

**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

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: .Diyala.....

Faculty/Institute: ...College of science

Scientific Department: .Physics

Academic or Professional Program Name:.. Bachelor's degree in Physics.....

Final Certificate Name: .. Bachelor's.....

Academic System: semesters

Description Preparation Date: 1/10/2023

File Completion Date:

Signature:

Head of Department Name:

Date:

Signature:

Scientific Associate Name:

Date:

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

Program vision is written here as stated in the university's catalogue and website.

2. Program Mission

Program mission is written here as stated in the university's catalogue and website.

3. Program Objectives

General statements describing what the program or institution intends to achieve.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

Is there a sponsor for the program?

6. Program Structure				
Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements				
Summer Training				
Other				

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

7. Program Description			
Year/Level	Course Code	Course Name	Credit Hours
The Fourth stage		Quantum Mechanics	theoretical

8. Expected learning outcomes of the program	
Knowledge	
Learning Outcomes 1	Learning Outcomes Statement 1
Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies
Teaching and learning strategies and methods adopted in the implementation of the

program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)	Number of the teaching staff	
	General	Special		Staff	Lecturer

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. Acceptance Criterion

(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. The most important sources of information about the program

State briefly the sources of information about the program.

14. Program Development Plan

Empty rectangular box at the top of the page.

Program Skills Outline															
				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
The Fourth stage		Nuclear Physics	Essential												

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

Course Description Form

1. Course Name:	
Quantum Mechanics	
2. Course Code:	
3. Semester / Year:	
First and second semester 2023–2024	
4. Description Preparation Date:	
1/10/2023	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Faisal Ghazi Hammoodi Email: faissal_hammody@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1. To develop skills in understanding Foundation of quantum mechanics. 2. To understand the principles of the Theories of black body radiation . 3. Develop an understanding of the Schrodinger time dependent equation.. 4. Getting to know the photoelectric effect ,Requirement on wave function. 5. To understand the Requirement on wave function operators in quantum mechanics, Normalization function, Eigen function and Eigen value, Average or expectation value. 6.To understand the one-Dimensional simple harmonic oscillator classical mechanics , Generating function, the results of classical and quantum mechanics for simple harmonic oscillator.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted is to present this unit in theoretical lecture from the professor of the scientific subject, while encouraging students to participate in clarifying the topics through discussion among students with the use of means of clarification, including posters in addition to scientific films, with a description of recent reports of scientists in this field.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	2	Inadequacy of classical theory to explain the spectrum of black body radiation, Theories of black body radiation.	Quantum Mechanics	The blackboard the data show	Monthly and daily exams homework
2.		photoelectric effect, The Compton Effect			
3.		Bohrs Theory of Hydrogen atom, The Sommerfeld Relativistic atom model.			
4.		Zeeman effect, Origin of normal Zeeman effect, origin of Anomalous Zeeman effect.			
5.		solved Examples			
6.		Schrodinger Equations, Introduction, Schrodinger time dependent equation and Schrodinger time independent equation			
7.		Requirement on wave function, Probability current density equation of continuity and its physical significances			
8.		operators in quantum mechanics, Normalization function, Eigen function			

9.	and Eigen value Midterm exam			
10.	Average or expectation value, Variance, Exchanging of average value per unit time, Degeneracy			
11.	Parity, solved Examples			
12.	Introduction, one-Dimensional simple harmonic oscillator classical mechanics			
13.	Normalization of wave function, Generating function			
14.	Comparison between the results of classical and quantum mechanics for simple harmonic oscillator solved Examples			
15.				
Semester 2				
16.	Free particles: Particles in one dimension box, Free particles in potential box in three dimensions			
17.	The potential step, Reflection and transmission in potentials barrier.			
18.	one – Dimensional Rectangular Potential Barrier (Quantum Mechanical Tunnelling Effect), One-Dimensional Square Well Potential (Free States).			
19.	One-Dimensional Square Well Potential of Finite Depth: Bound State, Density of states			

20.		solved Example			
21.		Particles in Spherically Symmetric Potentials(Spherical Harmonics), Schrodinger equation for a central potential, Solution of differential equation and The Hydrogen Atom.			
22.		The wave equation for the hydrogen atom, Reduction to Equivalent one-Body problem.			
23.		Separation of Variables Solution of the ϕ -equation			
24.		Midterm exam			
25.		Solution of the θ -equation, Solution of Radial equation			
26.		The Rigid Rotator, Solved Examples			
27.		Dirac Bra and Ket Notations, Properties of Bra and Ket Notations			
28.		Condition of Normalization , Orthogonality Condition, Eigenvalues and Eigenvector			
29.		Observable Operator , The Hermitian Adjoint			
30.		The Linear Harmonic Oscillator in Dirac Notation, Solved Examples Preparatory week before the final Exam			

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such

as daily preparation, daily oral, monthly, or written exams, reports etc

12.Learning and Teaching Resources

Required textbooks (curricular books, any)	1.Perspective of Quantum Mechanics by S.P.Kuila ,first edition 2008 2. Quantum Mechanics Concept and Application. Nouredine Zettili 2001.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	1-1000 Solved problems in Modern physics Ahmed A.Kamal ,2010
Electronic References, Websites	