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

2025

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.

University Name: University of Mosul

Faculty/Institute: College of Science

Scientific Department: Department of Physics

Academic or Professional Program Name: Bachelor of Science in Physics

Final Certificate Name: Bachelor of Physics

Academic System: Semester

Description Preparation Date: 15 /5 / 2025

File Completion Date: 15 /5 / 2025

Signature:

Head of Department Name: Assit Prof. Dr. Samir Mahmmod Ahmed

Date:

Signature:

Scientific Associate Name: Date: Prof. Dr. Mazin Ahmed Abed

Date:

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Department of Quality Assurance and University Performance

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Date:

Signature:

Hiyam Adil Al.Tai:

Approval of the Dean

Academic program description

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

1. Program vision

We seek for the Physics Department to be a pioneer in education and scientific research, contributing to achieving sustainable development and developing knowledge and physical applications that meet the needs of society, and for graduates of the Physics Department to be leaders and influencers in their fields, committed to the highest standards of professional and ethical responsibility, and keeping pace with the changing requirements of the labour market.

2. Program mission

The Physics Department at the College of Science seeks to provide high-quality education in the fields of basic and applied physics, and to promote pioneering scientific research that contributes to the advancement of scientific knowledge and solving societal problems. The department also seeks to prepare a generation of scientists capable of leading innovation in various fields of science, while adhering to the highest academic, ethical and professional standards, which qualifies them to contribute effectively to achieving sustainable development, and to provide the labour market with physical competencies capable of leadership and innovation in various scientific and technical sectors.

3. Objectives

The Department of Physics seeks to achieve the following objectives:

1. Developing the ability to innovate: Students will be able to analyze and formulate complex physical problems, using a precise scientific methodology, and apply the appropriate physical principles and mathematical models to solve them, while documenting the solution steps and results.

2. Linking theory to application and providing institutions with qualified graduates: The Department of Physics seeks to enhance its partnerships with industrial and research institutions to provide practical training for its students, enabling them to gain practical research and technical experience and meet the needs of the labor market

3. Improving the quality of scientific research and developing graduate programs: The Department of Physics aims to prepare a generation of physicist researchers by providing students with advanced research knowledge and skills. It focuses in particular on developing specialized graduate programs in future physics fields

4. Enhancing creative communication skills and promoting environmental sustainability:

The Department of Physics focuses on developing students' creative communication skills through specialized courses, with the aim of enabling them to become ambassadors of science and knowledge

5. Enhancing ethical awareness and preparing a generation of scientists committed to the highest standards: The Department of Physics attaches great importance to enhancing students' ethical awareness, considering scientific ethics as the basis for graduating responsible scientists. To achieve this, the department organizes workshops on scientific ethics with the aim of instilling commitment to ethical and professional standards among students, and enabling them to contribute effectively and responsibly to serving science and society.

6. Encouraging effective teamwork and promoting international cooperation: The Physics Department focuses on instilling the value of teamwork in students from the early stages through courses that include group projects aimed at developing cooperation skills and exchanging experiences among students. The Physics Department is keen to build bridges of international cooperation with leading universities and research institutions.

7. Integrating modern technology: The Physics Department integrates artificial intelligence and nanotechnology into its curricula to keep pace with scientific developments, with the aim of preparing theoretically and practically qualified graduates who are able to contribute to research and the labour market.

4. Programmatic accreditation

Does the program have program accreditation? From which side

We seek the National Accreditation Program for Science Programs.

5. Other external influences

Is there a sponsor for the program?
Decisions of the Ministry of Higher Education and Scientific Research

6. Program structure

Notes*	Percentage	Number of courses	Number of courses	Program structure	
Core	9.3%	18	8	Enterprise requirements	
Core	1%	2	1	College requirements	
Core	85.6%	166	32	Core	Department requirements
Elective	4.1%	8	4	Elective	
Satisfied				summer training	
None				Other	

*Notes may include whether the course is core or elective.

7. Program Description

Year	Level	Course Code	Course Name	Credit Hours	
				Theor.	Pract.
First	Semester 1	PHY1101	Mechanics and properties of matter I	2	2
		PHY1102	Electricity	3	2
		Sci-101	General Astronomy	2	0
		PHY1103	Mathematics I	2	0
		UOM104	Arabic Language	2	0
		UOM101	Democracy and Human Rights	2	0
	Semester 2	PHY1214	Mechanics and properties of matter II	2	2
		PHY1215	Magnetism	2	2
		PHY1217	English	2	0
		UOM103	Computer I	0	2
		PHY1206	Mathematics II	2	2
		UOM102	General Chemistry	2	0
Second	Semester 3	PHY2308	Modern Physics I	2	2
		PHY2309	Heat and Thermodynamic	2	2
		PHY23010	Analytical Mechanics I	2	0
		PHY23011	Analog Electronics	2	2
		UOM2050	Crimes of the Baath Regime in Iraq	2	0
		UOM2022	English	2	0
		PHY23112	Mathematics 3	2	0
	Semester 4	PHY24114	Modern Physics II	2	2
		PHY24015	Thermodynamic and Statistical	2	2
		PHY24116	Analytical Mechanics II	2	0
		PHY24017	Digital Electronics	2	2
		UOM2032	Computers (2)	1	2
		UOM2012	Arabic Language	2	0
		PHY24018	Sound and Wave Motion	2	0
Third	1st	PHYS301	Geometrical Optics	2	2
		PHYS302	Laser Physics I	2	2
		PHYS303	Quantum Mechanics I	2	0
		PHYS304	Material Physics I	2	2
		PHYS305	Numerical analysis	2	2
		PHYS306	English Language	2	0
		PHYS307	Elective	2	0
		PHYS308	Physical Optics	2	2

	2nd	PHYS309	Laser Physics II	2	2
		PHYS310	Quantum Mechanics II	2	0
		PHYS311	Material Physics II	2	2
		PHYS312	Molecular Physics	2	0
		PHYS313	Mathematics 4	2	2
		PHYS314	Spectra	2	0
		PHYS315	Elective	2	0
Fourth	**1st**	PHYS401	Quantum Mechanics I	3	0
		PHYS402	Electromagnetics Theory I	3	0
		PHYS403	Nuclear Physics I	3	2
		PHYS404	Solid State Physics I	3	2
		PHYS405	Elective	2	0
		PHYS406	Practical Physics I	0	3
	2nd	PHYS407	Quantum Mechanics II	3	0
		PHYS408	Electromagnetics Theory II	3	0
		PHYS409	Nuclear Physics II	3	2
		PHYS410	Solid State Physics II	3	2
		PHYS411	Elective	2	0
		PHYS412	Practical Physics II	0	3
		PHYS413	Research Project	2	0
Certifications and credit hours			**Bachelor's degree requires (S) credit hours**	**166hours 194credit hours**	

8. Outcome of the program	
Knowledge	
A1. Ability to identify scientific problems	The student identifies, analyses, and they formulate complex physical problems in a precise scientific manner by applying physical principles and using experimental and theoretical methods to understand and explain physical phenomena.
A2. Application of scientific knowledge	Employs physical knowledge in addressing problems in the fields of engineering, medicine, technology, and energy to provide sustainable solutions. It also contributes to developing innovative scientific solutions that meet the needs of society and the labour market.
Skills	
B1.Implementation of scientific tests	Designs accurate scientific experiments in line with scientific research standards using modern devices and software to collect and analyses physical data and interpret the results extracted from the experiments and compares them with approved physical theories.
B2. Effective communication skills	Presents scientific presentations in a clear and convincing manner to an academic or industrial audience, and they write scientific reports and research articles according to approved academic standards.

B3.Keeping up with technological developments	Follows up on developments in the field of modern physical technologies such as artificial intelligence and computer modelling. Uses modern software and technological tools to analyze data and conduct simulations. It seeks to continuously develop his skills through self-learning and participation in scientific courses and workshops.
Ethics	
C1. Ethical and professional awareness	Commits to ethical practices in physical research and applications, takes into account environmental and social issues and labour market requirements when applying physical solutions, and contributes to spreading scientific awareness and social responsibility in society.
C2. Teamwork	Participates effectively in scientific research and technological development teams, planning and implementing research projects in cooperation with colleagues to ensure achievement of objectives, identifying potential risks during laboratory or applied work, and taking appropriate measures to reduce them.

9. Teaching and learning strategies

A lecture accompanied by explanation and analysis.

- Discussion panel.
- Reports and research.
- Presenting the material via PowerPoint slides.
- Questions and answers.
- Class participation.

10. Method of evaluation

•The exams	• Duties	• Duties	•Final exam
• Projects/laboratory.	•a report	• Midterm test	

11. Faculty

Faculty members

Academic rank	Specialization		Special Requirements / Skills (if application)	No. of teaching staff	
	General	Special		Staff	Lect.
Professor 8	Physics	Nuclear		2	
	Physics	Solid		4	
	Physics	Optical-Electronic		1	
	Physics	Plasma		1	
Assistant Professor 14	Physics	Solid		4	
	Physics	Nuclear		1	
	Physics	New Energy		1	

	Physics	Plasma		1	
	Physics	Laser		1	
	Physics	Fiber Optics		1	
	Physics	Optical-Electronic		1	
	Physics	Solar Energy		1	
	Physics	Nuclear Astronomy		1	
	Computer	Information Security		1	
	Physics	Renewable Energy / Solar Cells		1	
Lecture 14	Physics	Polymers		1	
	Physics	Solar Energy		1	
	Physics	Optical-Electronic		2	
	Physics	Nuclear		3	
	Physics	Renewable Energy / Solar Cells		1	
	Physics	Solid		4	
	Physics	Health Physics		1	
	Physics	Solar Cells		1	
Assistant Lecture 6	Computer	Smart Technologies		1	
	Physics	Molecular		1	
	Physics	Nuclear		2	
	Physics	Nano		1	
	Physics	Solar Cells		1	

Professional development

Orienting new faculty members

New faculty members are mentored by participating in specialized courses concerned with faculty member development in educational institutions, which are organized by the Department and Division of Continuing Education. The orientation program covers the following topics:

- The role of faculty members in the educational process
- Evaluation and measurement
- Research
- Professional development

• Ethics and integrity

The orientation program is a valuable resource for new faculty, providing them with the information and support they need to succeed in their new roles.

Professional development for faculty members

The college implements an academic and professional development plan for faculty members through participation in courses, workshops, and seminars held at the college, university, and ministry, which aim to develop.

• Teaching skills
• Scientific research skills
• Technical skills

The College believes that professional development is necessary for faculty members to keep pace with developments in their field and provide the best possible education to the student. The college provides a variety of professional development opportunities, including (courses, workshops, and the college also encourages faculty members to participate in professional development activities outside the college, such as attending conferences and publishing research).

12. Acceptance criterion

Central admission guide

13. The most important sources of information about the program

• The central library at the university and the college library
• Information network (Internet)
• Experiences of Arab and international universities
• Current curriculum
• Ministry of Higher Education and Scientific Research - University - College – Department

14. Program development plan

• Participation of students in their orientations through continuous review of curriculum items through questionnaires and meetings
• Involving students in the relevant committees
• Participation in specialized scientific conferences
• Follow specialized international books and periodicals
• A plan was developed to activate field visits and cooperation and respond to the need of the local private market to improve scientific reality
• Increase activities that develop personal knowledge through seminars, conferences and seminars to develop scientific and personal development

Program skills chart										
Learning outcomes required from the programmed										
Valuation		**Skills**			**Knowledge**		**Essential or optional**	**Course Name**	**Course Code**	**Year/ Level**
C2	C1	B3	B2	B1	A2	A1				
√			√	√		√	Essential	Mechanics and properties of matter I	PHY24114	**First Stage/ Semester 1**
√	√		√		√	√	Essential	Electricity	PHY24015	
	√	√	√	√	√	√	Essential	General Astronomy	PHY24116	
		√	√		√	√	Essential	Mathematics I	PHY24017	
	√	√	√				Essential	Arabic Language	UOM205	
	√	√	√	√	√		Essential	Democracy and Human Rights	PHY24018	
√			√		√	√	Essential	Mechanics and properties of matter II	PHY1214	**First Stage/ Semester 2**
√	√		√		√	√	Essential	Magnetism	PHY1215	
	√	√	√	√	√	√	Essential	English	PHY1217	
		√		√	√	√	Essential	Computer I	UOM103	
√	√		√	√	√	√	Essential	Mathematics II	PHY1206	
	√	√	√	√		√	Essential	General Chemistry	UOM102	
	√				√		Essential	Modern Physics I	PHY2308	**Second**

		√	√		√	√	Essential	Heat and Thermodynamic	PHY2309	**Stage/ Semester 3**
		√	√		√	√	Essential	Analytical Mechanics I	PHY23010	
√	√	√	√	√	√	√	Essential	Analog Electronics	PHY23011	
	√	√	√				Essential	Crimes of the Baath Regime	UOM2050	
	√	√	√	√		√	Essential	English	UOM2022	
	√	√	√	√	√	√	Essential	Mathematics 3	PHY23112	
	√				√		Essential	Modern Physics II	PHY24114	**Second Stage/ semester 4**
	√		√		√		Essential	Thermodynamic and Statistical	PHY24015	
	√	√	√	√		√	Essential	Analytical Mechanics II	PHY24116	
√		√		√		√	Essential	Digital Electronics	PHY24017	
	√	√	√	√	√	√	Essential	Computers (2)	UOM2032	
	√	√	√	√	√		Essential	Arabic Language	UOM2012	
√	√	√	√	√	√	√	Essential	Sound and Wave Motion	PHY24018	
			√	√	√	√	Essential	Geometrical Optics	PHYS301	**Third Stage/ 1st**
		√	√		√	√	Essential	Laser Physics I	PHYS302	
√	√	√	√		√	√	Essential	Quantum Mechanics I	PHYS303	
√	√	√	√	√			Essential	Material Physics I	PHYS304	
			√		√	√	Essential	Numerical analysis	PHYS305	
	√	√	√	√		√	Essential	English Language	PHYS306	
√	√	√	√	√	√	√	Optional	Elective	PHYS307	
√	√	√	√		√	√	Essential	Physical Optics	PHYS308	**Third Stage/**

		√	√		√	√	Essential	Laser Physics II	PHYS309	**2nd**
√	√	√	√	√		√	Essential	Quantum Mechanics II	PHYS310	
√	√	√	√	√			Essential	Material Physics II	PHYS311	
			√	√	√	√	Essential	Molecular Physics	PHYS312	
	√	√	√	√		√	Essential	Mathematics 4	PHYS313	
√	√	√	√	√	√	√	Essential	Spectra	PHYS314	
√	√	√	√	√		√	Optional	Elective	PHYS315	
√	√	√	√		√	√	Essential	Quantum Mechanics I	PHYS401	**Fourth Stage/ 1st**
	√			√		√	Essential	Electromagnetics Theory I	PHYS402	
		√	√		√	√	Essential	Nuclear Physics I	PHYS403	
√	√	√	√	√	√	√	Essential	Solid State Physics I	PHYS404	
√	√	√	√	√	√	√	Optional	Elective	PHYS405	
√	√	√	√	√	√	√	Essential	Practical Physics I	PHYS406	
√	√	√	√	√		√	Essential	Quantum Mechanics II	PHYS407	**Fourth Stage/ 2nd**
√	√	√	√		√		Essential	Electromagnetics Theory II	PHYS408	
		√	√		√	√	Essential	Nuclear Physics II	PHYS409	
√	√	√	√	√	√	√	Essential	Solid State Physics II	PHYS410	
√	√	√	√	√	√	√	Optional	Elective	PHYS411	
√	√	√	√	√	√	√	Essential	Practical Physics II	PHYS412	
√	√	√	√	√	√	√	Essential	Research Project	PHYS413	

• Please check the boxes corresponding to the individual learning outcomes from the program subject to evaluation