



ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes

Medical Physics

Physics

Mathematics

(Male Campus)

Provided by

Umm Al-Qura University, Saudi Arabia

Version: December 6th, 2019

Table of Content

A About the Accreditation Process.....	3
B Characteristics of the Degree Programmes	5
C Peer Report for the ASIIN Seal	8
1. The Degree Programme: Concept, content & implementation	8
2. The degree programme: structures, methods and implementation.....	15
3. Exams: System, concept and organisation.....	20
4. Resources	22
5. Transparency and documentation.....	26
6. Quality management: quality assessment and development	29
D Additional Documents	33
E Comment of the Higher Education Institution (07.05.2018)	34
F Summary: Peer recommendations (16.05.2018)	35
G Comment of the Technical Committees	37
Technical Committee 12 - Mathematics (19.06.2018)	37
Technical Committee 13 - Physics (15.06.2018)	37
H Decision of the Accreditation Commission (29.06.2018)	39
I Fulfilment of Requirements (28.06.2019).....	42
Comments of the peers and the Technical Committees (24.06.2019).....	42
Decision of the Accreditation Commission (28.06.2019)	46
J Fulfilment of Requirements (06.12.2019).....	48
Comments of the peers and the Technical Committees (19.11.2019).....	48
Decision of the Accreditation Commission (06.12.2019)	51
Appendix: Programme Learning Outcomes and Curricula	52

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for ¹	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) ²
بكالوريوس العلوم في الفيزياء الطبية	Bachelor of Science in Medical Physics	ASIIN	-	13
بكالوريوس العلوم في الفيزياء	Bachelor of Science in Physics	ASIIN	-	13
بكالوريوس العلوم في الرياضيات	Bachelor of Science in Mathematics	ASIIN	-	12
<p>Date of the contract: 14.04.2017</p> <p>Submission of the final version of the self-assessment report: 13.10.2017</p> <p>Date of the onsite visit: 20.02. – 22.02.2018</p> <p>at: Makkah (male campus), Saudi Arabia</p>				
<p>Peer panel:</p> <p>Prof. Dr. Arno Schindlmayr, Paderborn University</p> <p>Prof. Dr. Ulrich Stadtmüller, University of Ulm</p> <p>Prof. Dr. Klemens Zink, Technical University of Applied Sciences Mittelhessen</p>				
<p>Representative of the ASIIN headquarter:</p> <p>Rainer Arnold</p>				
<p>Responsible decision-making committee:</p> <p>Accreditation Commission for Degree Programmes</p>				

¹ ASIIN Seal for degree programmes;

² TC: Technical Committee for the following subject areas: TC 13 – Physics; TC 12 – Mathematics

<p>Criteria used:</p> <p>European Standards and Guidelines as of 15.05.2015</p> <p>ASIIN General Criteria as of 28.03.2014</p> <p>Subject-Specific Criteria of Technical Committee 13 – Physics; as of 09.12.2011</p> <p>Subject-Specific Criteria of Technical Committee 12 – Mathematics as of 09.12.2011</p>	
--	--

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Ba Physics	Bachelor of Science in Physics	-	6	Full time	no	8 Semester	130 credit hours	Fall Semester 1981
Ba Medical Physics	Bachelor of Science in Medical Physics	-	6	Full time	no	8 Semester	136 credit hours	Fall Semester 1984
Ba Mathematics	Bachelor of Science in Mathematics		6	Full time	no	8 Semester	137 credit hours	Fall Semester 1998

³ EQF = The European Qualifications Framework for lifelong learning

For the Bachelor's degree programmes Physics and Medical Physics, University Umm Al-Qura has presented the following profile on its webpage:

“Vision:

Achieving leadership in physics and medical physics at the local and international levels and actively participating in the community institutions.

Mission:

Innovation and excellence in higher education and scientific research in physics and medical physics, the graduation of students highly skilled scientifically and technically, and the contribution to the service and development of the community.

Objectives:

Physics Department aims to achieve a number of objectives, exemplified in the following:

1. To achieve leadership in higher education, scientific research and community service.
2. To upgrade graduates level through the achievement of comprehensive quality standards.
3. To prepare advanced and innovative educational programs that qualify the graduates to keep up with the requirements of knowledge society and labour market.
4. To provide students with basic knowledge and skills in physics and medical physics.
5. To promote scientific research and to qualify specialized scientific and professional cadres to contribute to carrying out distinguished scientific and practical researches.
6. To serve community organizations through effective partnerships.
7. To form partnerships with research centers and prestigious global universities.
8. To attract distinguished scientific and administrative cadres.”

For the Bachelor's degree programme Mathematics, University Umm Al-Qura has presented the following profile in the Self-Assessment Report:

“Mission:

Our mission is to provide distinguished programs in Mathematical Sciences that serve education and scientific research to prepare professionals able to strongly compete in the labour market.

Objectives:

The Mathematical Sciences Department seeks to:

A- Prepare professional experts ready to work in the educational and scientific research sectors in the Mathematical Sciences field;

B- Develop Study plans to cope with scientific progress in Mathematical Sciences;

C- Enrich the scientific library through translating and authoring books of Mathematical Sciences;

D- Attract talented people in this field and prepare them to be faculty staff in the future;

E- Encourage Department members to attend and take part in scientific conferences and courses; and

F- Encourage members to carry out scientific researches, create research groups and give courses and lectures in mathematical sciences.”

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Learning objectives of each degree programme according to the SAR (Self-Assessment Report) and the objective-module matrices
- Study plans of the degree programmes
- Module descriptions
- Webpage Umm Al-Qura: <https://uqu.edu.sa/en>
- Webpage Department of Physics: <https://uqu.edu.sa/en/physcim>
- Webpage Department of Mathematics: <https://uqu.edu.sa/en/mthscim>

Preliminary assessment and analysis of the peers:

The university informs about the vision, objectives and learning outcomes of the degree programmes at several institutional levels (university, college, department). The provided documentation is well suited to assess whether the defined objectives of the Bachelor's degree programmes Physics, Medical Physics and Mathematics adequately reflect the level of academic education aimed at and comply with the learning outcomes as described in the respective ASIIN Subject-Specific Criteria (SSC).

According to the general programme objectives, as stated in the Self-Assessment Report, UQU wants to prepare academically qualified graduates for current labour market needs in Saudi Arabia. This happens in accordance with the "vision 2030" of Saudi Arabia's government, which aims at diversifying the economic capabilities from oil-based to knowledge-based.

The auditors base their assessment of the programme specific learning outcomes as mentioned on UQU's website and in the Self-Assessment Reports. For the degree programmes under review there are currently three active study plans (plan 19, plan 33

and plan 37). To provide a consistent assessment of the learning objectives in relation to the curriculum, the audit team focuses on the study plans version 2016/17 (1437, plan 37).

The auditors refer to the Subject-Specific Criteria (SSC) of the Technical Committees Mathematics and Physics as a basis for judging whether the intended learning outcomes of the Bachelor's degree programmes Physics, Medical Physics and Mathematics as defined by UQU correspond with the competences as outlined by the respective SSC. They come to the following conclusions:

Graduates of the Bachelor's degree programme Physics should have a broad understanding of fundamental and applied physics, both from a theoretical and experimental perspective. They should acquire relevant scientific knowledge in classical physics (mechanics, electrodynamics, thermodynamics, vibrations, waves and optics) and be familiar with the fundamentals of quantum, atomic and molecular, nuclear, elementary particle and solid-state physics. In addition, graduates should be trained to work in teams and to carry out experiments in a laboratory. Recently, graduate students from the Bachelor's degree programme Physics are highly demanded in universities and other educational institutions in Saudi Arabia.

The Bachelor's degree programme Medical Physics pursues the goal of training physicists with medical knowledge who are able to use physical appliances in the area of medicine. On this basis, graduates are supposed to be qualified to work as medical physicists in hospitals and the health care sector as well as at the interfaces between physics and medicine. The Medical Physics programme combines training in the core subjects of physics and its medically relevant applications, mainly radiology, with basic medical knowledge in areas such physiology and cell biology.

With respect to the Bachelor's degree programme Mathematics, the intended learning outcomes include gaining a profound overview of the contents of fundamental mathematical theories and applications and being able to identify their correlations. In addition, graduates should also be trained in using the appropriate mathematical techniques to analyse and interpret data. Finally, the graduates should be capable of applying mathematical skills and knowledge to understand and solve real life problems. Graduates of the Bachelor's degree programme Mathematics are able to work in various educational institutions as well as in research institutes or in the public administration.

During the discussion with the programme coordinators, the auditors learn that graduates wanting to pursue a teaching career in order to become a high school teacher have to enroll in a supplementary study programme, usually requiring an additional year of studies. The auditors hear from the alumni that becoming a high school teacher is one of the major job perspectives for graduates of the Bachelor's degree programmes Physics and Mathematics

as the economy currently suffers from a shortage in teachers for mathematics and physics. Graduates of the Bachelor's degree programme Medical Physics additionally have job opportunities in hospitals. Alternatives to a career in schools are jobs in the private sector, such as in medium-sized companies and in industry, but this aspect is presently not well developed.

The auditors are pleased to note that UQU constantly works on the qualification profile of the graduates in order to fulfil the needs of the economy. Therefore, UQU is trying to build bridges with local industries (e.g. SABIC) in order to enhance job opportunities in the private sector. Based on this information, the auditors come to the conclusion that objectives and learning outcomes of all three degree programmes are adequately and regularly reviewed by the programme coordinators and further developed, if required.

The information provided in the Self-Assessment Reports and the supplementary information received from the programme coordinators clearly show that discipline-related skills are accurately outlined and competences are defined for the Bachelor's level complying with the respective Subject-Specific Criteria (SSC) of the ASIIN Technical Committees. The auditors are convinced that the intended qualification profiles of the degree programmes under review allow the students to find positions reflecting their qualification, both in the private and the public sector. The degree programmes are designed to meet the particular needs of the local labour market in the area of Makkah. This implies a special focus on all problems and challenges that are connected with the Hajj, the annual Islamic pilgrimage to Makkah.

The auditors consider objectives and learning outcomes of the degree programmes appropriate for attaining the intended level of academic qualification. The intended learning outcomes also adequately correspond with the ASIIN Subject-Specific-Criteria (SSC) of the Technical Committee 12 – Mathematics respectively of the Technical Committee 13 – Physics (Physics, Medical Physics). The three Bachelor's degree programmes furthermore fulfill the qualification prerequisites as specified in the European Qualifications Framework level 6 (Bachelor).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-Assessment Reports
- Webpage Department of Physics: <https://uqu.edu.sa/en/phycim>
- Webpage Department of Mathematics: <https://uqu.edu.sa/en/mthscim>

Preliminary assessment and analysis of the peers:

The audit team considers all degree programme titles appropriate for reflecting the intended aims and learning outcomes. The main language used in teaching is English and if needed Arabic.

Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Reports
- Study plans of all degree programmes
- Module descriptions
- Webpage Umm Al-Qura: <https://uqu.edu.sa/en>
- Webpage Department of Physics: <https://uqu.edu.sa/en/physcim>
- Webpage Department of Mathematics: <https://uqu.edu.sa/en/mthscim>

Preliminary assessment and analysis of the peers:

Information on the degree programmes is available from the webpages of the involved departments. The auditors welcome that every departmental website entails the description of the curriculum. The curricula of all degree programmes under review are accessible via the webpages of Physics and Mathematics Departments.

The Bachelor's degree programmes Physics, Medical Physics and Mathematics include a so-called foundation year (formerly preparatory year) which focuses on General Studies, English skills, Islamic Courses and Computer Skills. The subject-specific training is implemented in the second to fourth year. As a result, there only a few subject relevant modules in the first year of studies. The curriculum of the Mathematics programme consists of the following courses: 5 % Computer Skills, 15 % General Sciences, 10 % English Language, 70 % Mathematics, 3 % Bachelor's Project and 2 % Practical Work. In the view of the auditors, this curriculum is designed appropriately and contains all basic courses being necessary for a Bachelor's degree programme in Mathematics. As a specific feature, introductory courses in all Natural Sciences can be mentioned. A similar distribution can be found in the Physics curriculum: 1 % Computer Skills, 20 % General Education, 6 % English Skills, 8 % Mathematics Science, 61 % Physics Course, 4 % Bachelor's Project. The auditors state that the curriculum follows the usual structure of undergraduate physics programmes, starting with accessible classical physics and mathematics and culminating in courses on modern physics. A special focus on nuclear physics and technology can be found in the final year. The programme coordinators explain this with a special demand for

graduates in this area as Saudi Arabia plans to build nuclear power plants. As already mentioned, the curriculum of the Medical Physics programme does not include any graduation project but a Hospital Training. Consequently, the Medical Physics' curriculum consists of the following courses: 3,7 % Computer Skills, 32,6 % General Science, 7,4 % English Language, 52,6 % Medical Physics, 3,7 % Training at the Hospital. Suitable placements are guaranteed by co-operations with 6 hospitals in Makkah and also some other hospitals (e.g. for radiation medicine) in the area of Jeddah, a well-functioning proceeding according to the students.

The auditors recognize that the three degree programmes under review are taught entirely in English (study plans 37). The respective learning outcomes also include the international competitiveness of graduates and their ability to communicate in English as the internationally accepted scientific language.

According to UQU's mission, the degree programmes aim at preparing students equally well for a scientific career and for work in industry or the public sector. This requires gaining expertise in carrying out independent scientific work, demonstrated, for instance, in a graduation project. Nevertheless, the Bachelor's degree programme Medical Physics does not include any graduation project. In addition, not all graduation projects reviewed by the auditors during the on-site-visit reflect an adequate scientific level (This is also discussed under criterion 3). According to the SSC of the Technical Committee Mathematics graduates of a Bachelor's degree programme Mathematics should be able to solve mathematical problems, which is generally to be proven within the framework of a Bachelor's thesis. Moreover, graduates should "have a basic ability to work in a scientific way. They are in particular able to formulate mathematical hypotheses and have an understanding of how such hypotheses can be verified or falsified using mathematical methods." The theses inspected by the auditors on-site did not reflect this academic level and, therefore, this requirement of the SSC is not fulfilled. In all programmes some research projects are done by large groups of students and it is not transparent what the contributions of each single student is. The same applies to the Bachelor's degree programme Physics. Furthermore, in both programmes some research projects are done by large groups of students. It did not become clear how the contributions of individual students can be properly assessed.

As outlined under criterion 1.1, the peers conclude from the information provided in the Self-Assessment Report and during the audit, particularly from reviewing sample exams, that the learning outcomes of the programmes match – minor limitations given – with the standards defined in the Subject-Specific Criteria (SSC) of the ASIIN Technical Committees for Mathematics and Physics.

The audit team concludes that the imparted discipline-specific curricular content of all three programmes – minor exceptions given – reflects the state of the art and is adequate for the level and objectives of the programmes. The courses are suited for achieving the intended learning outcomes in a comprehensive manner, as specified in the module descriptions. The students interviewed by the peers during the audit underline that curricular content and learning outcomes match their expectations with regard to their professional career. However, the auditors have the impression from studying the module handbook that scientific skills should be stronger emphasized in the curricula and should be particularly stressed in the research project. Addressing this issue, the auditors concur that the scope and quality of the research project needs to be improved. At module level, the introduction of small writing assignments in subject-specific courses could from early semesters on be an attractive way for allowing students to meet standards in scientific writing. Deficits in extracting information from scientific literature and placing experimental findings from graduation projects into a scientific context, which were obvious in some of the research projects inspected during the audit, could thus be reduced.

Furthermore, the auditors note that the curricula of all degree programmes entail some courses that appear to contribute more indirectly to qualifying students by international scientific standards. The auditors understand that the unique location of UQU in the city of Makkah justifies a specific profile with an emphasis on Quran and Islamic Studies. Additionally, the students stress the importance of Islamic and Arabic Studies and express their satisfaction with the Bachelor's degree curriculum during the audit. In view of the fact that most, if not all, students originate from Arabic countries, mandatory courses teaching Arabic language occupies, according to the peers' opinion, a considerable fraction of the three natural sciences curricula under review. The auditors expect students being admitted to the degree programmes at the College of Applied Sciences to have received sufficient expertise in speaking, reading, and writing Arabic on a well-educated level. Compensating deficits from high school education is not the duty of a university. An approach to securing that appropriate standards in Arabic language are met would be to request applicants to properly fill out questionnaires and pass an interview as part of an entrance examination. Directing language issues to high school education furthermore opens the possibility for introducing electives in the three degree programmes under review. The programme coordinators explain that the introduction of electives is planned and will mainly be based on student's needs and the peer's recommendation. For instance, courses in presentation skills and project management or specialized courses would be useful for creating more opportunities for students to specialize and to make them even more attractive for the job market.

Criterion 1.4 Admission requirements

Evidence:

- Self-Assessment Reports
- Webpage Umm Al-Qura: <https://uqu.edu.sa/en>

Preliminary assessment and analysis of the peers:

Admission requirements for all degree programmes are based on three elements: the final grade of the high school degree, passing of general IQ test by the applicant, and passing a test specifically designed for applicants enrolling for degree programmes at the College of Applied Sciences.

The results are combined and weighted against a minimum threshold percentage that is defined annually for each programme. Combined results above the minimum threshold grant access to the programme, results below the threshold do not.

As specified on the university's homepage the admission requirements at UQU are:

1. The student must be Saudi national, or descending from a Saudi mother (non-Saudis may apply for scholarship programmes).
2. The applicant must be holding a secondary school certificate (or an equivalent) from the Kingdom of Saudi Arabia or abroad.
3. The secondary-school certificate must be a recent one (not exceeding 5 years). For the Colleges of Medicine, Pharmacy and Health Sciences, the period must not be longer than 2 years.
4. The student must pass all exams (aptitude test + summative test + English language test) organized by the National Center for Academic Assessment, if required by the desired department.
5. The student must pass any other exam or interview required by the college (e.g. Quranic Recitations, Judicial Studies, Physical Education, and Art Education)
6. The applicant must not have been dismissed from the University or any other university for punitive purposes.

The auditors consider the chosen requirements suitable for ensuring subject-specific qualification of graduates from high school for being admitted to higher education at UQU.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

The peers appreciate that UQU will try to limit the number of students working on the same research project to four. In addition, each paper will include, as a complementary document, the scientific contribution of each student. With respect to improving the students' ability to write scientific publications and to carry out scientific work, the mathematics department council will offer two workshops. They will be compulsory for all students enrolling for the research project course. The peers expect UQU to submit detailed information about these workshops, the design of the research project, and the scientific outcome in the course of the fulfilment of requirements.

UQU clarifies in its statement, that "the degree programmes are designed to meet the particular needs of the local labour market in the Kingdom of Saudi Arabia (KSA), concerning the needs of Makkah's area." In addition, UQU points out that "there a special demand for graduates in this area as Saudi Arabia plans to build nuclear power plants for the peaceful use of nuclear energy." The peers accept this point but still recommend to work towards a more flexible curriculum and a wider qualification profile that aligns better with job opportunities in the private sector.

The peers consider criterion 1 to be mostly fulfilled.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules
--

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions

Preliminary assessment and analysis of the peers:

The structure of the Bachelor's degree programmes Physics, Medical Physics and Mathematics well as the individual modules are, from the auditors' point of view, coherent and consistent. This assessment is confirmed by the students who are very satisfied with the organisation and structure of the degree programmes. The auditors acknowledge

positively that there is a curriculum committee in the Physics as well in the Mathematics Department, which meet regularly to discuss about the courses, possible overlaps and the general structure of the respective degree programmes. The only weak point the auditors find is the lack of elective courses and the unsatisfactory scientific depths and quality of the Bachelor's thesis (research project) as outlined in under criterion 1.3 and criterion 3.

Each degree programme is composed of modules (here named "courses"), which the auditors perceive as comprehensive and self-contained teaching and learning units. Apart from the research project, the auditors consider the intended learning outcomes and the content of the courses to be reasonable and adequate.

In general, the degree programmes under review are designed to be completed within 4 academic years. As the intake for study plan 37 started in the fall semester 2016/2017, assessing the fraction of students able to complete the programme within the foreseen timeframe is only possible for the auditors by looking at statistical data referring to previous study plans (33 and 19). Data summarizing the number of admitted students, dropout rates, and the number of graduations suggest that the degree programmes can be completed within the regular timeframe (8 semesters). Students as well as programme coordinators confirm during the discussions with the auditors that only a few students leave UQU after one or two semesters but several change their major because other degree programmes better fit their interests and qualifications. In total, the drop-out rate is adequate.

With respect to the academic mobility of the students, the auditors find that studying abroad for a limited period during the Bachelor's programmes is not an option so far. The programme coordinators concede that the College of Applied Science is waiting for the international accreditation of the Bachelor's degree programmes before starting international co-operations. Since the auditors learn from students and graduates that many of them plan to apply for international Master's programmes, the College of Applied Sciences should immediately start to initiate exchange programmes with international universities and provide scholarships for qualified students. The auditors emphasize that it is very useful for students to spend some time abroad already during their Bachelor's studies to improve their English proficiency and to enhance their opportunities for being accepted in an international Master's programme.

There are rules for recognizing achievements acquired at other universities outside UQU, but this possibility is only a theoretical option and currently depends on the individual effort of the student. No support mechanisms for promoting academic mobility of students are currently offered by the College of Applied Sciences.

The auditors discuss with students and graduates about job opportunities. Most of the graduates of the physics and mathematics programmes become high school teachers or work for governmental institutions. Since there is a shortage in teachers for mathematics and physics in Saudi Arabia, the graduates have very good job perspectives. Even if there are employment opportunities in the private sector, the graduates prefer governmental jobs, because they are more secure and usually better paid. This is also true for graduates of the Bachelor's degree programme Medical Physics; they usually find a job in the medical physics department of a hospital. The graduates need an additional license before being allowed to work as a professional medical physicist. A governmental institution awards this license, it is necessary to pass an exam in order to receive the license. Many jobs in the area of medical physics are only open for license holders.

Several students want to continue their academic education with a Master's degree or possibly a PhD programme. For this reason, it would be useful to strengthen the role of the research project and to introduce more independent research activities so that graduates are better prepared for joining a Master's programme.

Criterion 2.2 Workload and credits

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions

Preliminary assessment and analysis of the peers:

The workload of the degree programmes under review is defined in the study plans (plan 37). It differs between the physics programme (130 credit hours), the medical physics programme (136 credit hours) and the mathematics programme (137 credit hours).

The credit point system in use at UQU is mainly based on contact hours, including lectures, seminars and labs. The number of contact hours is stipulated in the course specifications (module descriptions), but unfortunately no information is included, how the contact hours are divided into lectures and lab work. According to the Self-Assessment Report, the additional workload for self-study and/or homework is based on the amount of contact hours: independent study hours = lectures hours x 2 + labs hours. Again, the course specification do not make transparent, how many hours of self-studies are calculated. For this reason, the College of Applied Sciences should include this information in all course specifications, so that it becomes transparent, how the workload and the respective credit hours are determined.

In addition, the conversion to ECTS is done very inconsistently. The ratio between credit hours and ECTS credit points varies from degree programme to degree programme and from course to course. The auditors think it is necessary, firstly to determine the total workload (including contact hours and hours of self-study) for each course and secondly to convert the total workload into ECTS credit point. This should be done consistently and within the ECTS framework. Moreover, the auditors suggest systematically analysing the workload for all courses and adjusting the crediting system in case discrepancies regarding allocated credits become obvious.

During the discussion with the auditors, the students confirm that the overall workload in all degree programmes under review is appropriate and that it is possible to complete the degree without exceeding the expected duration of 8 semesters.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Assessment Report
- Study plans of the degree programmes
- Module descriptions

Preliminary assessment and analysis of the peers:

The Bachelor's degree programmes in Physics, Medical Physics, and Mathematics at UQU are full-time programmes with classroom and self-study activities. Class attendance is mandatory for all courses.

The auditors confirm that a number of different teaching methods such as traditional lectures, classroom and laboratory exercises, assignments, project work, online learning, and seminars are used. As the group sizes on the male campus are rather small, experiments can be done in small groups of 2 to 3 students. The panel positively acknowledges that homework and laboratory work are essential parts of many courses. Students also point out the usefulness of regular assignments in order to achieve the intended learning outcomes. The auditors especially appreciate that discussions between teachers and students are carried out in social media groups and via an electronic learning platform, allowing direct and real-time communication, also beyond regular lecture and university hours. The students confirm towards the peers that e-learning tools are widely used in the degree programmes.

In general, the auditors see that the employed teaching methods are appropriate to support the achievement of the intended learning objectives.

Criterion 2.4 Support and assistance

Evidence:

- Self-Assessment Report
- Student Handbook

Preliminary assessment and analysis of the peers:

Students receive extensive support in study- as well as in personal-related situations at UQU. The auditors are impressed by the commitment of the teachers in counselling students and helping to solve as many problems as possible. Resources and infrastructure for an effective support and assistance system are clearly visible and are appreciated by the students.

For guidance and assistance in planning their programme, students are assigned an academic advisor at the beginning of their studies. Involved in support and assistance are furthermore tutors, programme coordinators, teaching staff, as well as the members of the Careers and Employment Service. The teaching staff offers office hours for meeting students. The department's course coordinator and the Vice Dean for Academic Affairs have overall responsibility for student guidance, problem solving, and academic / non-academic counselling.

Both staff and students seem highly involved in the academic activities. Good relationships evidently exist between students and staff members. Reportedly, the teaching staff is highly responsive towards the students' needs and complaints as well. In addition, there are several student organizations at UQU; these include Student's Activity Clubs, which are divided into arts, sports, religious and other non-curricular activities.

The auditors are impressed by the dedication of the teaching staff for supporting and assisting students. This strong engagement is directly reflected by contentment and respect of the students towards their teachers. The support and assistance system at the College of Applied Sciences is one of the strong points of the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

The peers acknowledge that UQU has submitted some more information how the students' workload is calculated and how high it is every semester. The peers point out that the conversion in ECTS credit points is still faulty. As mentioned before, there must be a fixed relation between total working hours (contact hours and self-studies) and awarded ECTS credit points. In the first, sixth, seventh, and eighth semester of the mathematics

programme the total workload is 686 hours but the awarded ECTS credits are different (28 ECTS in the first semester and 32 ECTS in the sixth, seventh and eight semester, see table 2). The peers stress that UQU has to calculate the workload for each class, convert it to ECTS (with a fixed conversion rate), and then calculate the sum for the whole semester. They expect UQU to make sure that the actual workload of the students is consistent with the awarded credits.

The peers consider criterion 2 to be mostly fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self-Assessment Report
- Module descriptions

Preliminary assessment and analysis of the peers:

The auditors see that a variety of examination forms is used for assessing the intended learning outcomes. In each course, the students can achieve a maximum of 100 points. The teacher may allocate 40% to 60% to periodic assessments consisting of exercises and homework, participation in lectures, midterm exam, lab reports, quizzes, and projects while the remainder is allocated to the final examination. The elements used for the grading are described in detail in the course specifications (module descriptions). The students must attend 75% of the classes; otherwise, they fail the course.

The auditors learn during the discussion with the members of the teaching staff that oral assessments and small group projects are already used in several courses and contribute to verifying the achievement of learning outcomes. Nevertheless, the panel encourages UQU to explore further opportunities for implementing oral exams also in the case of final exams. The different forms of assessment are announced to the students at the beginning of each course and are transparent to them.

From studying the Self-Assessment Report and from discussions during the visit, the auditors gain the impression that the methods used by the teaching staff at the College of Applied Sciences for assessing learning outcomes are generally appropriate. The only weak point they identify is the Research Project. During the audit, the peers inspect sample exams and final theses (research projects). Not all theses shown to the auditors correspond

to scientific standards, as would have been expected based on the project description. The auditors consider scientific working standards, ethics in science, and concepts of writing scientific publications essential for graduating from scientific study programmes. Currently, the research project is usually literature based, but from the auditors' point of view, practical work or experiments should be an essential part of each thesis.

In case students work as a group when preparing a research project, the individual contribution of every student has to be apparent and clearly stated in the thesis in order to allow the individual contributions to be assessed. A reasonable limit for group size for conducting a graduation project are four students.

In order to meet international standards the auditors expect UQU to reconsider the scope, experimental background and documentation of the research project. Setting international standards will be the key for students to continue their academic education, particularly abroad, and will support graduates in finding a science-related job in the private sector or at universities. An appropriate scope and academic quality of a final project must also be guaranteed in order to follow the vision of the College of Applied Sciences: "The development of student's research capacity and take advantage of modern technological developments".

In addition, the auditors point out that there is no final project in the current curriculum of the Bachelor's degree programme Medical Physics. Although the students complete a Hospital Training in their last semester, this course does not compensate the missing final project. Hospital Training aims at conveying practical skills and abilities needed by medical physicists working in a hospital. The auditors expect UQU to introduce a research project into the curriculum of the Bachelor's degree programme Medical Physics and suggest combining it with the Hospital Training. A combined supervision of the research project by a UQU staff member and the responsible medical physicist in the hospital seems useful.

As stated in the Self-Assessment Report, there is a period in every semester for midterm exams and a period for final exams. Organization and scheduling of exams runs smoothly as exam dates are planned and published at the beginning of each semester and no issues of overlaps were reported by either students or teachers. Failed exams cannot be repeated, the whole course must be attended again, either during the summer term or in the next semester. The number of repetitions is unlimited. Students confirm that all rules and regulations regarding exams, calculation of grades and pass rates as well as scheduling and re-sits are clear to them and are transparently described.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

The peers acknowledge that the number of possible repetitions of an exam depends on a student's Grade Point Average (GPA). If the GPA is below 1.0 out of 4.0 in a semester, the student gets a warning and will be suspended after three consecutive warnings.

The peers consider criterion 3 to be mostly fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Report
- Staff Handbook
- Annual Programme Report Physics 2016/17
- Annual Programme Report Medical Physics 2016/17
- Annual Programme Report Mathematics 2016/17

Preliminary assessment and analysis of the peers:

At UQU, the staff members have different academic positions. There are full professors, associate professors, assistant professors, lecturers and demonstrators. The academic position of every staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. For example, a full professor needs to hold a PhD degree. In addition, responsibilities and tasks of a staff member with respect to teaching load, research, and supervision depend on the academic position. The auditors learn that the teaching load is 14 hours for assistant professors, 12 for associate and 10 for full professors

According to the Staff Handbook, the Physics Department employs 75 staff members. They are distributed between the female and male campus. The peers notice that the distribution is not well balanced. For example, there are 36 female and 39 male staff members, but there are almost ten times as many female as male students. In addition, all of the female staff members are demonstrators (15), lecturers (10) or assistant professors (11). Only males occupy the upper levels of the academic hierarchy (professors and associate professors).

The situation in the Mathematics Department is very similar. The academic staff encompasses 56 female and 36 male teachers, but there are approximately ten times as many female as male students enrolled in the mathematics programme.

The auditors discuss with the programme coordinators about the lack of female teachers and learn that the UQU is aware of this imbalance and tries to recruit more qualified female staff members. However, especially in areas like physics and mathematics it is very hard to find qualified female teachers. UQU tries to compensate this shortage by introducing more e-learning elements so that the female students can attend lectures from male teachers via internet. Moreover, UQU expects the number of female professors to rise, because UQU sends young female lecturers abroad for attending PhD programmes. Since the auditors see that UQU is aware of this problem and tries to improve it, they accept the current situation but encourage UQU to increase the efforts to hire more female staff members and to enhance their opportunities for becoming professors.

The majority of the staff members are from Saudi Arabia and hold permanent positions; employment contracts for the non-Saudi teachers (mostly from Egypt and Tunisia) are limited to one year and, thus, need to be renewed annually.

During the audit, the auditors learn that most staff members in the Department of Physics as well as in the Department of Mathematics conduct research activities but only rarely involve their students in these activities.

For achieving the aim to reach international standards, the auditors consider the fact that several staff members have acquired their PhD abroad, e.g. in UK a valuable starting point. This approach could, according to the auditors' opinion, be turned into a more general effective qualification scheme if the College of Applied Sciences sends staff members abroad for postgraduate education, so that they are able, upon their return, to develop study programmes balancing national needs with international demands.

Regarding teaching in general, the auditors are impressed by the excellent and open-minded atmosphere among the students and the staff members in all divisions visited during the audit. This interaction creates an atmosphere of understanding and support and is one of the strong points of the Bachelor's degree programmes in Physics, Medical Physics, and Mathematics.

Criterion 4.2 Staff development
--

Evidence:

- Self-Assessment Report

- Staff Handbook

Preliminary assessment and analysis of the peers:

According to the Self-Assessment Report, the aim of the College of Applied Sciences is to create a good working environment for its staff members, and to support their professional development and well-being at work. At UQU, the Vice Rector for Quality and Skills Development is responsible for these tasks. He annually revises the aims for professional development and expertise to be acquired, and decides on the focus areas of personnel training at UQU. In order to achieve these goals, UQU organises training workshops for staff members, which aim at strengthening the practical teaching competences and the didactic skills. In addition, UQU offers specialized courses for utilizing presentation-, documentation-, statistics- and e-learning-software. The teachers are also obliged to participate in management training programmes organized by the university or the faculty. Depending on the result of course evaluations, staff members at the lower end of the ranking take part in annual performance and development discussions with the Head of Department in charge. An integral part of such teaching performance reviews refers to goals for further developments in teaching skills and defines required individual training. If all efforts to improve the teacher's performance do not succeed, the working contract of the international staff members is not renewed. According to the programme coordinators, this happens from time to time but not very often. Saudi teachers receive benefits (participating at international conferences, increased research budget) if their performance is more than satisfactory.

The auditors discuss with the members of the teaching staff opportunities for developing personal skills and learn that the teachers are satisfied with the internal qualification programme at UQU. During the audit, the teachers describe existing opportunities for attending and participating at international meetings and workshops in their field of expertise by either delivering lectures, or presenting research results on posters.

Further more, UQU has developed an academic incentive programme for teachers. Quality in teaching, as evidenced, for example by course evaluations and awards, contribute to possible financial rewards by UQU. Other parameters increasing the chances to receive funding from UQU are research performance, academic development, and involvement in tutoring programmes. On a five-year schedule, professors may apply for a sabbatical leave, e.g. for joining international research programmes.

In summary, the auditors regard options and support mechanisms provided by UQU for members of the teaching staff for further developing professional and teaching skills as adequate and sufficient.

Criterion 4.3 Funds and equipment
--

Evidence:

- Self-Assessment Report
- On-site visit of the laboratories and lecture rooms

Preliminary assessment and analysis of the peers:

As described in the Self-Assessment Report, the College of Applied Sciences has 25 classrooms, 200 computer workplaces in 9 laboratories, and seminar rooms for group work. On the College's premises, there is a restaurant and a cafe serving students and staff members. The campus also hosts a student health center.

Students can use computers provided by the university in a public section of the library or use their own laptops. The Information Services and Technology (IT) Unit is responsible for maintaining and replacing computers, updating software and data systems. Centralized services, such as learning environments are accessible for registered personal from outside the campus. The university library provides relevant databases for conducting scientific research and for educational purposes. Students have access to printed and electronic versions of books as well as contemporary scientific journals. Electronic books can be accessed via a link to the library electronic archive. The library is built and equipped for on-site and online retrieval of information and knowledge. It is located in a modern spacious building offering plenty of desks and seats for students to work. Users have access to international literature, scientific journals, and publications. The students express in discussions their satisfaction with the library and the available literature.

The auditors discuss with representatives of UQU's management funding issues and available financial resources for the College of Applied Sciences. The auditors learn that the government provides most funding for teaching and equipment. Further funding can be applied for at the King Abdulaziz City for Science and Technology (KACST), an independent scientific organisation that is the national science agency of Saudi-Arabia under the regime of the Saudi Arabian Prime Minister. KACST is primarily in charge of proposing, developing and implementing strategies for the advancement of science and technology concerning national and international affairs. Private companies provide additional financial funds.

The auditors understand that governmental funding is closely linked to the number of students admitted to UQU and that the funding is secured for the next years. For distributing the available financial resources within UQU, every college has to submit an annual plan that lists needs and requirements of the division. UQU's management ranks

demands from colleges as outlined in the annual reports and decides how and where to allocate funding from the budget.

The two computer labs in the Department of Mathematics are equipped with up-to-date PCs and software packages (e.g. C++, MATLAB, Mathematica, FORTRAN, SPSS) for the use of both students and faculty members.

The Department of Physics houses 8 specialized laboratories (general physics, mechanics, electricity and magnetism, measurements and instruments, optics, modern (atomic) physics, nuclear physics, and electronics) for teaching students and conducting experiments. In addition, there are several research labs, which are used by the teachers for research activities.

From inspecting laboratories and classrooms, the audit team gains the impression that infrastructure and technical equipment are adequate for education according to the aims of the degree programmes under review. The students report during the discussion with the auditors that they consider the available equipment to be adequate and that they are satisfied with the facilities.

The auditors appreciate that UQU is currently furnishing a central research laboratory that will accommodate sophisticated and advanced technical equipment for conducting research activities.

In summary, the auditors consider the available funds, technical equipment, and infrastructure (laboratories, library, seminar rooms etc.) adequate for implementing the degree programmes.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

The peers see that some students are involved in research activities, but they believe that there is room for improvement in this respect. UQU should involve all students in basic research activities especially in connection with final graduation projects if they want to achieve their goal to contribute “to enhancement of scientific research by conducting and encouraging research.”

The peers consider criterion 4 to be mostly fulfilled.

5. Transparency and documentation

Criterion 5.1 Module descriptions
--

Evidence:

- Self-Assessment Report
- Module descriptions
- Webpage Umm Al-Qura: <https://uqu.edu.sa/en>

Preliminary assessment and analysis of the peers:

During the audit, the auditors receive updated module descriptions from the Bachelor's degree programme Mathematics. The module handbooks of the Bachelor's degree programmes Physics and Medical Physics were available as downloadable appendices to the Self-Assessment Report. Students and other stakeholders have access to the module descriptions via UQU's homepage.

The peers point out that the English webpage of the Mathematics Department only provides information about the study plan, whereas the webpage of the Physics Department also includes the student handbook, course specifications, staff handbook and all other relevant documents. Since it is important that all course-related information is available and accessible for all stakeholders, the peers ask the Mathematics Department to follow the good example of the Physics Department to present all relevant documents on the Department's webpage.

After studying the module descriptions, the auditors notice that in the Bachelor's degree programmes Physics and Medical Physics many bibliographical references are outdated and refer to old issues of the textbooks. For this reason, the bibliographical references should be updated. In addition, the auditors point out that the course specification of the graduation (research) project in the Physics programme is incomplete, providing no specific learning outcomes, assessment tasks or realistic study hours appropriate for an experimental or theoretical research project.

As discussed under criterion 2.2, all module descriptions must include detailed information about the workload and the awarded credits.

Otherwise, the module descriptions include all necessary information about responsible teachers, teaching methods, intended learning outcomes, content, admission and examination requirements, forms of assessment, and details explaining how the module mark is calculated.

The new module descriptions of the Mathematics programme were presented to the auditors during the on-site visit. The new version has been improved and completed substantially in comparison to the previous versions. Nevertheless, the module

descriptions should be proofread for errors (e.g., in Calculus (2) the prerequisite is Calculus (2) (furthermore in plan 37 it is named Differentiation and Integration (2)), some descriptions have Arabic numbers in the mode of instructions etc.).

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Transcript of Records for each degree programme
- Sample Diploma Certificate for each degree programme
- Sample Diploma Supplement of the Medical Physics programme

Preliminary assessment and analysis of the peers:

The auditors understand that the students of the degree programmes under review receive a Diploma Certificate and a Transcript of Records. Unfortunately, no sample Diploma Supplement was provided for the Bachelor's degree programmes Physics and Mathematics. The auditors only could examine the Diploma Supplement of the Bachelor's degree programme Medical Physics. They point out that the Diploma Supplement should inform about the structure and content of the respective degree programme, provide information about the individual performance as well as statistical data regarding the final grade, and include information about the composition of the final grade according to the ECTS-Users' guide. This allows the reader to categorise the individual result. The currently issued Diploma Supplement is more similar to a Transcripts of Records and does not follow the internationally accepted standards for a Diploma Supplement. The auditors expect that all graduates of the degree programmes are provided with a standardised Diploma Supplement. This makes academic qualifications comparable and raises the chances for succeeding on the job marked or for applying for further studies abroad. The auditors ask UQU to submit an updated Diploma Supplement for all degree programmes under review.

Criterion 5.3 Relevant rules

Evidence:

- Self-Assessment Report
- Webpage Umm Al-Qura: <https://uqu.edu.sa/en>

Preliminary assessment and analysis of the peers:

The auditors receive confirmation that the rights and duties of both UQU and the students are clearly defined and binding. All rules and regulations are published on the university's website and hence available to all relevant stakeholders.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

The peers appreciate that UQU will update the module descriptions and include information about the name of the faculty member responsible for each course, clear assessment methods and their contribution to the final grade, and the form and length of exams. They expect UQU to submit the updated module descriptions in the course of the fulfilment of requirements.

Although UQU was asked to submit a sample Diploma Supplement for each degree programme together with its statement, only a Transcript of Records was sent. For this reason, the peers decide to make it a requirement that UQU provides a Diploma Supplement that is handed out to each student upon graduation.

The peers consider criterion 5 to be mostly fulfilled.

6. Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- University Development and Quality Unit in Umm Al-Qura University (Present and Future), 2016
- Annual Reports
- Sample course evaluation questionnaire

Preliminary assessment and analysis of the peers:

The auditors are impressed by UQU's extensive quality assurance system; it is built on several layers of responsibility and activity, on university, college and department level. UQU has established the Deanship for Academic Development and Quality Assurance to coordinate and organize all quality related activities, including national and international accreditation of degree programmes.

The quality management system is based on standards and criteria of the National Commission for Academic Accreditation and Assessment (NCAAA). Every department submits an annual report to the Deanship for Academic Development and Quality Assurance about its performance, which is measured by several Key Performance Indicators (KPI) such as the number of enrolled students and graduates, completion rate per semester and per course, grade distribution per course, and course evaluations. If deficits are found, an action plan is designed aiming at improving the degree programmes and the related KPIs based on the annual check to what extent objectives have been met.

The auditors see that quality management at UQU is understood as a continuous process for improving the quality of the degree programmes, achieved through internal and external evaluation. Internal evaluation of the quality of the degree programmes is performed by surveys. A students' survey is organised by the university as the organisational institution for evaluating didactical and professional performance of teachers. This evaluation takes place in every course at the end of the semester. In case of negative feedback, the Dean of the College of Applied Sciences talks to the respective teacher, analyses the problems, and offers solutions. The auditors are convinced that, in addition to the systematic quality assurance activities, direct communication between students and teachers also contributes to enhancing the degree programmes' quality. A direct feedback to the students who were evaluating the course would hence be beneficial. If deficits are identified, changes are implemented. The students confirm during the discussion with the auditors that their concerns are taken into account and resolved where possible. To this extent, the panel considers the feedback loops to be closed.

Furthermore, the College of Applied Sciences conducts a graduate survey with respect to the quality of the degree programmes. This type of feedback is designed to consider changes in the curriculum by the College of Applied Sciences for matching needs of graduates in terms of job perspectives and plans.

Finally, employers are asked to give their feedback on the qualification profile and employability of graduates from the College of Applied Sciences. For this purpose, employers are also invited to take part at annual workshops with the programme coordinators where the further development of the degree programmes and the requirements of the job market are discussed.

The National Commission for Academic Accreditation & Assessment (NCAAA) provides external quality assessment for degree programmes in Saudi Arabia. The commission was established in 2004 with the responsibility for determining standards and procedures for accrediting higher education institutions and programmes within the Kingdom of Saudi Arabia. All degree programmes under review have been accredited by NCAAA, certifying

that the resources and facilities provided for processes of teaching, support services, and the quality and scope of students' education in terms of knowledge, skills and abilities needed for scientific practice meet required national standards.

During the discussion with the programme coordinators, the auditors learn that a Student Council was recently established. The rights and duties of the council remain somewhat unclear to the auditors. The students report to the auditors that the Student Council indeed exists and that this concept is rather new at UQU. In addition, the auditors receive the information that students are not represented in other boards of the College of Applied Sciences, especially not in the Curriculum Committee or the Faculty Council. The auditors point out that it is important to develop a culture of co-operation in which all stakeholders are involved in the processes of assessing, developing and improving the quality of study programmes. Therefore, they recommend including students' representatives in all important boards and panels of UQU.

UQU stays in contact with its graduates, regularly conducts alumni surveys and plans to re-establish a job fair with representatives from the private sector. Furthermore, there is an advisory board in each department with alumni from public institutions and private companies. However, during the discussion with the alumni, the auditors gain the impression that the experience and professional knowledge of the graduates could be used more effectively and that the communication between students, graduates, and teachers should be improved. For example, it would be useful, from the auditors' point of view, to invite professionals as contracted teachers to give lectures about the requirements of the job market with a view to both informing students about future employment opportunities and to gathering information about skills needed in the labour market that can be used to continuously enhance the programmes.

This seems to be especially necessary in the Bachelor's degree programme Medical Physics. The graduates point out to the auditors that they did not feel well prepared for the Hospital Training because they did not know what to expect and were lacking the necessary practical abilities. For this reason, the programme coordinators should discuss with the responsible people from the medical physics departments of the co-operating hospitals what practical abilities the students should possess before starting the Hospital Training and how to better prepare them for a professional career as medical physicists.

The auditors, in summary, consider the quality management system at the College of Applied Sciences operative and suitable for identifying weaknesses and inappropriate trends and for implementing modifications to improve and strengthen the degree programmes. All stakeholders are involved in the process.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

The peers consider criterion 6 to be fulfilled.

D Additional Documents

Before preparing their final assessment, the panel asks that the following missing or unclear information needs to be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

- Sample Diploma Supplement for all degree programmes

E Comment of the Higher Education Institution (07.05.2018)

The institution provided a detailed statement as well as the following additional documents:

- Sample Transcript of Records

F Summary: Peer recommendations (16.05.2018)

Taking into account the additional information and the comments given by UQU, the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ba Physics	With requirements for one year	-	30.09.2023
Ba Medical Physics	With requirements for one year	-	30.09.2023
Ba Mathematics	With requirements for one year	-	30.09.2023

Requirements

For all degree programmes

- A 1. (ASIIN 2.2) Make sure that the actual workload of the students is consistent with the awarded credits.
- A 2. (ASIIN 3) Make sure that all students know how scientific publications are written and how scientific work is carried out and presented.
- A 3. (ASIIN 3) Ensure that the graduation project meets the intended scientific standards and make transparent the individual contribution of each student. A reasonable size for group work is 2 to 4 students.
- A 4. (ASIIN 5.1) Re-write the module descriptions to adequately describe the workload, the learning outcomes and the awarded credits of each module.
- A 5. (ASIIN 5.2) Issue a Diploma Supplement that contains detailed information about the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student.

For the Bachelor's degree programme Medical Physics

- A 6. (ASIIN 3) The degree programme must comprise a thesis or final project for all students. A concept how an individual final project is introduced into the curriculum as a compulsory module with an appropriate amount of credit points must be presented.

For the Bachelor's degree programme Mathematics

- A 7. (ASIIN 5.1) Make the relevant course-related information available in English for all stakeholders.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to introduce electives and to reduce the number of non-subject-specific classes.
- E 2. (ASIIN 1.3) It is recommended to invite professionals as contract teachers and to better align the graduates' qualification profile to the needs of the private sector.
- E 3. (ASIIN 2.1) It is recommended to promote the academic mobility of the students.
- E 4. (ASIIN 4.1) It is recommended to give young teachers more room for carrying out research activities.
- E 5. (ASIIN 6) It is recommended to include students' representatives in the boards and panels of UQU.

For the Bachelor's degree programmes Physics and Medical Physics

- E 6. (ASIIN 5.1) It is recommended to update the bibliographical references in the module descriptions.

G Comment of the Technical Committees

Technical Committee 12 - Mathematics (19.06.2018)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee criticises that the module descriptions of the non-subject-specific compulsory modules (Quran, Islamic Culture, Biography of Prophet Mohammed) have not been inspected by the peers. Since this issue is important to the members of the Technical Committee, they decide to state an additional requirement (A 1).

Otherwise, the Technical Committee approves the proposed requirements and recommendations.

The Technical Committee 12 – Mathematics recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Physics	With requirements for one year	-	30.09.2023
Ba Medical Physics	With requirements for one year	-	30.09.2023
Ba Mathematics	With requirements for one year	-	30.09.2023

Requirements

For all degree programmes

- A 1. (ASIIN 2.2) The missing module descriptions for the university compulsory courses must be submitted in an English translation. All learning outcomes must be in coherence with the study objectives.

Technical Committee 13 - Physics (15.06.2018)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure and follows the assessment of the peers. A considerable fraction of the curriculum relate to Arabic language competencies, which could be reduced. The Islamic related modules are meant to address problems and

challenges connected with the Hajj but do not appear fundamentalist or problematic in view of the scientific orientation of the degree programmes.

The Technical Committee 13 – Physics recommends the award of the seals as follows:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Physics	With requirements for one year	-	30.09.2023
Ba Medical Physics	With requirements for one year	-	30.09.2023
Ba Mathematics	With requirements for one year	-	30.09.2023

H Decision of the Accreditation Commission (29.06.2018)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses about scope and content of the non-subject-specific compulsory modules (Quran, Islamic Culture, and Biography of Prophet Mohammed). The TC 12 has criticised that the respective module descriptions have not been inspected by the peers. However, the peers involved in the accreditation of the Islamic Architecture programme, that was conducted at the same time did have exemplary English translation of the module descriptions and did not find any faults. For this reason, the Accreditation Commission decides not to include an additional requirement. They follow the peers' positive assessment. Since this issue is important to the Accreditation Commission, they decide to state a fundamental decision: English translations of the module descriptions for all compulsory and essential subject-specific courses of a programme must be submitted in the course of an international accreditation procedure.

In summary, the Accreditation Commission approves the proposed requirements and recommendations.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN seal	Subject-specific labels	Maximum duration of accreditation
Ba Physics	With requirements for one year	-	30.09.2023
Ba Medical Physics	With requirements for one year	-	30.09.2023
Ba Mathematics	With requirements for one year	-	30.09.2023

Requirements

For all degree programmes

- A 1. (ASIIN 2.2) Make sure that the actual workload of the students is consistent with the awarded credits.
- A 2. (ASIIN 3) Make sure that all students know how scientific publications are written and how scientific work is carried out and presented.

- A 3. (ASIIN 3) Ensure that the graduation project meets the intended scientific standards and make transparent the individual contribution of each student. A reasonable size for group work is 2 to 4 students.
- A 4. (ASIIN 5.1) Re-write the module descriptions to adequately describe the workload, the learning outcomes and the awarded credits of each module.
- A 5. (ASIIN 5.2) Issue a Diploma Supplement that contains detailed information about the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student.

For the Bachelor's degree programme Medical Physics

- A 6. (ASIIN 3) The degree programme must comprise a thesis or final project for all students. A concept how an individual final project is introduced into the curriculum as a compulsory module with an appropriate amount of credit points must be presented.

For the Bachelor's degree programme Mathematics

- A 7. (ASIIN 5.1) Make the relevant course-related information available in English for all stakeholders.

Recommendations

For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to introduce electives and to reduce the number of non-subject-specific classes.
- E 2. (ASIIN 1.3) It is recommended to invite professionals as contract teachers and to better align the graduates' qualification profile to the needs of the private sector.
- E 3. (ASIIN 2.1) It is recommended to promote the academic mobility of the students.
- E 4. (ASIIN 4.1) It is recommended to give young teachers more room for carrying out research activities.
- E 5. (ASIIN 6) It is recommended to include students' representatives in the boards and panels of UQU.

For the Bachelor's degree programmes Physics and Medical Physics

- E 6. (ASIIN 5.1) It is recommended to update the bibliographical references in the module descriptions.

I Fulfilment of Requirements (28.06.2019)

Comments of the peers and the Technical Committees (24.06.2019)

Requirements

For all degree programmes

- A 1. (ASIIN 2.2) Make sure that the actual workload of the students is consistent with the awarded credits.

Initial Treatment	
Peers	partly fulfilled Justification: The module handbook has been modified so that for each module an additional table has been inserted which specifies the number of estimated working hours, broken down according to contact time and self-study hours. However, the quotient Workload/ECTS points is often not in the range between 25 and 30 hours/ECTS point and differs from module to module. A verification and adjustment of the ECTS points of the individual modules would be highly desirable.
TC 12	not fulfilled Vote: unanimous Justification: The TC emphasizes that the requirement deals with a consistent assignment of workload and ECTS points, which is not yet given.
TC 13	not fulfilled Vote: unanimous Justification: The TC recognizes the improvement measures implemented by the HEI. However, the University should ensure that the ECTS are in a range of 25-30 hours per ECTS point. It should also be consistent so that modules with a higher workload should not have fewer ECTS points than modules with lower workloads.
AC	not fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees that the actual workload of the students is not yet consistent with the awarded ECTS points.

	UQU needs to calculate the rate between students' workload and ECTS point consistently.
--	---

- A 2. (ASIIN 3) Make sure that all students know how scientific publications are written and how scientific work is carried out and presented.

Initial Treatment	
Peers	fulfilled Justification: The description of the graduation project has been amended and now includes the ability to write scientific articles, and to present research results.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers
TC 13	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers without any changes.
AC	fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees.

- A 3. (ASIIN 3) Ensure that the graduation project meets the intended scientific standards and make transparent the individual contribution of each student. A reasonable size for group work is 2 to 4 students.

Initial Treatment	
Peers	partly fulfilled Justification: While the final project was originally more of a seminar paper on the basis of a literature search, its own experimental part is now included in the module description. A clear improvement is therefore discernible. The projects continue to be conceived as joint projects, in which the individual contributions are not covered by deferred subtasks but must be recognized by the lecturer. This is not an optimal solution, but is acceptable due to the small group size of usually three students. Weighing heavier is the fact that only 5 ECTS points (126 h) are awarded in the Physics programme and 3 ECTS point (95 h) in the Mathematics programme. It can be assumed that the quality of the theses varies considerably and depends more on the initiative of the students than on the requirements of the lecturers and the examination regulations.
TC 12	not fulfilled

	<p>Vote: unanimous Justification: The TC agrees with the opinion of the peers that UQU has made improvements in this respect, but that the scope of the Bachelor's thesis with 5 ECTS is not sufficient to ensure the required quality.</p>
TC 13	<p>not fulfilled Vote: unanimous Justification: The TC recognizes the improvement measures implemented by the HEI. However, as the peers are of the opinion that the quality of the theses varies considerably and depends more on the initiative of the students than on the requirements of the lecturers and the examination regulations, the HEI should ensure the intended scientific standards by raising the requirements and the requested workload. The HEI should implement regulations and processes that ensure that the graduation project of all students meet the intended scientific standards. In particular, the amount of ECTS awarded for the final project seems to be quite low. The workload for the final project includes self-study and unsupervised work. This should be reflected in an adequate workload (of about 10-15 ECTS) which is necessary for a final project with the intended scientific quality.</p>
AC	<p>not fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees that the scope and quality of the graduation project needs to be increased, with the goal to establish graduation projects that are aligned with international standards for Bachelor's theses.</p>

- A 4. (ASIIN 5.1) Re-write the module descriptions to adequately describe the workload, the learning outcomes and the awarded credits of each module.

Initial Treatment	
Peers	<p>fulfilled Justification: For each module the workload and the number of ECTS points awarded is now clearly visible in the module descriptions. The quality of the formulation of learning objectives differs from module to module and is not perfect but acceptable.</p>
TC 12	<p>fulfilled Vote: unanimous Justification: The TC points out that the same kind of numbers should be used in all module descriptions.</p>
TC 13	<p>fulfilled Vote: unanimous</p>

	Justification: The Technical Committee follows the assessment of the peers without any changes.
AC	fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees.

- A 5. (ASIIN 5.2) Issue a Diploma Supplement that contains detailed information about the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student.

Initial Treatment	
Peers	fulfilled Justification: The Diploma Supplement has been updated and now includes all necessary information.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers
TC 13	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers without any changes.
AC	fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees.

For the Bachelor's degree programme Medical Physics

- A 6. (ASIIN 3) The degree programme must comprise a thesis or final project for all students. A concept how an individual final project is introduced into the curriculum as a compulsory module with an appropriate amount of credit points must be presented.

Initial Treatment	
Peers	fulfilled Justification: The curriculum committee of the Department of Physics has decided to change the course structure and the credit hours in level 8 (4th year, second semester) in order to include a compulsory final project. This change will take effect by 2020.
TC 12	fulfilled Vote: unanimous Justification: The TC follows the assessment of the peers
TC 13	fulfilled

	Vote: unanimous Justification: The Technical Committee follows the assessment of the peers without any changes.
AC	fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees.

For the Bachelor's degree programme Mathematics

A 7. (ASIIN 5.1) Make the relevant course-related information available in English for all stakeholders.

Initial Treatment	
Peers	fulfilled Justification: The stud-plan and the course descriptions are now available via UQU's webpage.
TC 12	not fulfilled Vote: unanimous Justification: The requirement is fulfilled by the English module descriptions of the mathematical subjects. For the non-subject-specific modules, which mostly refer to the Islamic religion, the corresponding module descriptions are not available in English.
AC	not fulfilled Vote: unanimous Justification: The AC follows the Technical Committee 12 and requires UQU to make the non-subject-specific module descriptions available to all stakeholders in English.

Decision of the Accreditation Commission (28.06.2019)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Mathematics	Requirements 1,3 and 7 not fulfilled	-	30.09.2023
Ba Medical Physics	Requirements 1, 3 not fulfilled	-	30.09.2023
Ba Physics	Requirements 1, 3 not fulfilled	-	30.09.2023

The Accreditation Commission justifies its decision as follows:

The Accreditation Commission follows the judgement of the peers and the involved Technical Committees and considers requirements 1, 3, 7 to be not fulfilled.

A1: The AC follows the assessment of the peers and the involved Technical Committees that the actual workload of the students is not yet consistent with the awarded ECTS points. UQU needs to calculate the rate between students' workload and ECTS points consistently

A3: The AC follows the assessment of the peers and the involved Technical Committees that the scope and quality of the graduation project needs to be increased, with the goal to establish graduation projects that are aligned with international standards for Bachelor's theses.

A7: The AC follows the Technical Committee 12 and requires UQU to make the non-subject-specific module descriptions available to all stakeholders in English.

J Fulfilment of Requirements (06.12.2019)

Comments of the peers and the Technical Committees (19.11.2019)

Requirements

For all degree programmes

- A 1. (ASIIN 2.2) Make sure that the actual workload of the students is consistent with the awarded credits.

Initial Treatment	
Peers	partly fulfilled Justification: The module handbook has been modified so that for each module an additional table has been inserted which specifies the number of estimated working hours, broken down according to contact time and self-study hours. However, the quotient Workload/ECTS points is often not in the range between 25 and 30 hours/ECTS point and differs from module to module. A verification and adjustment of the ECTS points of the individual modules would be highly desirable.
TC 12	not fulfilled Vote: unanimous Justification: The TC emphasizes that the requirement deals with a consistent assignment of workload and ECTS points, which is not yet given.
TC 13	not fulfilled Vote: unanimous Justification: The TC recognizes the improvement measures implemented by the HEI. However, the University should ensure that the ECTS are in a range of 25-30 hours per ECTS point. It should also be consistent so that modules with a higher workload should not have less ECSTS points than modules with lower workloads.
AC	not fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees that the actual workload of the students is not yet consistent with the awarded ECTS points.

	UQU needs to calculate the rate between students' workload and ECTS points consistently.
Secondary Treatment	
Peers	fulfilled Justification: The workload of the individual modules as well as the number of the ECTS points have been adjusted. As a consequence, the inconsistencies that previously existed have now been eliminated, the workload appears plausible at module level, and the number of ECTS points is fixed throughout so that the workload/ECTS points quotient is always as close as possible to the ideal value of 30.
TC 12	fulfilled Vote: unanimous Justification: The members of the Technical Committee discuss the procedure and agree with the assessments of the experts involved in the procedure.
TC 13	fulfilled Vote: unanimous Justification: The Technical Committee follows the opinion of the peers.

- A 3. (ASIIN 3) Ensure that the graduation project meets the intended scientific standards and make transparent the individual contribution of each student. A reasonable size for group work is 2 to 4 students.

Initial Treatment	
Peers	partly fulfilled Justification: While the final project was originally more of a seminar paper on the basis of a literature search, its own experimental part is now included in the module description. A clear improvement is therefore discernible. The projects continue to be conceived as joint projects, in which the individual contributions are not covered by deferred subtasks but must be recognized by the lecturer. This is not an optimal solution, but is acceptable due to the small group size of usually three students. Weighing heavier is the fact that only 5 ECTS points (126 h) are awarded in the Physics programme and 3 ECTS point (95 h) in the Mathematics programme. It can be assumed that the quality of the theses varies considerably and depends more on the initiative of the students than on the requirements of the lecturers and the examination regulations.
TC 12	not fulfilled Vote: unanimous Justification: The TC agrees with the opinion of the peers that UQU has made improvements in this respect, but that the scope

	of the Bachelor's thesis with 5 ECTS is not sufficient to ensure the required quality.
TC 13	not fulfilled Vote: unanimous Justification: The TC recognizes the improvement measures implemented by the HEI. However, as the peers are of the opinion that the quality of the theses varies considerably and depends more on the initiative of the students than on the requirements of the lecturers and the examination regulations, the HEI should ensure the intended scientific standards by raising the requirements and the requested workload. The HEI should implement regulations and processes that ensure that the graduation project of all students meet the intended scientific standards. In particular, the amount of ECTS awarded for the final project seems to be quite low. The workload for the final project includes self-study and unsupervised work. This should be reflected in an adequate workload (of about 10-15 ECTS) which is necessary for a final project with the intended scientific quality.
AC	not fulfilled Vote: unanimous Justification: The AC follows the assessment of the peers and the involved Technical Committees that the scope and quality of the graduation project needs to be increased, with the goal to establish graduation projects that are aligned with international standards for Bachelor's theses.
Secondary Treatment	
Peers	fulfilled Justification: The final thesis includes an accompanying course, which teaches important working techniques, as well as an independent project including its documentation and final presentation. The group size is limited and the individual contribution is made transparent. The requirement must therefore be formally assessed as fulfilled.
TC 12	fulfilled Vote: unanimous Justification: The members of the Technical Committee discuss the procedure and agree with the assessments of the experts involved in the procedure.
TC 13	fulfilled Vote: unanimous Justification: The Technical Committee follows the opinion of the peers.

For the Bachelor's degree programme Mathematics

A 7. (ASIIN 5.1) Make the relevant course-related information available in English for all stakeholders.

Initial Treatment	
Peers	fulfilled Justification: The stud-plan and the course descriptions are now available via UQU's webpage.
TC 12	not fulfilled Vote: unanimous Justification: The requirement is fulfilled by the English module descriptions of the mathematical subjects. For the non-subject-specific modules, which mostly refer to the Islamic religion, the corresponding module descriptions are not available in English.
AC	not fulfilled Vote: unanimous Justification: The AC follows the Technical Committee 12 and requires UQU to make the non-subject-specific module descriptions available to all stakeholders in English.
Secondary Treatment	
Peers	fulfilled Justification: The English module descriptions are now available on UQU's webpage and the religious courses have a minimal description in English.
TC 12	fulfilled Vote: unanimous Justification: The members of the Technical Committee discuss the procedure and agree with the assessments of the experts involved in the procedure.

Decision of the Accreditation Commission (06.12.2019)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ba Mathematics	All requirements fulfilled	-	30.09.2023
Ba Medical Physics	All requirements fulfilled	-	30.09.2023
Ba Physics	All requirements fulfilled	-	30.09.2023

Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Physics:

Program Learning Outcomes require that our graduate will		
Knowledge	a1	Understand relevant of knowledge and theory in other related disciplines and professional fields
	a2	Recognize facts, principles and concepts of classical physics (mechanics, electrodynamics, thermodynamics, vibrations, waves and optics) and are familiar with the fundamentals of quantum, atomic, nuclear, and solid state physics.
	a3	Describe concepts, Procedures of matching the principles and the concepts to analyze problems within specific core areas and theories.
Cognitive Skills	b1	Apply skills when asked (discuss how to overcome educational problems)
	b2	Gain mental calculating skills by training them on it
	b3	Solve problems in Physics by using suitable mathematical principles
	b4	Analyze and interpret quantitative results
	b5	Gain the skills of solving scientific problems related to industrial problems
Interpersonal Skills & Responsibility	c1	Show responsibility for self-learning to be aware with recent developments in physics
	c2	Work effectively in groups and exercise leadership when appropriate.
	c3	Act as professional and responsible person.

	c4	Recognize life-long learning is a necessity as well as a responsibility of every graduate
Communication, Information Technology, Numerical	d1	Communicate effectively in oral and written form
	d2	Collect and classify the material for a course
	d3	Use basic physics terminology in English
	d4	Acquire the skills to use the internet communicates tools.
Psycho-motor	e1	Use a perfect experimental tools to solve Physics problems in the Labs
	e2	Employ software skills.

The following curriculum (study plan 37) is presented:

Level 1 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4041101-4	Calculus	4	-		
4021101-4	General Chemistry	3	1		
7004101-4	English Language	4	-		
605101-2	The Holy Qura'an (1)	2	-		
601101-2	Islamic Culture (1)	2	-		

Level 2 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4041101-4	General Biology	3	1		
4031101-4	General Physics	3	1		
7004102-4	English Language	4	-	7004101-4	English Language
501101-2	Arabic Language	2	-		
102101-2	Biography of prophet Mohamed (PBUH)	2	-		

Level 3 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4042501-4	Differentiation and Integration	4	-	4041101-4	Calculus
4042402-4	Linear Algebra	4	-	4041101-4	Calculus
4032102-4	General Physics (2)	3	1	4031101-4	General Physics
4032121-4	Electricity and magnetism	3	1	4031101-4	General Physics

Level 4 : Credit Hours 17					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4032141-4	Theoretical Methods in Physics (1)	4	-	4042501-4	Differentiation and Integration
4032131-4	Optics	3	1	4032102-4	General Physics (2)
4032150-4	Modern Physics	3	1	4032102-4	General Physics (2)
4032122-3	General Physics(3)	2	1	4032121-4	Electricity and magnetism
601201-2	Islamic Culture (2)	2	-	601101-2	Islamic Culture (1)

Level 5 : Credit Hours 17					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4033142-4	Theoretical Methods in Physics (2)	4	-	4032141-4	Theoretical Methods in Physics (1)
4033143-4	Classical Mechanics(1)	4	-	4032102-4	General Physics (2)
4033145-4	Quantum Mechanics (1)	4	-	4032141-4	Theoretical Methods in Physics (1)
4033110-3	Heat and Thermodynamics	3	-	4032102-4	General Physics (2)
605201-2	The Holy Qura'an (2)	2	-	605101-2	The Holy Qura'an (1)

Level 6 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4033132-3	Electromagnetism (1)	3	-	4032141-4	Theoretical Methods in Physics (1)
4033146-3	Quantum Mechanics (2)	3	-	4033145-4	Quantum Mechanics (1)
4033111-3	Statistical Thermodynamics	3	-	4033110-3	Heat and Thermodynamics
4033144-2	Classical Mechanics (2)	2	-	4033143-4	Classical Mechanics(1)
605301-2	The Holy Qura'an (3)	2	-	605201-2	The Holy Qura'an (2)
601301-3	Islamic Culture (3)	3	-	601201-2	Islamic Culture (2)

Level 7 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4034133-3	Electromagnetism (2)	3	-	4033132-3	Electromagnetism (1)
4034160-4	Nuclear Physics	3	1	4033145-4	Quantum Mechanics (1)
4034170-4	Solid State Physics (1)	4	-	4033145-4	Quantum Mechanics (1)
4034180-3	Computational Physics	2	1	4033142-4	Theoretical Methods in Physics (2)
605401-2	The Holy Qura'an (4)	2	-	605301-2	The Holy Qura'an (3)

Level 8 : Credit Hours 16					
Course		Hours		Prerequisite	
Code	Title	L	P	Code	Title
4034162-3	Radiation Physics	3	-	4034160-4	Nuclear Physics
4034172-4	Solid State Physics (2)	3	1	4034170-4	Solid State Physics (1)
4034173-4	Electronics	3	1	4034170-4	Solid State Physics (1)
4034199-3	Graduated Project	3	-		Agreement of Department
601401-2	Islamic Culture (4)	2	-	601301-3	Islamic Culture (3)

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Medical Physics:

Table 1.1: Program Learning Outcomes.	
a. Knowledge	<p>Summary description of the knowledge to be acquired and on completing this program students will be able to:</p> <p>a1. acquire the major aspects of nature and subject of medical physics and the application of physics to medicine.</p> <p>a2. recognize matter in various forms including crystals, semiconductors, atoms, nuclei and understand the principles of laser and its application in medicine.</p> <p>a3. use bioinformatics in order to know how to analysis data which is used to diagnose with the aid of different medical devices such as X- ray machines, gamma camera, accelerator and nuclear magnetic resonance.</p> <p>a4. define different quantitative, mathematical science and physical tools to analyze problems and list some foundations of systems theory to solve and analysis different problems.</p> <p>a5. understand the nature, properties, dosimetry of radiation and basics of radiation protection and also medical effects of ionizing and non-ionizing radiation.</p> <p>a6. know the principles of physics of different medical radiation devices and their modern advances, especially in medical radiation therapy and different applications in medical physics.</p>
b. Cognitive Skills	<p>Summary description of the Cognitive Skills to be acquired and on completing this program students will be able to:</p> <p>b1. apply mathematical and physical formulas and demonstrate skills of critical thinking and analytical reasoning to solve problems in medical physics and related fields of studies.</p> <p>b2. interpret the data obtained from testing diagnostic instruments such as MRI, X-rays, ultrasonic images, CT images and gamma camera images.</p> <p>b3. apply the mathematical expressions in evaluating and understanding of essential facts, concepts, principles and theories of medical physics.</p> <p>b4. formulate and test hypotheses using appropriate experimental design and analysis of data (Computer simulation) and integrate IT-based solutions into the user environment effectively.</p>
c. Interpersonal Skills and Responsibility	<p>Summary description of the Interpersonal Skills and Responsibility to be acquired and on completing this program students will be able to:</p> <p>c1. analyze and evaluate information by using computational tools to interpret experimental data relevant to medical physics by using packages from different theoretical and experimental resources, and perspectives.</p> <p>c2. operate some medical instrumentation such as that used for diagnosis of different diseases in medical centers and demonstrate competency in laboratory techniques and safety.</p> <p>c3. use scientific literature effectively and prepare technical reports that for individual student or making a group of research.</p>

	<p>c4. acquire ethical, social and legal responsibilities concerning Medical Physics.</p>
<p>d. Communication, Information Technology and Numerical Skills</p>	<p>Summary description of the Communication, Information Technology and Numerical Skills to be acquired and on completing this program students will be able to:</p> <p>d1. illustrate and employ the processes of scientific inquiry and research methods through use effectively information and communications technology (IT) tools and use the basic software, to ensure global understand of medical physics issues.</p> <p>d2. represent scientific concepts and analytical argument, in a clear and organized way, verbally and on writing.</p> <p>d3. implement all kinds of relevant information in medical physics through the use of local and internationally accessible libraries, information database, and electronic data and use that information in problem solving activities.</p> <p>d4. work independently and demonstrate the ability to manage time and to work as a part of a team, and learn independently with open- mindedness to learn how solve the daily life problems.</p>
<p>e. Psychomotor Skills (if applicable)</p>	<p>NA</p>

The following curriculum (study plan 37) is presented:

Course Code	Course Title	Required or Elective	Credit Hours	College or Department
First year				
Level 1 (Semester 1)				
4041101	Calculus (1)	R	4	Faculty of Applied Science / Dept. of Mathematics
4021101	General Chemistry	R	4	Faculty of Applied Science / Dept. of Chemistry
7004101	English Language - General	R	4	English Language Institute
605101	Holy Quran I	R	2	
601101	Islamic Culture I	R	2	
Total			16	
Level 2 (Semester 2)				
4031101	General Physics	R	4	Faculty of Applied Science / Dept. of Physics
4011101	General Biology	R	4	Faculty of Applied Science / Dept. of Biology
7004102	English for Science	R	4	English Language Institute
501101	Arabic Language	R	2	Faculty of Arabic Language
102101	The Biography of the Prophet Mohammad (PBUH)	R	2	
Total			16	
Second year				
Level 3 (Semester 3)				
4032280	Fundamentals of Medical physics	R	4	Faculty of Applied Science / Dept. of Physics
4032102	General physics (2)	R	4	Faculty of Applied Science / Dept. of Physics
4032121	Electricity and magnetism	R	4	Faculty of Applied Science / Dept. of

0 Appendix: Programme Learning Outcomes and Curricula

				Physics
4041502	Differentiation and Integration (2)	R	4	Faculty of Applied Science / Dept. of Mathematics
4012312	Cell Biology	R	2	Faculty of Applied Science / Dept. of Biology
Total			18	
Level 4 (Semester 4)				
4032293	Biomechanics	R	3	Faculty of Applied Science / Dept. of Physics
4032141	Theoretical Methods in Physics(1)	R	4	Faculty of Applied Science / Dept. of Physics
4032150	Modern Physics	R	4	Faculty of Applied Science / Dept. of Physics
4013331	Biology-Physiology	R	3	Faculty of Applied Science / Dept. of Biology
605201	Holy Quran II	R	2	
601201	Islamic Culture II	R	2	
Total			18	
Third year				
Level 5 (Semester 5)				
4033290	Physics of Medical Ultrasound	R	2	Faculty of Applied Science / Dept. of Physics
4033281	Physics of medical laser	R	2	Faculty of Applied Science / Dept. of Physics
4033285	Radiation Medical physics(1)	R	4	Faculty of Applied Science / Dept. of Physics
4033298	Physics of cell membrane & Macromolecules	R	2	Faculty of Applied Science / Dept. of Physics
4033145	Quantum Mechanics (1)	R	4	Faculty of Applied Science / Dept. of Physics
601301	Islamic Culture III	R	3	
Total			17	

Level 6 (Semester 6)				
4033283	Health Physics	R	3	Faculty of Applied Science / Dept. of Physics
4033292	Radiation Medical physics(2)	R	4	Faculty of Applied Science / Dept. of Physics
4034170	Solid State Physics(1)	R	4	Faculty of Applied Science / Dept. of Physics
4033132	Electromagnetism (1)	R	3	Faculty of Applied Science / Dept. of Physics
4034160	Nuclear Physics	R	4	Faculty of Applied Science / Dept. of Physics
Total			18	
Fourth year				
Level 7 (Semester 7)				
4034291	Computer Applications in Medical physics	R	2	Faculty of Applied Science / Dept. of Physics
4034289	Physics of Medical Imaging	R	3	Faculty of Applied Science / Dept. of Physics
4034286	Physics of radiotherapy	R	4	Faculty of Applied Science / Dept. of Physics
4034295	Physics of Nuclear Medicine	R	4	Faculty of Applied Science / Dept. of Physics
4034296	Physic of Bio-Material	R	3	Faculty of Applied Science / Dept. of Physics
605301	Holy Quran III	R	2	
Total			18	
Level 8 (Semester 8)				
4034998	Hospital Training	R	11	
605401	Holy Quran IV	R	2	
601401	Islamic Culture IV	R	2	
Total			15	

According to the Self-Assessment Report, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor's degree programme Mathematics:

“Specialist Goals and Objectives of Mathematics Program

G-I. Provide students a wide range of the basic concepts and theories of mathematics.

O-a. Retain basic knowledge in the core branches of mathematics

O-b. Profound overview of the contents of fundamental mathematical theories and laws and able to identify their correlations

G-II. Reveal the relation between mathematics and others basic sciences.

O-a. Utilize the appropriate mathematical techniques to analyze and interpret practical data.

O-b. Use computer science applications and information technology to solve mathematical problems.

G-III. Recognize the role of mathematics in the development of society.

O-a. Apply mathematical skills and knowledge to understand and solve real life problems.

O-b. Communicate, and contribute their work effectively in teams

G-IV. Able to obtain employment in their area of mathematical interest or gain admittance to a graduate program in mathematics.

O-a. Succeed in gaining admission, and perform adequately in graduate programs.

O-b. Obtain entry-level employment in math-related fields.

O-c. Improve language and self-learning skills.”

The following curriculum (study plan 37) is presented:

Course Code	Module Name	CHS
Level 1		
601101-2	Islamic Culture I	2
605101-2	The Holy Qur'aan I	2
4021101-4	General Chemistry I	4
4041101-4	Calculus	4
7001401-4	English Language I	4
Level 2		
102101-2	The Biography of Prophet Muhammad (pbuh)	2
501101-2	Arabic Language	2
4011101-4	General Biology	4
4031101-4	General Physics	4
7001402-4	English Language II	4
Level 3		
601201-2	Islamic Culture II	2
4042501-4	Differentiation and Integration(2)	4
4042401-4	Sets and Algebraic Structures	4
4042301-3	Elements of Statistics and Probability	3
4042402-4	Linear Algebra(1)	4
Level 4		
605201-2	The Holy Qur'aan II	2

Course Code	Module Name	CHS
4042601-3	Differential Geometry	3
4042502-4	Ordinary Differential Equation	4
4042503-4	Multi - Variable Calculus	4
4042101-3	Intro-Real Analysis	3
Level 5		
601301-3	Islamic Culture III	3
605301-2	The Holy Qur'aan III	2
4043302-3	Probability Theory	3
4043701-4	Continuum Mechanics	4
4043102-3	Real Analysis(1)	3
4043403-3	Group Theory	3
Level 6		
601401-2	Islamic Culture IV	2
4043504-4	Partial Differential Equations	4
4043103-3	Real Analysis (2)	3
4043404-3	Linear Algebra(2)	3
4043702-3	Numerical Analysis	3
4043405-3	Discrete Mathematics	3
Level 7		
605401-2	The Holy Qur'aan IV	2
4044201-3	Linear Programming	3
4044303-3	Mathematical Statistics	3
4044602-3	General Topology	3
4044703-4	Fluid Mechanics	4
4044406-3	Number Theory	3
Level 8		
4044901-2	Research Project	2
4044304-3	Financial Mathematics	3
4044202-3	Mathematical Software Packages	3
4044104-4	Complex Analysis	4
4044105-3	Measure and Intergration	3
4044407-3	Rings and Fields Theory	3

