Program Specification

(Postgraduate Programs)

Program Name:	**MASTER OF SCIENCE (M.Sc.) IN PHYSICS**
Program Code (per the Saudi Standard Classification of Educational Levels and Specializations):	**053301**
Qualification Level:	**7**
Department:	**Physics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University (IMSIU)**
Program Specification:	New ☐ updated* ☒
Last Review Date:	**26/09/2024**

*Attach the previous version of the Program Specification.

Table of Contents

A. Program Identification and General Information:

1. Program's Main Location:

Main campus

2. Branches Offering the Program (if any):

N.A.

3. System of Study:

☐ Coursework & Thesis ■ Coursework

4. Mode of Study:

■ On Campus ☐ Distance Education ☐ Other .....(specify)

5. Partnerships with other parties (if any) and the nature of each: None

- Partnership Arrangement:
- Type of Partnership:
- Duration of Partnership:

6. Professions/jobs for which students are qualified:

- Teaching in high schools, universities and scientific institutions.
- Working in research centres.
- Industry areas: working in public and private companies.

7. Relevant occupational/ Professional sectors:

N.	Occupation name	Occupation code
1	Physicist	211101
2	Geophysicist	211402
3	Teaching Methods Specialist	235101
4	Quality Specifications and Metrics Specialist	242122
5	Astronomer	211102
6	Educational Supervision Manager	134511
7	Meteorologist	211201
8	Weather Forecasting and Environmental Monitoring Station	134906
9	Measurement and Evaluation Specialist	235105

8. Major Tracks/Pathways (if any):		
Major track/pathway	**Credit hours** (For each track)	**Professions/jobs** (For each track)
1.		
2.		

9. Exit Points/Awarded Degree (if any):	
Exit points/Awarded degree	Credit hours
1. High diploma of Science in Physics	24 Credit Hours

10. Total credit hours: (41 Credit Hours)

41 Credit Hours

B. Mission, Goals, and Program Learning Outcomes

1. Program Mission:

To provide the students with a quality higher education in physics and serve the community through research, teaching, and outreach.

2. Program Goals:

- *Advanced knowledge and skills to teach and practice different fields of physics.*
- *Enhance the ability of the graduates to become independent learners and conduct independent research in physics.*
- *A solid foundation for Ph.D. studies, continuing education, and life-long professional development in physics and related fields, which contributes to economic and social development.*

3. Program Learning Outcomes:*

Knowledge and Understanding:	
K1	Recognize an advanced and specialized structure of knowledge that includes theories, principles and concepts in the areas of physics.
K2	Describe applications of advanced laboratory techniques, numerical techniques and physics development in industry.
K3	Outline methods that lead students to make research and development.
Skills:	
S1	Apply the advanced concepts, principles and theories involved in addressing issues and problems in a range of different contexts.
S2	Evaluate knowledge and use it to provide innovative solutions to contemporary issues and problems in physics.
S3	Communicate in different ways demonstrating an understanding of theoretical knowledge, transferring knowledge and specialized skills, and sharing ideas within a variety of audience.
S4	Choose and use a variety of digital technology, information, communication technology tools, to process, analyze and produce data and information; to support and promote specialized research and projects.

Values, Autonomy, and Responsibility:	
V1	Demonstrate integrity, professional and academic ethics, participation in finding constructive solutions to some societal issues, and a commitment to responsible citizenship.
V2	Self-evaluate of the level of learning and performance, insist on achievement and excellence, and make logical decisions supported by evidence and arguments independently.
V3	Lead teamwork with functional flexibility and effectiveness, and take responsibility for professional development, participating in developing the group's performance, and enhancing the quality of life.

* * Add a table for each track (if any)

High diploma Learning Outcomes (Exit point):

Knowledge:

K1. Recognize an advanced and specialized structure of knowledge that includes theories, principles and concepts in the areas of physics.

Skills:

S1. Apply the advanced concepts, principles and theories involved in addressing issues and problems in a range of different contexts.

S2. Evaluate knowledge and use it to provide innovative solutions to contemporary issues and problems in physics.

Values:

V1. Demonstrate integrity, professional and academic ethics, participation in finding constructive solutions to some societal issues, and a commitment to responsible citizenship.

V2. Self-evaluate of the level of learning and performance, insist on achievement and excellence, and make logical decisions supported by evidence and arguments independently.

V3. Lead teamwork with functional flexibility and effectiveness, and take responsibility for professional development, participating in developing the group's performance, and enhancing the quality of life.

C. Curriculum:

1. Curriculum Structure:

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	**7**	**28**	**68.3%**
	Elective	**3**	**9**	**22%**
Graduation Project (if any)		**1**	**4**	**9.7%**
Thesis (if any)		**N.A.**		
Field Experience(if any)		**N.A.**		
Others (.....)		**N.A.**		
Total		**11**	**41**	**100%**

* Add a separate table for each track (if any).

2. Program Courses:

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	PHY 6101	Classical Mechanics	Required	None	4	Program
	PHY 6131	Mathematical Methods in Physics	Required	None	4	Program
	PHY 6121	Classical Electrodynamics	Required	None	4	Program
Level 2	PHY 6111	Quantum Mechanics	Required	None	4	Program
	PHY 6161	Advanced Solid-State Physics	Required	None	4	Program
	PHY 6171	Advanced Nuclear Physics	Required	None	4	Program
Level 3	PHY 6251	Advanced Statistical Mechanics	Required	None	4	Program
	PHY 62xx	Elective Course (1)	Elective	None	3	Program
	PHY 62xx	Elective Course (2)	Elective	None	3	Program
Level 4	PHY 62xx	Elective Course (3)	Elective	None	3	Program
	PHY 6299	Research Project	Required	None	4	Program

Elective courses:

PHY 6233: Modeling and Simulation in Physics.
PHY 6235: Symmetry in Physics.
PHY 6241: Selected Topics in Physics (1).
PHY 6242: Selected Topics in Physics (2).
PHY 6263: Physics of Semiconductors and Devices.
PHY 6265: Nanophysics and Technology.
PHY 6267: Physics of Low-Dimensional Systems.
PHY 6273: Radiation Detection and Measurements.
PHY 6275: Radiological Mathematics.
PHY 6277: Radiation Protection and Dosimetry.
PHY 6281: Synthesis and Characterization Techniques.
PHY 6283: Experimental Methods in Radiation Physics.

* Include additional levels (for three semesters option or if needed).
** Add a table for the courses of each track (if any)

3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-104)

https://drive.google.com/drive/folders/1BbapF4jHlwc20QwxJQV6h7MouEeDhcce?usp=sharing

4. Program learning Outcomes Mapping Matrix:

Align the program learning outcomes with the program's courses according to the desired performance levels.
(I = Introduced, P = Practiced, M = Mastered).

Course code & No.	Program Learning Outcomes									
	Knowledge and understanding			Skills				Values, Autonomy, and Responsibility		
	K1	K2	K3	S1	S2	S3	S4	V1	V2	V3
PHY 6101	I	I	I	I	I	I	I	I	I	I
PHY 6131	I	I	I	I	I	I	I	I	I	I
PHY 6121	I	I	I	I	I	I	I	I	I	I
PHY 6111	I	I	I	I	I	I	I	I	I	I
PHY 6161	I	I	I	I	I	I	I	I	I	I
PHY 6171	I	I	I	I	I	I	I	I	I	I
PHY 6251	I	I	I	I	I	I	I	I	I	I
PHY 6263	P	P	P	P	P	P	P	P	P	P
PHY 6265	P	P	P	P	P	P	P	P	P	P
PHY 6267	P	P	P	P	P	P	P	P	P	P
PHY 6281	P	P	P	P	P	P	P	P	P	P
PHY 6283	P	P	P	P	P	P	P	P	P	P
PHY 6241	P	P	P	P	P	P	P	P	P	P
PHY 6233	P	P	P	P	P	P	P	P	P	P
PHY 6235	M	M	M	P	P	P	P	M	P	P
PHY 6273	M	M	M	P	P	P	P	M	P	P
PHY 6275	M	M	M	P	P	P	P	M	P	P
PHY 6277	M	M	M	P	P	P	P	M	P	P
PHY 6242	M	M	M	P	P	P	P	M	P	P
PHY 6299	M	M	M	M	M	M	M	M	M	M

* Add a separate table for each track (if any).

5. Teaching and learning strategies applied to achieve program learning outcomes:

Describe teaching and learning strategies to achieve the program's learning outcomes in all areas.

The department ensures teaching quality standards through the following actions:

- At the beginning of each term the syllabi, are given to the students, containing courses detailed information, method of evaluation and grades, etc.
- The courses distribution is done according to the specialities of faculty staff and their wishes.
- The duties of the course instructor consist on:
  - Distribution of time according to the course contents.
  - The preparation of the exercises lists, the midterms and the final exam.

- The follow-up of good progress of the course through the periodic meetings with course instructors and graduate studies committee.
- Collect the course report.
- Update the course folder.
- Annual report is prepared annually.
- Student surveys of all courses and program.
- Teaching staff evaluations of the program.
- Annual Faculty and Staff performance evaluation.

Supports for student independent work:

There are many supports for the independent scientific work of the students and here are some of them:

1) Open Computer Labs: The students can use these facilities to review independently a part of a course, to prepare a home work or an exam, or to access the (local) digital library;
2) Provided free textbooks: The students can use textbooks to prepare independently exercises for the tutorial or to review examples of the course;
3) Digital library via open computer labs: The students can access the (local) digital library to get free papers and theses. They read independently these resources and write reports on them;
4) Materials provided via Blackboard: The teachers use Blackboard platform to give students all kinds of materials related to the courses: syllabi, slides, list of exercises, solutions to exams and home works, etc… These materials can be used independently by students for a best management of the course;
5) At least six office hours provided by each teacher: Each teacher has to choose in his timetable at least six office hours in order to discuss all course issues with students;
6) Research project course. During this course, students have to work independently in order to write a report and to give an oral presentation at the end of the course;

Mini-projects and/or home works in some courses: The main goal of these assessment methods is to strength the independence work of students.

6. Assessment Methods for program learning outcomes:

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.

The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least once in the program's cycle).

The assessment processes are performed for each cycle (two years) based on direct and indirect methods as indicated in the flowchart blow

Direct Assessment Methods:

- Exams.
- Capstone Project or Course.
- Performance (participation in campus and/or community events, volunteer work, presentations, internships, art performances, etc).
- Course e-Portfolio.

Indirect Assessment Methods:

- Alumni survey.
- Employer survey.
- Program advisory committee survey.
- Teaching staff surveys on the program.

D. Thesis and Its Requirements (if any):

1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

2. Scientific Supervision:

(The regulations of the selection of the academic supervisor and their responsibilities, as well as the procedures/ mechanisms of the scientific supervision and follow-up)

3. Thesis Defense/Examination:

(The regulations for selection of the defence/examination committee and the requirements to proceed for thesis defence, the procedures for defence and approval of the thesis, and criteria for evaluation of the thesis)

H. Student Admission and Support:

1. Student Admission Requirements:

In addition to the conditions mentioned in article (13) of the UGSP, applicants to the Master Program should fulfill the followings:

- The applicant should have a B.Sc. degree in physics from a national university or a recognized international university with a GPA equals or equivalent to 3.75 out of 5.
- The applicant should pass the entry exam set by the Physics Graduate Committee (PGC).
- The applicant should get a TOEFL score at least 400 or equivalent scores in other recognized international English test.
- An applicant who was admitted for this program with his/her B.Sc. in physics from a college other than the College of Science may be required to finish successfully some complementary undergraduate courses before registering any course of the master program.
- The complementary undergraduate courses mentioned in (d) are determined for each student by the PGC and should be taken within two academic semesters from his/her enrolment in the program and being dealt on that according to article (18) of the UGSP.
- Students who are enrolled in another recognized physics master program having at least a GPA equal or equivalent to 3.75 out of 5 may be transferred to the program upon establishing all related conditions mentioned above and upon fulfilling the requirements mentioned in article (30) of the UGSP.
- Applicants who got a B.Sc. in a scientific major other than physics will be dealt case by case and an appropriate decision for them will be made by the PGC.

- Students who are enrolled in another graduate program in Al Imam University or in another recognized master program other than physics will be dealt case by case and an appropriate decision for them will be made by PGC according to article (31) of the UGSP.

2. Guidance and Orientation Programs for New Students:

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

- The physics department provides a student handbook orientation.
- At the beginning of the academic year, new students are encouraged to attend orientation sessions organized by the counselling Committee.
- New students will have the opportunity to meet faculty members, head of department, and program manager.

3. Student Counseling Services:

(Academic, professional, psychological and social)

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level)

- Program handbook;
- Departmental web site with details of all degree programs, programs and courses description, as well as staff contact details and other information;
- Induction talks and meetings in the first week;
- Office Hours when course lecturers are available for consultation;
- Computers with access to Blackboard, email, the world-wide web and other software;
- Facilities for scanning, photocopying and printing;
- A central library containing multiple copies of all course texts and giving access to a wide range of electronic resources;
- Study areas and a room containing copies of text books within the department;
- A student common room area with drinks and nibbles available;
- Well-equipped postgraduate laboratories with demonstrator support;
- In the second year, the student should take the Research Project course (PHY 6299) and chooses a research supervisor who will assist and guide him (her) in the compulsory research project;
- The departmental advisor can provide information, advice and support in relation to accommodation, assessment of needs and provision of support related to disability, student funding, general welfare, student discipline.

4. Special Support:

(Low achievers, disabled, and talented students).

Students with special needs or disabilities may be allowed to take only one course instead of two in a term upon the consent of the PGC.

E. Faculty and Administrative Staff:

1. Needed Teaching and Administrative Staff:

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professor	Physics			8	0	8
Associate Professor	Physics			6	1	7
Assistant Professor	Physics			10	8	18
Technicians and Laboratory Assistants						
Administrative and Supportive Staff				1	1	2
Others (specify)						

F. Learning Resources, Facilities, and Equipment:

1. Learning Resources:

Learning resources required by the program (textbooks, references, e-learning resources, web-based resources, etc.)

- For each course the PGC assigned a faculty members committee to do the followings:
  - Course description (preliminary syllabus),
  - Recommend Lists of Required Textbooks, Essential References Materials (Journals, Reports, etc.), Recommended Textbooks and Reference Material (Journals, Reports, etc.), Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.), and other learning material such as computer-based programs/CD, professional standards or regulations and software.
- PGC collects learning resources of all courses and submits the required lists to the Head of the department to get the approbation of the department council.
- After the department council approbation, the Department Head asks the College Dean to provide the Required lists of Learning Resources through the University Central Library and/or the IT Deanship.

2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

For the planning and acquisition resources for library, laboratories, and classrooms the PGC proceeds as follows:

- Research Labs: There are many research labs, which are used by both faculty and students to fulfil course outcomes as well as to conduct research. The following table summarizes the research topics investigated in these labs and their location. Please note that most of students are doing their research projects in these labs.

- Evaluation of the locals assigned for graduated programs: Library (equipped with textbooks and references provided by the Central Library), Laboratories (equipped with appropriate computers and software), and classrooms.
- In the shortage case of supplies the PGC will report that to the Department Head in order to ask the College Dean to provide such supplies through the University Central Library and/or the IT Deanship.

3. Procedures to ensure a healthy and safe learning environment:

(According to the nature of the program)

Laboratories are equipped with first aid and ventilation.

G. Program Quality Assurance:

1. Program Quality Assurance System:

Provide a link to the quality assurance manual.

First Link

Second Link

Program review and its development is periodically assessed through the following processes:

- Courses reports are submitted to the program manager every semester.
- Appropriate teaching staff committee is in the charge of assessment and modification.
- Prepare and monitor the annual program report.
- Conduct and analyze surveys opinion of the students about the courses and the program.
- Conduct and analyze surveys opinion of the employers about the program.
- Program manager reviews the proposals submitted by the previous committees and makes appropriate decision after approbation of the department council.
- Monitor a global review for the development of the program periodically each five years if necessary.

All the previous processes follow the Teaching\Learning Quality Assurance Process Diagram:

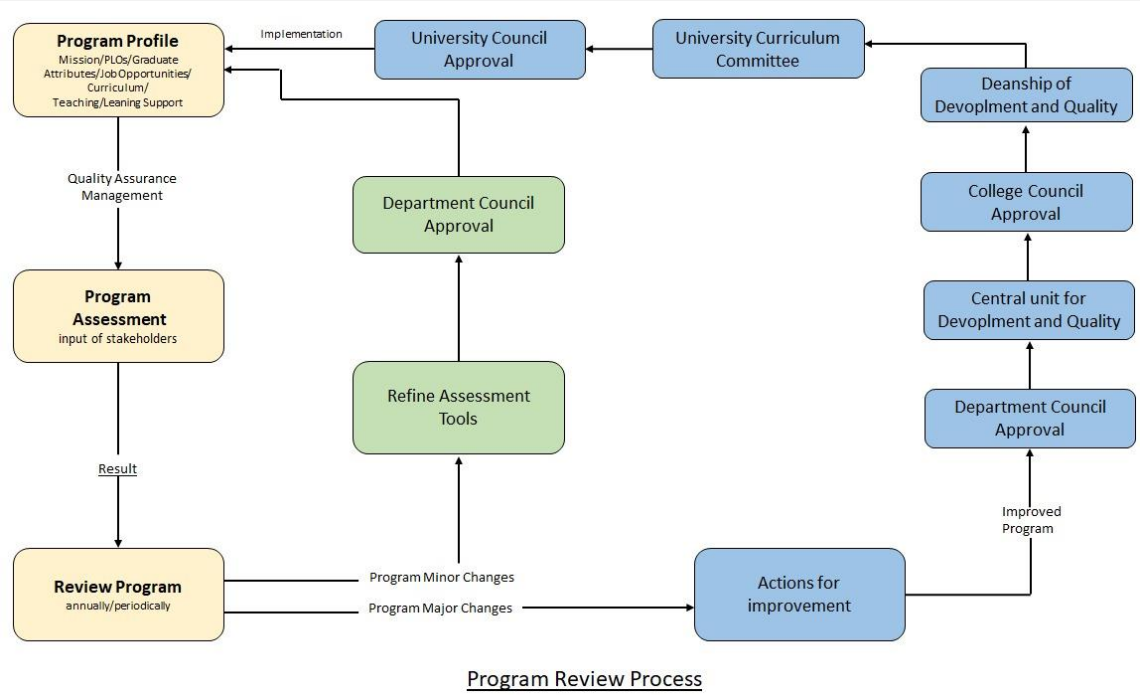

Figure 1 - Teaching\Learning Quality Assurance Process Diagram

2. Program Quality Monitoring Procedures:

- At the end of each term the course instructor should complete a course report, including a summary of student questionnaire responses appraising progress and identifying changes (course contents and/or textbooks and/or references) that need to be made if necessary. In the case where changes are recommended the course responsible reports that to the Department Head in order to take actions.
- Students are asked at the end of this course to fill in an anonymous questionnaire on their assessment of the course. The forms will be analyzed, and the summary of results will be reported to the Department Head for evaluation and then to take actions.

3. Procedures to Monitor Quality of Courses Taught by other Departments:

There are not departments that provide academic support to the program. All program courses are taught by the physics department.

4. Procedures adopted to ensure consistency between the program's sections (male and female sections, if any).

- The students of both campuses are taught at the same time, in the same section, and by the same instructor.
- Furthermore, they have the same exams, homework, and required reports.

5. Assessment Plan for Program Learning Outcomes (PLOs):

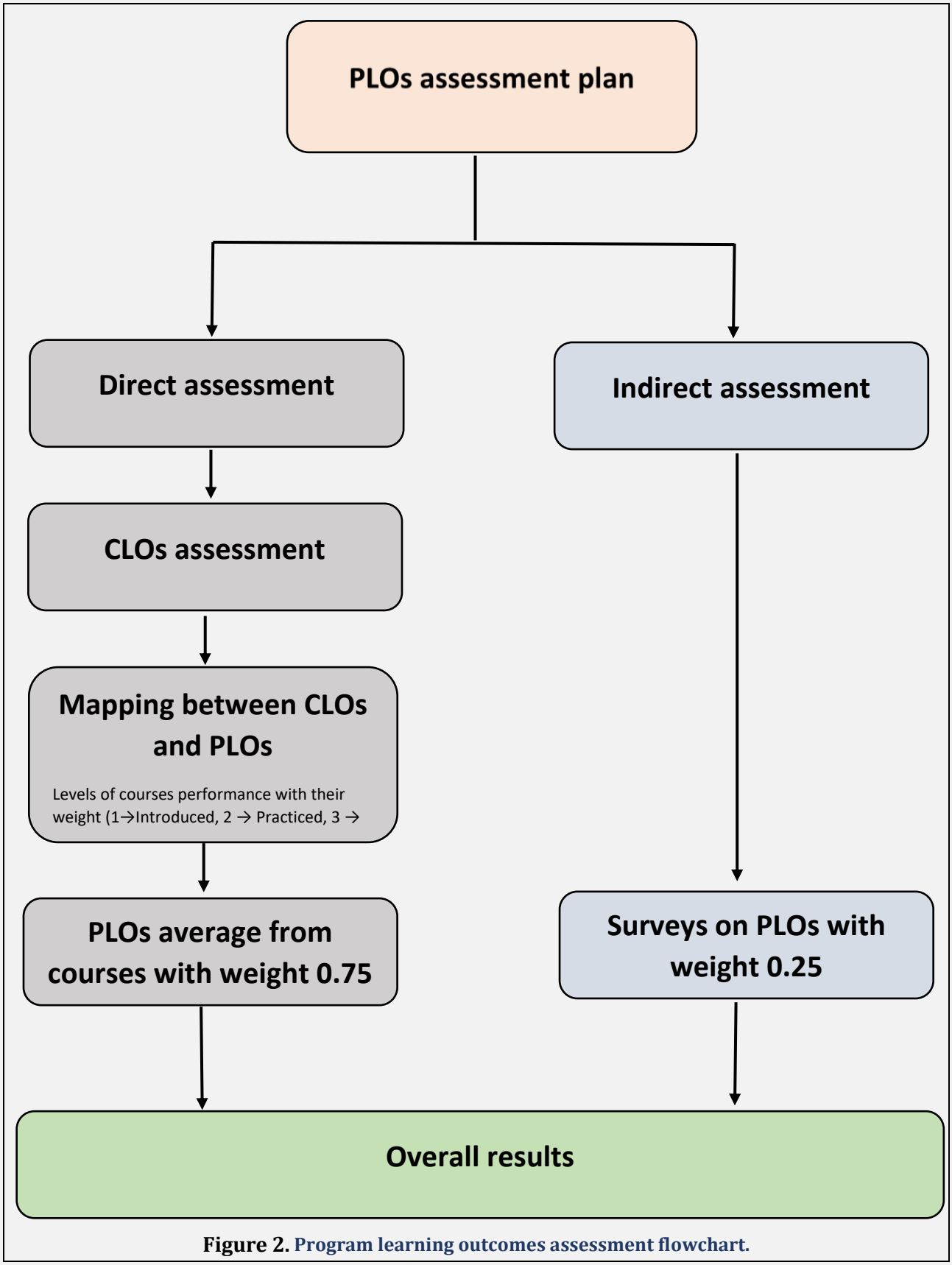

Figure 2. Program learning outcomes assessment flowchart.

Program direct assessment plan focused on the following courses

Course	When
PHY 6101*	Every third semester
PHY 6131*	Every first semester
PHY 6121*	Every first semester
PHY 6161*	Every second semester
PHY 6171*	Every second semester
PHY 6233*	Every third semester
PHY 6265*	Every third semester
PHY 6251*	Every third semester
PHY 6275*	Every third semester
PHY 6299*	Last semester

Table 1. Selected courses for PLOs assessment.

Performance Indicators (PIs):

KPI attainment level	Range
Excellent	> 90
Adequate	≥80
Minimal	≥70
Inadequate	< 70

Table 2. Performance indicator with attainment level.

6. Program Evaluation Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Leadership	Dean	Evaluation report	End of academic year
Effectiveness of teaching & assessment	Program leader, faculty, independent reviewers, students	Surveys, interviews, visits	End of the term, during the term
Learning resources	Employers, faculty, graduates, students	Surveys, interviews	end of the term, during the term

Evaluation Areas/Aspects (e.g., leadership, effectiveness of teaching & assessment, learning resources, services, partnerships, etc.)
Evaluation Sources (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others.
Evaluation Methods (e.g., Surveys, interviews, visits, etc.)
Evaluation Time (e.g., beginning of semesters, end of the academic year, etc.)

7. Program KPIs:*

The period to achieve the target (2024-2025) year(s).

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-PG-1	Students' Evaluation of Quality of learning experience in the program	4.50	surveys	Two times per year
2	KPI-PG-2	Students' evaluation of the quality of the courses	4.50	surveys	Two times per year
3	KPI-PG-3	Students' evaluation of the quality of academic supervision	4.80	surveys	Yearly starting from the first promotion
4	KPI-PG-4	Average time for students' graduation	2 years	Graduation data	Yearly starting from the first promotion
5	KPI-PG-5	Rate of students dropping out of the program	0.25	Graduation data	Yearly starting from the first promotion
6	KPI-PG-6	Employers' evaluation of the program graduates' competency	4.50	surveys	Yearly starting from the first promotion
7	KPI-PG-7	Students' satisfaction with the provided services	4.50	surveys	Yearly
8	KPI-PG-8	Ratio of students to faculty members	15:1	Department data	Yearly
9	KPI-PG-9	Percentage of publications of faculty members	85%	Department data	Yearly
10	KPI-PG-10	Rate of published research per faculty member	2.00-4.00	Department data	Yearly
11	KPI-PG-11	Citations rate in refereed journals per faculty member	100	Department data	Yearly
12	KPI-PG-12	Percentage of students' publication	50%	Department data	Yearly starting from the first promotion
13	KPI-PG-13	Number of patents, innovative products, and awards of excellence	2	Department data	Yearly

*including KPIs required by NCAAA

H. Specification Approval Data:

Council / Committee	**Quality Unit-Physics Department**
Reference No.	**Department council No. 6**
Date	**26/09/ 2024**