Corrosion resistance
Alloy development
3. Industry and Community Engagement
Field Visits to Factories:
Oil refineries, production labs, petrochemical companies
Hosting Industry Experts:
Joint lectures on industrial challenges and solutions
Applied Projects with the Private Sector:
Designing graduation projects addressing real industrial problems
4. Participation in Conferences and Workshops
Financial Support for Attending International Conferences:
Partial or full funding for participation
Organizing an Annual Departmental Conference:
Showcasing achievements of faculty and students
5. Language and Professional Development
Academic English Courses:
Improving writing and publication skills
Specialized Professional Certifications:
Fields such as:
NACE Certified Corrosion Technician
6. Evaluation and Follow-Up
Annual Performance Evaluation:
Based on clear criteria: teaching, research, community engagement
Student Feedback:
Periodic surveys to measure student satisfaction
Individual Development Plan (IDP):
Tailored for each member according to their needs and goals

12. Acceptance Criterion

- The standard indicates that admission to the program is highly competitive, requiring a high GPA (90 or above).
- The number of students is very limited (only 50 students per year), reflecting the program's focus on quality over quantity.
- Reliance on ABET standards demonstrates the program's commitment to achieving global quality benchmarks.

13. The most important sources of information about the program

1. Websites of Iraqi and foreign universities
    - To review curricula and program requirements of similar programs and make comparisons.
2. Workshops organized by the Ministry of Higher Education and Scientific Research
    - To follow the latest academic guidelines and standards issued by the Ministry.
3. Standards of the Ministry of Higher Education and Scientific Research
    - To comply with local regulations and standards for engineering education.
4. ABET (Accreditation Board for Engineering and Technology) program
    - As a primary reference to ensure program quality and adherence to international standards.

14. Program Development Plan

1. Curriculum and Course Development
Review current courses annually to align with ABET standards and labor market requirements.
Introduce new courses in advanced fields such as: Nanomaterials,Advanced Manufacturing Technologies (Additive Manufacturing),Polymers & Composites
Enhance practical skills by increasing laboratory and hands-on training hours.
2. Infrastructure and Laboratory Development
Upgrade laboratory equipment and provide advanced testing and analysis devices (e.g., SEM, XRD, Mechanical Testers).
Provide specialized simulation software (e.g., ANSYS, MATLAB for materials modeling).
Create interactive learning spaces equipped with smart boards and modern projectors.
3. Practical Training and Industry Linkage
Strengthen the summer training program through partnerships with factories and companies (e.g., oil, petrochemical, and metal production companies).
Organize regular field visits to industrial facilities to apply theoretical knowledge.
Host engineers and industry experts for lectures and workshops.
4. Faculty Development
Encourage faculty members to participate in international conferences and workshops.
Utilize academic exchange programs with foreign universities to enhance staff competencies.
Develop teaching skills using modern technologies and e-learning methods.
5. Quality Assurance and Accreditation
Continuously follow international accreditation requirements (ABET) and implement its recommendations.
Conduct periodic surveys for students and graduates to evaluate the program and identify areas for improvement.
Maintain ongoing documentation of program activities and quality reports.
6. Supporting Scientific Research
Encourage undergraduate students to participate in scientific research projects.
Provide small grants to fund outstanding graduation projects.
Establish an academic journal for the Department of Materials Engineering to publish research.
7. E-Learning and Blended Learning
Develop electronic course content (videos, recorded lectures, interactive exercises).
Use learning platforms such as Moodle or Google Classroom to manage courses.
Implement blended learning to enhance the learning experience.
8. Alumni Follow-Up
Create a database of graduates to monitor their performance in the labor market.
Organize employment forums in collaboration with industrial companies.
Survey alumni opinions on the program's relevance to job market requirements.

Required program Learning outcomes															
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
3rd year	MAE312	Behavior of Engineering Materials	Foundation.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
3rd year	MAE313	Heat Treatments of Ferrous metals	Foundation.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
3rd year	MAE314	Engineering Materials Technology	Foundation.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
3rd year	MAE315	Ceramic Materials	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3rd year	MAE316	Corrosion (I)	Foundation.	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
3rd year	MAE317	Conduction Heat Transfer	Foundation.	✓	✓		✓	✓	✓	✓		✓			✓
3rd year	MAE318	Laboratories (I)	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3rd year	E311	Engineering Analysis	Foundation.	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
3rd year	E321	Numerical Analysis	Foundation.	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
3rd year	MAE322	Failure of Engineering Materials	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3rd year	MAE323	Heat Treatments of non-ferrous metals	Foundation.	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
3rd year	MAE324	Welding and Cutting	Foundation.	✓	✓		✓	✓	✓	✓		✓	✓	✓	
3rd year	MAE325	Polymers Engineering	Foundation.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	

3rd year	MAE326	Corrosion (II)	Foundation.	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
3rd year	MAE327	Convection Heat Transfer	Foundation.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
3rd year	MAE328	Laboratories (II)	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	E407	Engineering Project	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE411	Mechanical Design	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE412	Non-Destructive Testing	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE413	Composite Materials	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE414	Powder Metallurgy	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE415	CAD & CAM	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE416	Industrial Engineering	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE418	Laboratories (I)	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE421	Selection of Engineering Materials for Design	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE422	X-Ray Diffraction and Microscopy	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE423	Advance Materials	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4th year	MAE424	Stress Analysis and Plasticity	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

4th year	MAE425	Nano Materials	Foundation.	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		
4th year	MAE426	Project Management	Election	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4th year	MAE428	Laboratories (II)	Foundation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**