

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



# **Guide Academic Program and Course Description**

**2025**

## **Introduction:**

Based on the need to align educational outcomes with labor market requirements, this educational program was developed to effectively hone students' skills, while ensuring its quality through annual audits.

The academic description is the cornerstone of this program, defining its objectives, content, and acquired skills. It is an essential document for program accreditation. Faculty members prepare this description under the supervision of departmental academic committees.

This edition of the guide keeps pace with the latest developments in the Iraqi education sector, providing a detailed description of traditional programs and adopting new standards for describing academic programs, as stated in the Department of Studies circular dated May 3, 2023. We emphasize that accuracy in describing programs and courses is key to improving the quality of education.

## **Concepts and terms:**

**Academic program description:** It is a comprehensive summary that accurately describes the program, its components, basic methods, and the objectives it seeks to achieve. This description also includes a detailed breakdown of the expected learning outcomes and how they will be achieved through specific educational strategies.

**Course Description:** It is a statement that outlines the key characteristics and outcomes a student should achieve upon successful completion of the course. This description aims to demonstrate the extent to which the student will benefit from the available learning opportunities and is directly linked to the academic program's vision, taking into account the program's future aspirations, focus, practical reality, and the applicability of what they have learned.

**Program message:** It clarifies the main objectives the program seeks to achieve, and the activities and procedures required to achieve these objectives. The mission also outlines the paths through which the program will be developed and its future directions.

**Program objectives:** These are specific statements that describe the results the program aims to achieve. These objectives must be measurable and observable, allowing for evaluation of the program's effectiveness.

**Curriculum structure:** It is the comprehensive organization of the courses included in the academic program according to the approved education system (whether semester, annual, or track-specific). This includes specifying the number of academic units (credit hours) for each course.

**Learning outcomes:** These are the knowledge, skills, and competencies a student acquires after successfully completing an academic program. Learning outcomes for each course must be defined to align with the overall program objectives.

**Teaching and learning strategies:** These are the methods and techniques used to develop student learning. These strategies encompass all classroom activities (inside the classroom) and extracurricular activities (outside the classroom) that aim to achieve specific educational objectives.

## Academic Program Description Form

**University name:** Samarra University

**College/Institute:** College of Engineering

**Scientific Department:** Department of Electromechanical Engineering

**Name of academic or professional program:** Bachelor of Science in Electromechanical Engineering

**Final certificate name:** Bachelor of Electromechanical Engineering

**Academic system:** Bologna (1st and 2nd), Semester (3rd and 4th)

**Description preparation date:** 11/10/2024

**Date of filling out the file:** 11/10/2024

**signature:**

**Head of Department name:**

Lect. Oras Fadel Khalaf

**date:** 31/7/2025

**signature:**

**Scientific Associate name:**

Asst. Prof. Ahmed Mohamed Ahmed

**Date:** 31/7/2025

**The file is checked by:** *Muhammed Kh. Muhammed*  
**Division of Quality Assurance and University Performance**

**Director of the Quality Assurance and University Performance Division:**

**Date:** 31/7/2025

**Signature:**

*AS Mahmood*  
**Approval of the Dean**  
Asst. Prof. Amjed Saleh Mahmood

## 1. Program vision

The vision of the Department of Electromechanical Engineering's academic program is ambitious, aiming to provide high-quality education in line with the latest technological developments in the fields of electrical and mechanical engineering. The department seeks to prepare highly competent engineers capable of effectively contributing to the advancement of local and global industries by providing students with advanced technical knowledge and the practical skills .necessary to solve complex engineering problems

In the future, the department aspires to be a leading reference in engineering education, utilizing the latest tools and software while promoting the integration of various sciences in the fields of mechanical and electrical engineering. It also aims to enhance students' research and development skills and encourage them to innovate and work collaboratively in multidisciplinary environments.

## 2. Program message

The mission of the Department of Electromechanical Engineering's academic program is to provide students with advanced knowledge and skills in electrical and mechanical engineering, by providing a distinguished educational environment that contributes to preparing engineers qualified to innovate and solve complex engineering problems. The program aims to achieve an ideal balance between theory and practical application, helping students address modern engineering challenges and contribute to the development of industry and society.

## 3. Program objectives

**Integrated Education:** Providing advanced and updated educational curricula in the fields of electromechanical engineering, encompassing basic and advanced

knowledge in electrical and mechanical engineering, with a focus on practical applications and innovation

**Developing Practical Skills:** Providing students with practical training opportunities through advanced laboratories and engineering projects that simulate industrial reality, enabling them to apply theoretical concepts in real-world work environments

**Enhancing Critical and Creative Thinking:** Developing students' critical and analytical thinking skills, enhancing their skills in solving engineering problems in innovative ways, and developing their ability to work collaboratively and communicate effectively

**Supporting Research and Development:** Encouraging students and faculty to conduct scientific and applied research that contributes to technological advancement and provides sustainable solutions to engineering and industrial challenges

**Collaborating with Industry:** Establishing partnerships with companies and factories to provide practical training opportunities for students, and achieving integration between what students learn at the university and the needs of the market and industry.

#### 4. Target audience

**Students:** Those seeking to acquire the engineering skills and knowledge necessary to meet the growing challenges of the labor market and who aspire to develop their technical and creative skills

**Companies and factories:** Those in need of highly qualified engineers capable of contributing to the improvement of engineering and industrial processes and the

development of modern technologies in the fields of electrical and mechanical .engineering

**Community:** By providing innovative and sustainable engineering solutions that benefit society and improve the quality of life through sustainable and advanced .technology

**Scientific Research:** The academic community by promoting and developing research programs that contribute to the advancement of knowledge in the fields of electromechanical engineering, both at the level of engineering applications and scientific theories.

#### 5.Program accreditation

The program is in the process of submitting the Readiness Review Form along with the accompanying report to the Iraqi Council for Accreditation of Engineering Education (ICAEE)

#### 6.Other external influences

Deanship of the College of Engineering

#### 7.Program structure

Program structure	Number of courses	Study unit	percentage	comments

Institutional requirements	6	12	10%	There are two study systems in the department (Bologna and semester)
College requirements	8	16	13%	
Department requirements	34	92	74%	
Summer training	1	Not counted	2%	
Other (Graduation project)	1	4	1%	

Program description						
Year/Level	Course code	Course name	Credit hours			Units
			theoretical	applied	practical	
First Level / First semester	EME111	Thermodynamics	7		2	9
	EME112	Mathematics	8			9
	EME113	Computer Science	2		2	4
	EME 114	Engineering Physics	5			5
	EME115	Mechanical workshop	1		2	3
Total hours and units			23		6	30
First Level / Second semester	EME121	Fundamentals of Electrical Engineering	6		2	9
	EME122	Engineering Mechanics	5		2	8
	EME123	Engineering Drawing and Auto CAD	3		3	6
	EME124	Electric workshop	1		3	4
	EME125	English Language I	3			3
Total hours and units			18		10	30
Second Level / First semester	EME 211	Electronics	5		2	8
	EME212	Fluid Mechanics	5		2	8
	EME213	Strength of Materials	3		2	5
	EME214	C++ Language	1		2	4

	EME215	English Language II	3			3
	EME216	Crimes of Al Ba'ath Regime in Iraq	2			2
Total hours and units			19		8	30
Second Level / Second semester	EME221	Electric circuits	5		2	8
	EME222	Theory of Machines	3		2	7
	EME223	Engineering Mathematics	6			6
	EME224	Programming (MATLAB)	1		2	4
	EME225	Arabic Language	2			3
	EME226	Human Rights and Democracy	2			2
Total hours and units			19		6	30
Third year / First semester	EME 311	Heat Transfer I	3		1	2.5
	EME 312	Electrical Machines (DC)	3		1	2.5
	EME 313	Vibration	3		1	2.5
	EME 314	Combustion	3		1	2.5
	EME 315	Fluid Machinery	3			2
	EME 316	Communications I	3		2	3
	EME 317	Engineering Analysis	3			2
	EME 318	Power Systems	3			2
Total hours and units			24		6	19
Third year / Second semester	EME 321	Heat Transfer II	3		1	2.5
	EME 322	Electrical Machines (AC)	3		1	2.5
	EME 323	Air conditioning	3			2
	EME 324	Measurements and Devices	2			2
	C 325	English Language III	2			2
	EME 326	Communications II	3		2	3

	EME 327	Numerical Analysis	3			2
	EME 328	Protection Systems	3			2
Total hours and units			22		4	18
Fourth year / First semester	EME 411	Power plants	3			2
	EME 412	Design of Machine Elements	3			2
	EME 413	Control I	3		2	3
	EME 414	Properties of engineering materials	3			2
	EME 415	High Voltage Engineering	3			2
	EME 416	Power Electronics	3			2
	EME 417	Communication Network	3			2
	C 408	Engineering Project	3			2
Total hours and units			24		2	17
Fourth year / second semester	EME 421	EM Systems	2		2	3
	C 422	English Language VI	2			2
	EME 423	Control II	3		2	3
	EME 424	Manufacturing process	2			2
	EME 425	Renewable Energy	3		2	3
	EME 426	Power plants Operation and Maintenance	3			2
	EME 427	Industrial Engineering	3			2
	C 408	Engineering Project	3		4	4
Total hours and units			21		10	21

## 8. Expected learning outcomes of the program

knowledge

Understand the fundamental principles of mechanical and electrical engineering, including dynamics, thermomechanics, materials science, and electrical systems. Familiarity with the fundamentals of advanced mathematics and physics that underpin specialized engineering solutions. Familiarity with modern technologies in areas such as control systems, robotics, renewable energy, and smart systems. Familiarity with sustainability concepts in electromechanical engineering and how to design environmentally friendly systems.

### Skills

Ability to use engineering analysis methods to solve complex problems in the fields of mechanical and electrical engineering and skill in using modern engineering tools (such as engineering software and simulation) to design and analyze electromechanical systems. Ability to evaluate the performance of electromechanical systems and identify solutions to improve efficiency and performance. Ability to work efficiently within multidisciplinary teams, with the ability to lead engineering projects and coordinate efforts to achieve common goals. Engineering project management skills, including scheduling, budgeting, and resource management.

### values

A strong commitment to professional ethics in engineering work, including respect for engineering standards and recognition of the social responsibility of engineering projects. A commitment to applying sustainability principles in the design of engineering systems, while respecting the environment.

## 9. Teaching and learning strategies

General strategies and methods adopted to implement the program in general:

- 1 - Giving theoretical lectures using PowerPoint.
- 2 - Conduct laboratory experiments to apply concepts practically.
- 3 - Use of computer labs for training on programs and applications.
- 4 - Display video lectures to support educational content.
- 5 - Assign students group assignments to promote collaborative work.

## 10. Evaluation methods

- 1 - Midterm and final exams
- 2 - Daily short exams
- 3 - Reports and assignments

## 11. Faculty

### Faculty members

Academic rank	Specialization		Special requirements/skills (if applicable)	Number of the Faculty Staff	
	general	Special		staff	lecturer
professor	Electrical Engineering	Communication Engineering		1	
	Mechanical Eng.	thermal		1	
	Mechanical Eng.	applied		1	
Prof. Assistanc e	Mechanical Eng.	applied		1	
	Chemical Eng.	Chemical		1	
Lecturer	Electrical Engineering	Network and Communication Engineering		1	
	Electrical Engineering	Communication Engineering		2	
	Mechanical Eng.	Power		1	
	Mechanical Eng.	applied		2	
	Mechanical Eng.	Solar Energy		1	
	Civil Engineering	Construction		1	
	Computer Information Systems	Computer Information Systems		1	
Lect. Assistanc e	Electrical Engineering	Electrical Engineering		1	

e	Electrical Engineering	Electronics and Communications Engineering		1	1
	Chemical Eng.	Chemical Eng.		3	

### Professional development

#### Orientation of new faculty members

- Introduce them to the teaching methodology in Electromechanical Engineering and student interaction skills.
- Provide them with approved course curricula and lecture plans.
- Train them on the effective use of laboratories and workshops.
- Engage them in discussion forums on the latest educational tools.
- Familiarize them with the quality and evaluation systems adopted in the department.

#### Professional development for faculty members

- Participate in advanced workshops on Artificial Intelligence and its applications.
- Update knowledge in the fields of automatic control, renewable energy, and engineering design.
- Attend scientific conferences and seminars in the field of Electromechanical Engineering, both locally and internationally.
- Develop scientific publishing skills in reputable engineering journals.
- Collaborate with research centers to develop graduation projects and student innovations.

## 12. Acceptance criteria

### I. Determine the capacity:

- The department first determines its “capacity” (the number of students that can be accommodated) based on its admissions plan and available staff (faculty and resources).
- This energy is then sent to the college deanship.
- From the deanship, you move to the university.
- Finally, it is sent to the Ministry of Higher Education and Scientific Research for official approval.

#### II. Central Student Admission:

- The Ministry of Higher Education and Scientific Research issues central admission decisions for students.
- Students are accepted based on their GPA and preferred choices.

#### II. College registration and student distribution:

- Once accepted, a student registers at the college. This is done through the Registration Division of the Deanship of the College of Engineering.
- Students must submit all required official documents during registration.
- Students are then distributed among the college's various departments. This distribution is based on:
  - Department capacity.
  - Student's desire.
- There is a provision that allows students to transfer from other departments to this specific department (here meaning the Department of Environmental Engineering, as will be mentioned later).

#### V. Registration in the Environmental Engineering Department:

- After the student's acceptance into the Environmental Engineering Department (specifically mentioned) is confirmed, he/she begins registration and begins attendance in this department.

### 13. The most important sources of information about the program

University Guide

WebsiteFor the department:

<https://uosamarra.edu.iq/colleges-departments/Department-of-Electromechanical-Engineering/>

University website:

<https://uosamarra.edu.iq>

### 14. Program Development Plan

To Enhancing the quality of educationVanThe department has adopted the Bologna Process with the aim of achieving three main objectives:

- \* Enhancing the quality of education: improving the level and quality of the educational process.
- \* Raising graduate outcomes: improving the level of educational outcomes and the outcomes of graduating students.
- \* Meeting the required competencies: ensuring that graduates possess the skills and knowledge (competencies) required by the labor market or subsequent academic fields.

The Bologna system includes the European Credit Transfer and Accumulation System (ECTS).

## 15. Program Skills Map

Required learning outcomes of the program															
year/Level	Course code	Course name	Essential or optional?	knowledge				Skills				values			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First Level / First semester	EME111	Thermodynamics		*											
	EME112	Mathematics		*											
	EME113	Computer Science		*											
	EME 114	Engineering Physics		*											
	EME115	Mechanical workshop		*				*							
First Level / Second semester	EME121	Fundamentals of Electrical Engineering				*				*					
	EME122	Engineering Mechanics		*						*					
	EME123	Engineering Drawing and Auto CAD			*			*							
	EME124	Electric workshop				*		*							
	EME125	English Language I					*								
Second Level / First semester	EME 211	Electronics				*				*					
	EME212	Fluid Mechanics		*											
	EME213	Strength of Materials		*											
	EME214	C++ Language			*						*				
	EME215	English Language II					*								
	EME216	Crimes of Al Ba'ath Regime in Iraq					*								

Second Level / Second semester	EME221	Electric circuits			*				*						
	EME222	Theory of Machines		*						*					
	EME223	Engineering Mathematics		*											
	EME224	Programming (MATLAB)			*					*					
	EME225	Arabic Language				*									
	EME226	Human Rights and Democracy				*							*		
Third year / First semester	EME 311	Heat Transfer I			*										
	EME 312	Electrical Machines (DC)					*			*					
	EME 313	Vibration		*											
	EME 314	Combustion			*					*					
	EME 315	Fluid Machinery		*											
	EME 316	Communications I			*										
	EME 317	Engineering Analysis		*											
	EME 318	Power Systems				*				*					
Third year / Second semester	EME 321	Heat Transfer II		*											
	EME 322	Electrical Machines (AC)					*			*					
	EME 323	Air conditioning			*										
	EME 324	Measurements and Devices		*											
	C 325	English Language III					*								
	EME 326	Communications II				*									
	EME 327	Numerical Analysis		*											
	EME 328	Protection Systems					*								

Fourth year / First semester	EME 411	Power plants			*						*				
	EME 412	Design of Machine Elements		*				*							
	EME 413	Control I					*								
	EME 414	Properties of engineering materials				*									
	EME 415	High Voltage Engineering					*								
	EME 416	Power Electronics			*										
	EME 417	Network Communication					*				*				
	C 408	Engineering Project													
Fourth year / second semester	EME 421	EM Systems (REVIT MEP)		*											
	C 422	English Language VI					*								
	EME 423	Control II					*								
	EME 424	Manufacturing process										*			
	EME 425	Renewable Energy			*										
	EME 426	Power plants Operation and Maintenance					*								
	EME 427	Industrial Engineering										*			
	C 408	Engineering Project					*	*				*			