



قسم الفيزياء
Department of Physics

Quality Assurance Manual Master Program

The Quality Assurance Manual serves as a reference for developing and executing quality assurance policies and procedures for teaching and learning withing the program. All procedures and polices complies with the Internal Quality Assurance System of King Abdulaziz university (IQAS2023)

All faculty members have access to this document for future reference.

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Definitions and Abbreviations

Advisory Committee: is a group of individuals assembled to provide advice, recommendations, and expertise to an organization, institution, or a specific project or initiative, providing an independent evaluation of the program and representing the local community.

Education Quality Assurance: is a process or set of processes used to monitor, assess, and improve the quality of educational services and institutions.

Mapping Matrix: is a tool used to visually align and track learning outcomes with the components of a curriculum.

Quality: is a multifaceted term, often used to describe the degree of excellence, workmanship, or functionality inherent in a product, service, process, or outcome.

Quality Assurance (QA): Quality Assurance refers to the systematic process or set of procedures used to ensure that a product, service, or outcome meets defined criteria for quality and that the final output is error-free and compliant with standards .

Stakeholder: refers to an individual, group, or organization that has a direct or indirect interest or stake in a particular decision, outcome, or process, including students; alumni; donors; parents; other institutions or providers; accrediting agencies; vendors and suppliers; employers; non-government organisations; government; and academic faculty, unions and advocacy bodies.

CLOs: Course Learning Outcomes.

EQAUP: Evaluation and Quality Assurance of University Performance.

IQAS: Internal Quality Assurance Systems.

KPIs: Key Performance Indicators.

NCAAA: The National Center for Academic Accreditation and Evaluation.

PLOs: Program Learning Outcomes.

1. Introduction

Quality Assurance (QA) is a systematic process aimed to ensuring that a product or service meets specified standards of quality. This process often involves multiple stages, including planning, implementing, monitoring, evaluating, and refining, to ensure that the final output meets the desired level of quality. While the term is commonly associated with manufacturing and software development, it is applicable across a range of sectors, including healthcare, education, and service industries.

An education quality assurance system is the linchpin that ensures the program's educational endeavours consistently meet these exacting standards. It embodies a commitment to continuous improvement, transparency, and accountability, underpinning the department's mission to equip students with a profound understanding of the fundamental laws of the universe while fostering cutting-edge research that pushes the boundaries of human knowledge. This system, finely tuned and adaptive, is the cornerstone upon which the program's reputation, academic impact, and contribution to the global scientific community rest. In this comprehensive framework, we explore the various facets and components of a Quality Assurance System designed to elevate the program's pursuit of excellence and innovation.

The purpose of quality assurance in a master program is multifaceted and serves various crucial objectives. Quality assurance ensures that the program's educational and activities meet high standards of excellence, effectiveness, and integrity. Here are some key objectives of quality assurance in the program:

1-Maintaining Academic Excellence: Quality assurance ensures that the programs offered by the physics department maintain high standards of quality and rigor. It aims to provide students with a robust and comprehensive education in physics, equipping them with the knowledge and skills needed to excel in their field.

2-Ensuring Student Learning Outcomes: Quality assurance helps to ensure that students achieve the intended learning outcomes of the program.

3-Student Satisfaction and Retention: Monitoring and assessing student satisfaction and retention rates are part of quality assurance efforts. The program uses feedback from students to make improvements in teaching, advising, and support services.

4-Continuous Improvement: Quality assurance is a catalyst for continuous improvement. By regularly assessing and evaluating teaching methods, curriculum, research activities, and administrative processes, the program can identify strengths and weaknesses areas and adopt an action plane to enhance and make necessary improvements.

5- Resource Allocation: It assists in the effective allocation of resources, ensuring that the department has the necessary budget, faculty, laboratory facilities, and equipment to support its educational and research objectives.

6- Enhancing Research Quality: For programs involved in research, quality assurance is essential to maintain the quality and integrity of research activities. It includes ensuring that research projects are conducted ethically, that data is collected and analysed accurately, and that research findings are disseminated responsibly.

2. Program Quality Assurance

The quality cycle is a fundamental tool in quality management and continuous improvement of the program. This cyclic approach ensures a dynamic, responsive, and effective educational experience that is continually refined and improved. It creates a loop of continuous improvement and responsiveness to student needs, teaching advancements, and changes in the physics field. The figure below shows the quality cycle adapted by the program. By continually cycling through these stages, the program can amend to changing circumstances, enhance their efficiency, and consistently strive for higher levels of quality and performance.

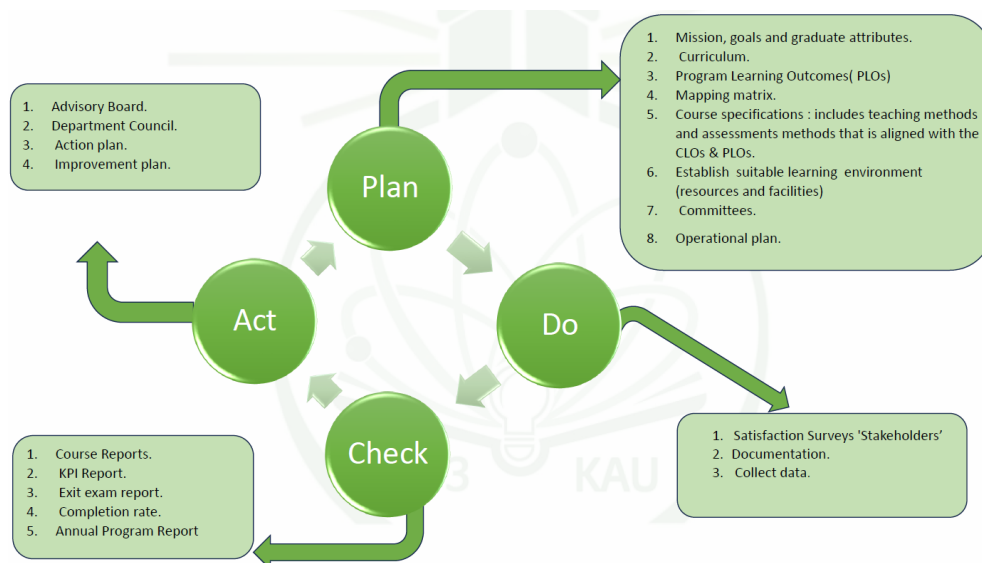
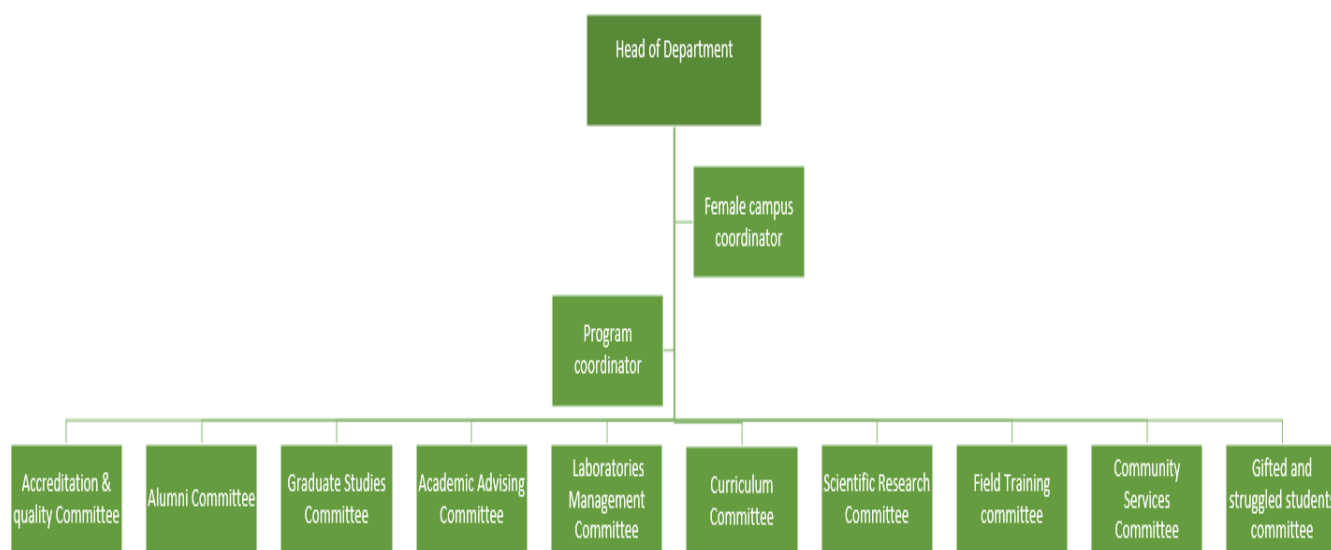


Figure1: Quality cycle of the program.

The table below shows the time frame for all the activities included in the program quality assurance.

Evaluation Areas/Aspects	When	Who
Course evaluation survey	Every semester	University survey system
Course report	Every semester	Course instructor/course coordinator
Students experience survey	Annually	Equap
Employer survey	Annually	Equap
Alumni Survey	Annually	Equap
KPI	Annually	Equap
Annual Program report	Annually	Program coordinator
PLOs Assessment	2 years	Program coordinator
Curriculum review	3-5 years	Curriculum committee.

3. Structural organization of the program



4. Boards, Management, and Committees

4.1 Boards

The Physics program has two boards:

4.1.1 Department council

It consists of all the faculty members with PhD degrees and chaired by the head of the department. It plays a crucial role in shaping the academic, administrative, and cultural environment of the department. Its primary responsibilities are to ensure that the department achieves its educational objectives, maintains academic integrity, and fosters an inclusive community for both faculty and students. It follows the regulations and rules specified by the Ministry of education.

4.1.2 Advisory committee

The Advisory Committee of the Physics program is formed by members of the professionals, representatives of employers, and Student Representatives (current and graduate students). It serves as a consultative body that helps the department to review, develop, and enhance its performance.

4.2 Management

4.2.1 Head of department

The department head is responsible for managing administration, educational and research aspects of the department.

4.2.2 Female Campus coordinator

The administration, instruction, and research activities of department in the female campus are under the oversight of the female campus coordinator.

4.2.3 Program coordinator

The program coordinator is responsible for :

- 1- Collecting all the data needed for the annual report.
- 2- Analyse the data and submit the report to the department council for approval.
- 3- Advise action and improvement plans to be discussed and approved by the department council.
- 4- Assessing the program PLOs and writing a report to the department council.
- 5- Writing the Follow-up scientific supervision report in the program.

4.3 Committees

The Committee is a specialized group that focuses on aspects of the department's overall mission and functions. Ranging from curriculum development to research oversight, these committees play a critical role in managing the complexities of academic and administrative processes that help the department in planning, improving decision-making, and enhances the department's overall performance. There are 11 committees within the physics department, each committee has a head to organizes and assigns tasks among members in the committee to achieve its goal. Moreover, the head of committee must submit a report by the end academic year to the coordinator about all the achieved tasks and difficulties faced during the academic year. For a detailed description of the responsibilities of each committee please refer to the committee manual of the department.

5. Teaching Quality Assurance

Teaching quality assurance is a systematic approach to maintaining and improving the effectiveness, efficiency, and equity of the teaching and learning process. The essential quality assurance aspects of the program are as follows:

1. ensuring the achievement of the program learning outcomes .
 2. Satisfaction of the programme's stakeholder .
 3. complying with regional and international accreditation standards.
- Figure 2 summarizes the teaching quality cycle and below are the detailed procedures of each stage:

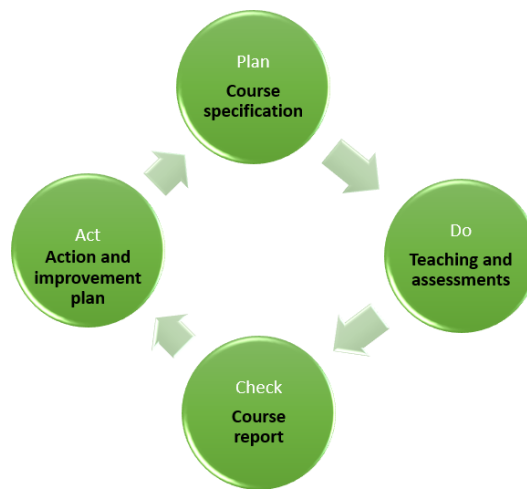


Figure 2: The quality cycle at the course level.

5.1 planning procedures

The planning stage is a crucial part of the quality cycle in which all other stages depend on. Below are the procedures followed in the program for this stage:

- 1- Mission, Goals, objectives, and graduate attributes are well-defined.
- 2- Program Learning outcomes (PLOs) are identified and aligned with its mission and goals.
- 3- Study plan is designed to consider achieving the program goals and learning outcomes and create an educational experience that is relevant, impactful in the field of physics.
- 4- Each course and module should be directly aligned to a specific PLO through the mapping matrix (see Appendix A).
- 5- A course specification for each course is established that includes desired learning outcomes that are aligned with PLOs according to the mapping matrix, Teaching and Learning Strategies, and Assessment Methods.
- 6- Establish suitable learning environment including resources and facilities.

5.2 Implementation procedures

1. The course instructor must follow course materials, teaching strategies, and evaluation methods as described in the course specification.
2. If more than one faculty member participates in teaching the same course, then a course coordinator is appointed who works in coordination among the course instructors to ensure that the curriculum is consistent.
3. To achieve equivalent teaching standards across all male and female sections, the course coordinator is responsible to ensure compliance with the unified course description of the course, the learning outcomes it contains, the list of topics, teaching and learning strategies, and assessment methods.

5.3 Monitoring procedures

1. By the end of each semester, each course instructor should complete the course report. The course report includes a percentage of the achievement of each course learning outcomes which are aligned with the PLOs of the program. . It also provides an analysis of students' grades and students' evaluations of the course that is collected from the Students Evaluation of Course surveys. Moreover, the course report also includes an improvement and action plans for the next semester.
2. The coordinator must collect course reports from all instructors and write prepares a comprehensive and unified report that reflects all the different sections.
3. The coordinator should prepare a course portfolio including: the final course report, samples of students' work, sample of exams, students' evaluation of the course and submit it to the accreditation and quality committee.
4. The accreditation and quality assurance committee reviews all the submitted course reports and write a report according to action and improvement plans proposed in the course reports and delivers it to curriculum committee.
5. The curriculum committee reviews the recommendation and make sure that any changes will not affect the other courses in the study plan.

5.4 Improvement Procedures

- 1- The improvement and action plans for each course are discussed in the department council meeting for final approval.
- 2- The curriculum committee updates the course specification based on the approved action plan.
- 3- The new course specification is distributed to instructors to follow the modified course specification.

6. Thesis Supervision Quality Assurance

Thesis Supervision Quality Assurance refers to the strategies and practices implemented within the program to maintain and enhance the quality of guidance provided to students during their thesis development. This process is crucial in ensuring the academic integrity and excellence of higher education institutions. Here's a follow of how quality assurance in thesis supervision can be achieved:

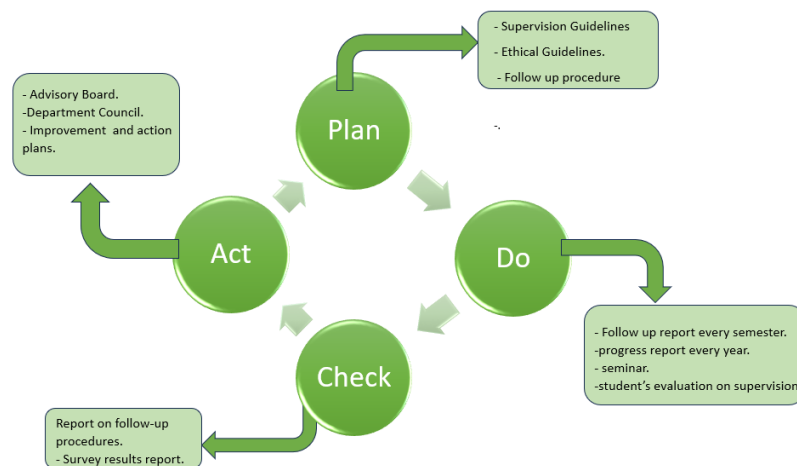


Figure 3: The quality cycle of thesis supervision.

6.1 Planning procedures

The planning stage is a crucial part of the quality cycle in which all other stages depend on. Below are the procedures followed in the program for this stage:

- 1- Establishing clear guidelines for supervisors detailing their roles and responsibilities (refer to the supervision guidelines).
- 2- Creating Ethical Guidelines: for emphasizing the importance of ethical research practices and ensuring both supervisors and students adhere to these standards (refer to Manual for Intellectual Property Regulations and Ethical Practices in the Physics Department).
- 3- Forming system to regularly monitor the progress of the thesis.

6.2 Implementation procedures

The implementation procedures are controlled in two significant phases: the proposal's approval and the research Follow-up. Below is the procedures for each phase:

6.2.1 Thesis's proposal approval

1. Topic Selection: Student often choose a topic that aligns with his/her interest. Then, the department suggests a qualified faculty member to serve as the thesis supervisor.

2. Initial Meeting: a meeting between the student and the faculty member is conducted to discuss the research plan, objectives, methodology, and expected outcomes.

3. Supervisor Confirmation: after meeting with the potential supervisor, students must identify and confirm a faculty member who specializes in the relevant area and is willing to provide guidance.

4. Proposal Preparation upon agreement, the faculty member prepares a comprehensive proposal (according to a proposal form template) that includes the research question, literature review, methodology, and expected outcomes.

5. Postgraduate Committee Review: the proposal is then submitted to the postgraduate committee to review it. Upon approval, the postgraduate committee will distribute the proposal with a survey to collect the staff members' opinions and comments about the proposal.

6. Feedback and Revision: the comments are sent back to the faculty member for consideration.

7. Department Council Approval: the proposal is discussed and approved by the department council.

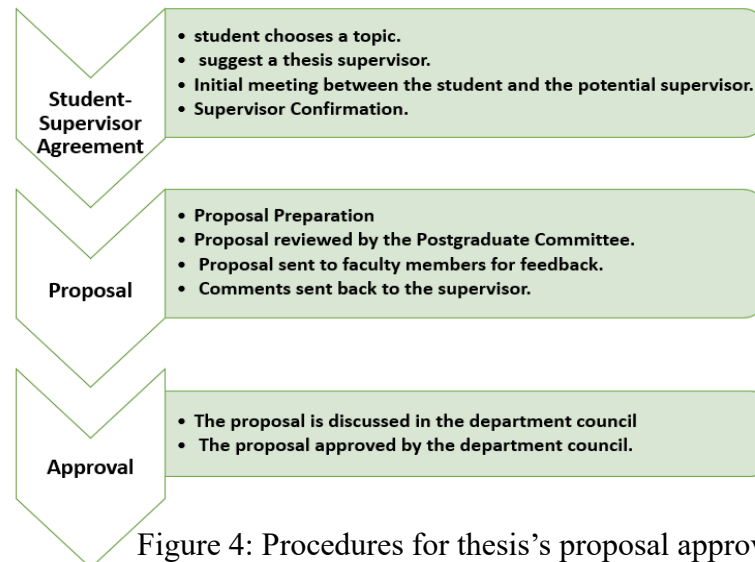


Figure 4: Procedures for thesis's proposal approval.

6.2.2 The research follow-up

1. Follow-up report: by the end of each semester each supervisor must submit follow-up report for each student to

2. Progress Report: by the end of academic year, the program assigns one of the faculty members to meet with the student to discuss the progress of the thesis and submit a report to the postgraduate committee.

3. Supervisor report: by the end of each semester the supervisor must submit an electronic report to the dean of postgraduate studies to evaluate the student's progress.

4. Scientific supervision quality survey: the questionnaire is typically designed to gather feedback from students about their experiences with their supervisors.

5. Seminar: Every student must give a seminar about his/her thesis during the department weekly seminar before submitting their thesis for defines. The seminar is evaluated by three faculty members (including the supervisor) that are specialized in the field student's thesis.

6. Publication: Students before applying for forming the VIVA committee must publish their research results in a journal or a conference.

6.3 Monitoring procedures

By the end of the academic year, the program coordinator prepares a report on the follow-up scientific supervision reports.

6.4 Improvement Procedures

- 1- The program coordinator with the help of the head of the department and the female coordinator, devises action or improvement plans.
- 2- The final report as well as the action and improvement plans are reviewed with the advisory committee for feedback.
- 3- The final report as well as the action and improvement plans are discussed in the department council for approval.
- 4- The implementation of the improvement and action plans are applied for one academic year then a new cycle begins.

7. Program Quality Assurance

It includes the procedures for the quality assurance cycle of the program, starting from the planning stage, then implementation, passing through Assessment, and ending with development.

6.1

7.1 Program Internal Quality Cycle

➤ Planning procedures

Key Performance Indicators (KPIs) are measurable indicators used to assess the program's progress in meeting goals for a given activity and project. The set of KPI's (see appendix B) to measure the effectiveness of the program activities and projects are approved by the department council as well as its targeted level.

➤ Implementation procedures

King Abdulaziz University is progressively producing various supporting data sets electronically through Evaluation and Quality Assurance of University Performance (EQAUP) that covers the following main aspects:

- 1- The key performance indicators (KPIs) are based on the requirements of NCAAAA including:
 - Average time for student's graduation.
 - Student satisfaction with the program.
 - Teaching effectiveness.
- 2- Profile of student numbers, scientific publishing, and percentage of faculty members compared to number Students.

➤ Assessment procedures

The program coordinator prepares an annual report according to NCAA annual report templet that includes Program Statistics, Program Assessment, KPIs, Challenges and difficulties encountered by the program, and Program development Plan. It measures the achievement of the learning outcomes of the program, its courses, and the results of the key performance indicators of the program included in the electronic EQAUP system, in addition to the results of the central questionnaires that include the evaluation of (program - course - university services - student experience - employers).

➤ Improvement Procedures

- 1- The annual report is discussed in the department council meeting for evaluation and approval.
- 2- The head of department with the help of the program coordinator Devise action and improvement plans for the next academic year.

- 3- The annual report, as well as the action and improvement plans, are reviewed with the advisory committee for feedback and evaluation.
- 4- Finally, the action and improvement plans are discussed and approved by the department council.
- 5- The head of the department is responsible for the implementation of the plans by distributing the tasks among the program's committee.

7.2 PLOs Assessment Cycle

The program adopts a 2-year review cycle for the evaluation of PLOs to measure the effectiveness of the implemented significant changes if any. Figure 5 summarizes the PLOs assessment cycle and below are the detailed procedures of each stage:

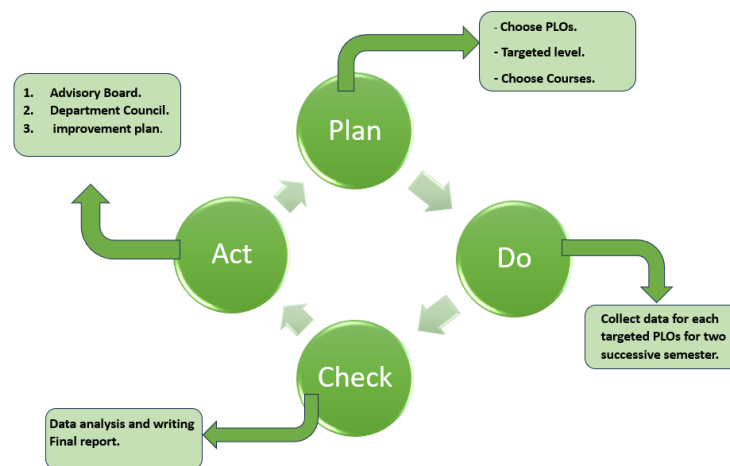


Figure 5: The assessment cycle for PLOs.

➤ Planning procedures

At this stage three important aspects must be specified:

- 1- Choose the PLOs that will assess each academic year (Usually the program chooses 2 PLOs).
- 2- Choose the courses that will be used for the assessment: The program selects courses have had sufficient practice with the PLO and are being expected to demonstrate their proficiency of the skill.
- 3- Set up the targeted level of achievement.

➤ Collect Data Procedures

By the end of each semester for one academic year, the program will collect the actual achievement level for each targeted PLO from the course report of the selected courses for two successive semesters.

➤ **Analyse Data Procedures**

In the third semester:

- 1- The program will merge all the collected data and analyse it to write a report that includes the actual level of achievement of each selected PLOs, a comparison with the last assessment report (if available) and determining causes of issues.
- 2- The program devises action or improvement plans which may include teaching methods, assessment methods, curriculum changes etc.

➤ **Improvement Procedures**

In the third semester

- 1- The report will be discussed with the advisory committee for feedback and improvement suggestions.
- 2- The report is discussed in the department council meeting for review and approval.
- 3- The implementation of the improvement and action plans will be applied for one academic year then a new assessment cycle will start.

7.3 Curriculum Review

Curriculum review is a formal process that evaluates the effectiveness of a curriculum in achieving its stated goals and objectives. This process is critical for ensuring that educational programs remain current, relevant, and aligned with institutional goals, industry standards, and student needs. There are two types of reviewing process :

➤ **Periodic Curriculum Review**

According to the university's strategic plan, the programs providing the bachelor's degree, the periodic curriculum review should be conducted every four to six years (IQAS2023). The program follows the policies and procedures provided by the Curriculum centre for the review process. The approval of the review will follow the path shown in (Figure 4).

➤ **Modification of the Curriculum**

This includes simple modification to some elements in the study plan (less than 20% changes) and require the approval form Educational Curriculum Centre as shown in Figure 6.

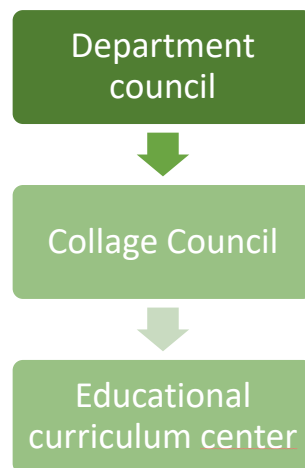


Figure 6: Modification of the curriculum improvement Route.

7.4 Development Paths

According to the university internal quality assurance system (IQAS 2023), there are two types of improvements, each with its own approval path:

- **The major changes** that require approval are on the path shown in Figure 5. This usually involves changing one or more of the following major components of the program:
 - Objectives of the program,
 - Program title, duration, or method(s) of study
 - Adding new tracks to the program.
- **The minor changes** that require internal action within the department and to approve it as shown in Figure 6. Minor changes that may be approved under this category include:
 - Course content changes if learning outcomes are not affected.
 - Teaching and learning methods.
 - Assessments methods of the course.
 - Update references.

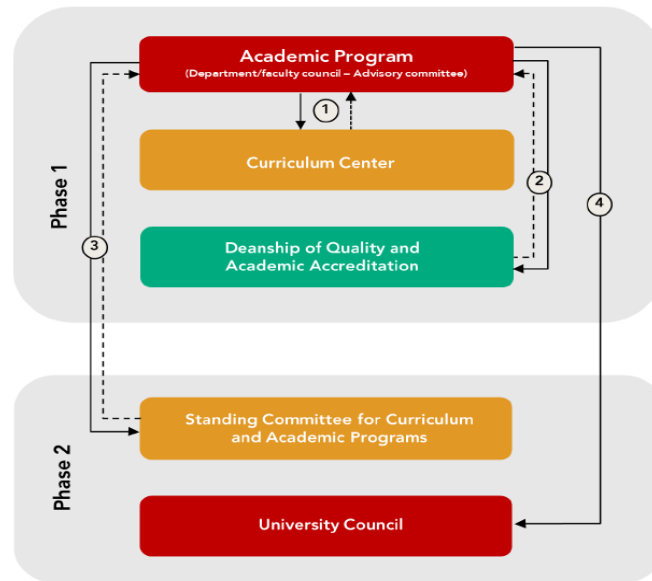


Figure 7: Procedural sequence of major changes for university's undergraduate programs [Source: KAU, IQAS, 2023]

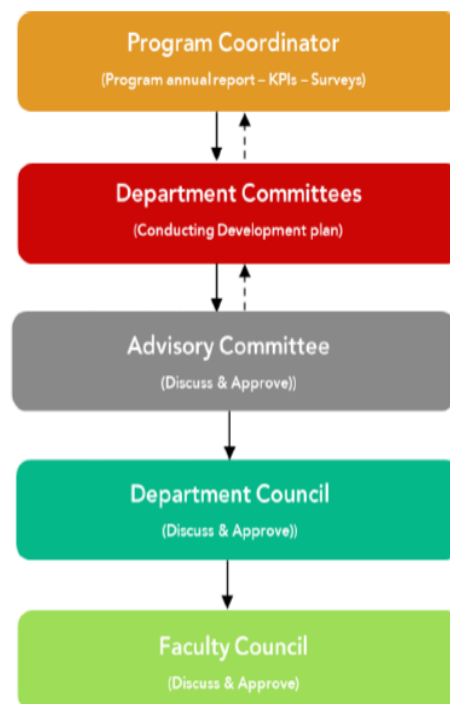


Figure 8: Procedural sequence of minor changes [Source: KAU, IQAS, 2023]

Appendix A: Program learning Outcomes Mapping Matrix

Align the program learning outcomes with program courses, according to the following desired levels of performance (**I** = **Introduced** **P** = **Practiced** **M** = **Mastered**)

Course code & No.	COURSE NAME							
		K1	S1	S2	S3	V1	V2	V3
PHYS 600	Experimental Measurements and Data Analysis			I	I	I	I	I
PHYS 613	Mathematical Physics	I	I					
PHYS 614	Advanced Analytical Mechanics	I	I					
PHYS 615	Electromagnetism Theory (1)	P	P					
PHYS 616	Advanced Quantum Mechanics (1)	M	M					
PHYS 617	Statistical Mechanics	M	M					
PHYS695	seminar			P	P	P	P	P
PHYS 699	thesis			M	M	M	M	M

Appendix B :Program KPIs

No	KPIs Code	KPIs	Measurement Methods	Measurement Time
1	KPI-P-01	Students' Evaluation of quality of learning experience in the program	Survey	End of academic year
2	KPI-P-02	Students' evaluation of the quality of the courses	Survey	End of each semester
3	KPI-P-03	Students' evaluation of the quality of supervision	Survey	End of each semester
4	KPI-P-04	Average time for student's graduation	Postgraduate committee	End of academic year
5	KPI-P-05	Rate of students dropping out of the program	Postgraduate committee	End of each semester
6	KPI-P-06	Employers' evaluation of the program graduate's proficiency	Survey	End of academic year
7	KPI-P-07	Students' satisfaction with services provided	Survey	End of academic year
8	KPI-P-08	Ratio of students to faculty members	Program coordinator	End of academic year
9	KPI-P-09	Percentage of publications of faculty members	Scientific research committee	End of academic year
10	KPI-P-10	Rate of published research per faculty member	Scientific research committee	End of academic year
11	KPI-P-11	Citations rate in refereed journals per faculty member	Scientific research committee	End of academic year
12	KPI-P-12	Percentage of students' publication	Scientific research committee	End of academic year
13	KPI-P-13	Number of patents, innovative products, and awards of excellence	Scientific research committee	End of academic year

Appendix C: Academic calendar for all Quality Assurance activities

Semester	Week	Activity
First semester	Q1	1- Approval of all course reports action plan 2- Assigning a coordinator for each course report. 3- Advisory committee meeting for feedback. 4- Discussion of the Program Annual report for approval by the department council.
	Q2	1- Action and improvement plans approval from the department council. 2- Implementation of the action and improvement plans
	Q3	
	Q4	1- All course reports must be submitted. 2- Revision of Course reports
Second semester	Q1	1- Approval of all course reports action plan 2- Assigning a coordinator for each course report
	Q2	Advisory committee meeting for feedback.
	Q3	Collecting data for the Program Annual Report
	Q4	1- All course reports must be submitted. 2- Revision of course reports

Approval Data

Committee/Council No.	14
Reference NO.	5 th
Date	23/01/2024