ASIIN Seal

Accreditation Report

Bachelor's Degree Programmes
Mathematics
Physics
Female campus

Provided by
King Saud University, Riyadh, Saudi Arabia

Version: 23 March 2018

Table of Content

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]
Bachelor of Science in Mathematics		ASIIN	01.04.2011 – 30.09.2016	TC 12
Bachelor of Science in Physics		ASIIN	01.04.2011 – 30.09.2016	TC 13
Date of the contract: 09.05.2017 **Submission of the final version of the self-assessment report:** 07.06.2017 **Date of the onsite visit:** 13-15 November 2017 **at:** female campus, Ad-Dirayah, Riyadh				
Peer panel: Prof. Dr. Daniela Pfannkuche, Universität Hamburg; Dipl.-Math. Iris Rüßmann, Capgemini GmbH; Prof. Dr. Maria Lukacova, Universität Mainz (desktop review only, did not participate in onsite visit)				
Representative of the ASIIN headquarter: Dipl.-Kulturw. Jana Möhren				
Responsible decision-making committee: Accreditation Commission for Degree Programmes				
Criteria used: European Standards and Guidelines as of May 2015				

[1] ASIIN Seal for degree programmes

[2] TC: Technical Committee for the following subject areas: TC 12 - Mathematics; TC 13 - Physics.

ASIIN General Criteria, as of 01.12.2015 Subject-Specific Criteria of Technical Committee 12 – Mathematics as of 09.12.2011 Subject-Specific Criteria of Technical Committee 13 – Physics as of 09.12.2011	

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
Mathematics	B.Sc.	n/a	6	Full	n/a	8 Semesters	136 credits	1957, intake annually
Physics	B.Sc.	n/a	6	Full	n/a	8 Semesters	136 credits	1957, intake annually

For the Bachelor's degree programme Mathematics the institution has presented the following profile in the Programme Specifications:

"Program Mission Statement

Offering excellent programs aimed at graduating students in all degrees in the field of Mathematics and its applications capable of meeting the developmental needs of society, as well as enriching knowledge through education, research, authoring and translation."

For the Bachelor's degree programme Physics the institution has presented the following profile in the Programme Specifications:

"Program Mission Statement

Offer highly distinguished education and creative research to serve society and contribute toward knowledge through creating a stimulating educational, creative and scientific research environment of continued quality that guarantee the use of technology and general partnership with the social institutions in connection to the disciplines of Physics and Astronomy."

[3] EQF = The European Qualifications Framework for lifelong learning

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:

- Programme Specifications, including Program Learning Outcome Mapping Matrix
- Subject specific website:
    - Mathematics: https://sciences.ksu.edu.sa/en/node/649 (accessed 01.12.2017)
    - Vision Mathematics: https://sciences.ksu.edu.sa/en/node/619 (accessed 01.12.2017)
    - Physics: https://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
- Self-Assessment Reports
- Discussions with management and teaching staff during onsite visit

Preliminary assessment and analysis of the peers:
*Objectives and learning outcomes of the degree programme*s

The specifications for each of the programmes contain both objectives for the department offering them as well as for the students. In the frame of this accreditation process, the panel focused on the latter while acknowledging that the overarching mission and objectives of the department also served as framework for the programme development, e.g. in the aim of "producing qualified graduates" or to "attract mathematically talented candidates to prepare them for faculty positions". The learning outcomes for the students were found to be aligned with the National Qualifications Framework (NQF) of Saudi Arabia as stipulated by the National Commission for Academic Accreditation & Assessment (NCAAA). The panel positively noted that all modules were linked to the NQF as well as to corresponding teaching and assessment methods. They also acknowledged that much information was available on the programme specific websites, though the information presented there differed between the programme and not everything was provided in English.

The panel referred to the Subject-Specific Criteria (SSC) of the Technical Committee Mathematics and Physics as a basis for judging whether the intended learning outcomes of both Bachelor's programmes, as defined by KSU, correspond to the exemplary constituted learning outcomes of these Technical Committees. The panel examined the areas of competence as set forth by the Subject-Specific Criteria for degree programmes and come to the following conclusions:

For the mathematics programme, the ASIIN Subject-Specific Criteria contain a number of learning outcomes as specialist, subject-related and social competences. The graduates of the Bachelor of Mathematics of KSU shall be able to "recall definitions of basic mathematical terms", "state some fundamental mathematical theorems" and to "describe methods of proof". In addition the students shall also "describe mathematical techniques used for solving of applied problems". The panel concluded that this is in line with the subject-specific criteria of ASIIN and that graduates of KSU shall "have sound mathematical knowledge" and be able to "recognize and solve mathematics-related problems". The programme specifications provided by KSU also stipulated that students shall be enabled to "select and apply appropriate mathematical method needed for the solution of a problem". The students shall also obtain interpersonal skills which comprises the competence to "work independently and in teams" and to "meet deadlines and manage time properly". The panel appreciated that students shall also "exhibit ethical behaviour and respect different points of view". Finally, students shall develop communication and Information Technology skills like "to present mathematics to others, both in oral and written form clearly and in a well-organized manner", "to use IT facilities as an aid to mathematical processes" and to "use the library to locate mathematical information".

The learning outcomes for the Physics programme stipulate skills in the field of knowledge including students' ability to "define the most fundamental concepts, principles and terminology of physics" and to "recognize appropriate tools and techniques that may be used to solve the problems they will face". Cognitive skills like to "apply the knowledge and understanding to solve qualitative and quantitative problems of a familiar and unfamiliar nature" and to "execute and analyze critically the results of an experimental investigation and draw valid conclusions" shall also be achieved. Additionally, students shall also develop interpersonal skills like "to learn independently", "to work as a team", "to acknowledge others' work", and to "be self-disciplined". These skills are complemented by communicational skills like "research in web sites" or "calculate and interpret the results using computer programs". In Physics, it is also important that students develop skills such as those to "operate and use equipment/tools/machinery appropriately" and to "take precise and accurate measurements".

Furthermore, the panel discussed both programmes' objectives with the heads of department and teaching staff and found them to have a common understanding of the programme goals. In particular, they aimed at enabling students to solve any problems by connecting it to the concepts learned using their analytical skills. Staff expected students to be qualified to take up tasks outside of higher education and be open-minded about new research in their field while applying the tools learned. The panel positively acknowledged this approach to the programmes.

The peers conclude that the Subject-Specific Criteria of Mathematics and Physics are by and large covered in the learning objectives of both programmes under review.

Employment opportunities for graduates and further development of degree programmes

In particular, the panel noted that the aim of preparing graduates for the labour market had significantly changed since the last audit. At the time of the first accreditation, the main field of employment for the female graduates was as a primary or secondary school teacher. However, the panel learned that, on the one hand, an additional diploma was needed to become a teacher so that this was no longer a primary objective of the programmes. On the other hand, the labour market had begun to open up much more for female graduates with positions for mathematics and physics graduates in, for example, hospitals, banks, public offices, statistics departments or research centres. Employers confirmed that in fact the need for female graduates was still growing and that they were developing systematic collaboration with the College of Science to ensure further close connection between needed skills and the programmes under review. The panel lauded initiatives such as planned traineeships for female students in order to ensure that students acquire job-relevant skills during their programme beyond the technical and field-specific competences. Their personal skills in areas like English and presentations and communication as well as research were also reported to have improved. Furthermore, the competences of the student trainees were checked against the expectations of the labour market and feedback given to the institution. Overall, the panel gained the impression from the discussion that the graduates for the programmes were highly sought after as employees in particular due to their problem-solving skills.

Thus, the panel was able to confirm that the programme objectives were at the adequate level and in line with the expectations of stakeholders.

Furthermore, the panel also noted that the programme objectives on the level of the programme as a whole, not on the level of individual courses, were not published on the website and thus not easily accessible for stakeholders. The respective programme handbooks that were provided to the students only contained very generic objectives and thus did not entirely fulfil the expectation regarding transparency.

As mentioned above, the involvement of the stakeholders in the development of the programmes was considered to be satisfactory. Nevertheless, discussion partners agreed that more systematic exchange, in particular between students and graduates could be organized (see further criterion 6).

Criterion 1.2 Name of the degree programme

Evidence:

- Programme Specifications, including Program Learning Outcome Mapping Matrix
- Self-Study Reports
- Website: ksu.edu.sa/en

Preliminary assessment and analysis of the peers:
The panel considered the names of both programmes to fully reflect their objectives and content and thus to be entirely adequate. The issue of the teaching language is taken up elsewhere in this report (criterion 1.3).

Criterion 1.3 Curriculum

Evidence:

- Self-Study Reports
- Programme Specifications, including Program Learning Outcome Mapping Matrix
- Subject specific website:
    - Mathematics: https://sciences.ksu.edu.sa/en/node/649 (accessed 01.12.2017)
    - Vision Mathematics: https://sciences.ksu.edu.sa/en/node/619 (accessed 01.12.2017)
    - Physics: https://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
- Programme Handbooks
- Course Specifications
    - Ba Mathematics: https://sciences.ksu.edu.sa/en/node/4000 (accessed 01.12.2017)
    - Ba Physics: http://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)

- Study plans on website: http://sciences.ksu.edu.sa/en/node/1101
- Discussions with management, teaching staff, students, alumni and employers

Preliminary assessment and analysis of the peers:
Firstly, the panel lauded that recommendations from the previous accreditation regarding improvements to the curricula had been implemented, specifically with regard to introducing a mandatory course in programming. The new course (C111) was found to be adequate to ensure that all students gain numeric knowledge, using mainly Java and C++, and the ability to learn other languages such as Perl or Fortran 90. Students also confirmed that they learn the usage of MATLAB.

In the view of the panel, this completed the curriculum which they overall considered to be suitable for the level and objectives of the programme. They also found the curriculum to be in line with comparable programmes at other institutions internationally as well as the expectations of the Subject-Specific Criteria. The first year, the Preparatory Year, focuses on general mathematics, computer and English skills. The subject-specific education is implemented in the second to fourth year. The programmes enable students to gain sound fundamental knowledge in their disciplines as well as practical skills. The panel also acknowledged that the curricula encompass a wide range of problem-solving techniques and methods. Both programmes include electives for 9 credits from the departments in the last year. The panel lauded the inclusion of electives in the curriculum. However, during the discussions with the stakeholders it became evident that a further widening of the electives would be desirable in order to foster interdisciplinary working of the students. This would include allowing them to choose electives from other colleges, such as social sciences or humanities.

The panel also noted that the students have to choose 8 credit points out of a list of University-wide elective course courses like “Introduction to Islamic Culture”, “Economic System in Islam”, “Studies in the Biography of the Prophet”, “Human Rights” etc. They looked at a number of examples of module descriptions and gained the impression that the modules deal with cultural topics of the Islam which does not contradict the basic principles of scientific research.

The panel also positively acknowledged that the graduation project (Bachelor thesis) had been expanded since the first accreditation. In the physics programme, for example, it now allowed for more experimental aspects to be taken up in the projects. Similarly, the number of experimental and lab courses had been increased following a recommendation.

The teaching language was intensively discussed with the students and teachers. Generally, in the mathematics programme, all courses are taught in English and exams are held in

English as well. While this was confirmed to be likewise the aim for the physics programme, the panel learned that more courses are effectively taught in both English and Arabic in a mixed manner. Though teachers and students confirmed that both teaching material and homework were provided in English, the explanations and discussions during the courses more often were held in Arabic, though key words were again provided in English. The exam questions were also translated into Arabic. The panel concurred with the students, that the mix of languages proved confusing and did not sufficiently contribute to the aim of generating English skills in the subject. While the panel acknowledged the reasons in the more difficult situation of the physics programme, namely with the lower level of skills of incoming students due to a lower admission barrier (see below, criterion 1.4), the panel concluded that the inconsistency in the use of the teaching language did not improve the situation. They considered it advisable to encourage students with lower English competences to take up additional English classes which are already offered outside of the curriculum. A more persistent approach to the teaching language would also enable students to participate more easily in international mobility activities as was desired by all stakeholders.

Overall, the peers concluded that the curricula of the programmes are designed in a way to develop the competences as exemplified in the Subject-Specific Criteria of ASIIN and the level 6 competences of the European Qualification Framework. The overarching objectives and intended learning outcomes for the degree programmes are systematically substantiated in modules and it is made transparent in the module-outcomes matrix which knowledge, skills and competences students will acquire in each module.

Criterion 1.4 Admission requirements

Evidence:

- Self-Study Reports
- Programme Handbooks
- Report on Programme Requirements and Regulations
- Website: dar.ksu.edu.sa/en (accessed 01.12.2017)
- Discussions with management, teaching staff and students

Preliminary assessment and analysis of the peers:

The admission requirements for the programmes are made transparent in the programme handbooks as well as on the university website. Student surveys confirmed that the admis-

sion requirements and process were transparent. Generally, in line with national regulations, a secondary school certificate granting access to higher education is mandatory. After the Preparatory Year, an additional acceptance grade is defined which needs to be passed to continue on to the second year. The necessary grade point average (GPA) levels differ between the physics and mathematics programmes, however. More specifically, it was confirmed that a lower GPA entry level is required for the physics programme. Accordingly, a significant number of students enrol in the programme with the sole aim of transferring to another programme later on and that these students regularly had a lack of interest in the subjects, causing longer duration of study. This also resulted in a comparatively high dropout rate in this programme. Furthermore, staff and students pointed out that the overall qualification level, not least in English, of the students in this programme was lower. The panel gained the impression that the institution was well aware of the issue and its ensuing consequences and that a number of measures were taken to counter them. For example, teachers give talks at the beginning of each year to inform students about the requirements. Generally, with the aim of attracting more and well qualified students for both programmes, some relations with schools have been established. Students who are organized in the maths and physics clubs (see further below, criterion 2.4) also organize school trips to encourage girls to study the subjects. They also participate in open days at the college. In principle, the panel found the admission requirements to be adequate but strongly encouraged the institution as well as the student clubs to maintain and increase their efforts to attract more interested and qualified students. Considerations about raising the required GPA level should also be continued.

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

As the university relinquished on any comments, the panel confirmed its preliminary assessments. The auditors saw the criterion widely fulfilled. From their point of view only additionally it is needed to ensure that the programme outcomes are published and easily accessible for all stakeholders.

Further on, the peers recommended for both programmes to allow students to choose electives more widely in order to foster interdisciplinary working. Additionally for the bachelor programme physics they recommended to increase efforts to raise the qualification of incoming students by requiring a higher GPA level and at the same time to increase outreach to secondary schools to attract more interested and qualified students. Consistently teaching in English was also recommended for the physics programme. Finally, they recommended to continue efforts to further develop students' English competences to enable

them to better participate in international mobility and to encourage students whose English competences are low to take up additional English classes.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self-Study Reports, including statistical data about cohort progression, results from surveys
- Course Specifications
    - Ba Mathematics: https://sciences.ksu.edu.sa/en/node/4000 (accessed 01.12.2017)
    - Ba Physics: http://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
- Discussion with management, teaching staff and students
- Programme Handbook, including transfer regulations

Preliminary assessment and analysis of the peers:
Structure and modularization:

The structure of the programmes as well as the individual modules were found to be coherent and consistent. The results from satisfaction surveys from students and teaching staff also did not show any area of concern with regard to the structure or possible overlap. The panel acknowledged positively that teaching staff members discussed their respective courses at least annually in order to ensure the coherence between them. This included the allocation of homework and exams to maintain a reasonable workload for the students. The embedding of electives into the curriculum has been discussed above (criterion 1.3).

Depending on the GPA achieved by students, these are allowed to take courses for a maximum of 20 contact hours per week. In case the GPA drops, students are asked to take fewer courses in order to achieve the intended competences. The panel considered this practice adequate though it might lead to slightly longer study durations. Overall, they found that most students completed their programme within 4.5 years.

While no immediate issues were found, the panel was satisfied that the institutional stakeholders discussed possible changes for enhancement of the programme. In the case of the physics programme, this would enable students to include more lab work in the project.

Practical Approach/Internships and student mobility

While currently no work placements or internships are foreseen in the curriculum, the panel noted that discussions are under way to foster students' practical experiences (see above, criterion 1.1). Additionally, students have an option to complete a one year research in the research centre in addition to their studies. International mobility is organized on an institutional level and currently takes place in the form of summer schools at international universities or research centres. Some students had participated in these exchanges while others confirmed that the possibilities were widely available and reasons for not participating were mainly personal. The panel also took note that the institutional policy placed international mobility rather at the level of Master and PhD programmes

Recognition of achievement and competences

The recognition of credits acquired outside of the college as well as between programmes is stipulated in the university regulations and published in the programme handbooks. The panel took note, however, that a transfer from another university is very rare. In such cases, the procedures for checking the courses and competences are followed. However, it does not become fully clear if KSU is required to provide the reasons for the rejection of applications of recognition which would be necessary to be in accordance with the Lisbon Recognition Convention; the panel asked KSU to clarify this issue.

Criterion 2.2 Work load and credits

Evidence:

- Course Specifications
    - Ba Mathematics: https://sciences.ksu.edu.sa/en/node/4000 (accessed 01.12.2017)
    - Ba Physics: http://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
- Discussions with management, teaching staff and students
- Self-Study Reports including progression statistics, survey results

Preliminary assessment and analysis of the peers:
Each of the degree programmes runs over a period of 8 semesters with 136 credit points. The workload of the degree programmes and the course structure are stipulated in course specifications. The credit point system in use at the university is based on the number of contact hours, including lectures, seminars and labs. These are also stipulated in course specifications. Students on average have about 19 contact hours per week. The additional workload of students for self-study and/or homework is estimated to be around 6 hours per week, though this is not consistently considered. The peers take positive note that the Course Evaluation Survey (CSE) includes the question (question 16) "The amount of work I had to do in this course was reasonable for the credit hours allocated" which demonstrates that KSU checks each semester systematically whether the overall workload of students is adequate. Though a number of students exceeded the normal duration of the programme, the panel was satisfied that this was not caused by a too high workload.

The panel supported ongoing considerations at the College to give credits to students who are involved in the student clubs (see below, criterion 2.4). Such a move would recognize the effort the students bring to these activities but also the skills they acquire by, for example, managing projects and finances and working in teams and as leaders. Employer representatives also confirmed the value of these skills for employment.

Criterion 2.3 Teaching methodology

Evidence:

- Self-Study Reports
- Course Specifications
    - Ba Mathematics: https://sciences.ksu.edu.sa/en/node/4000 (accessed 01.12.2017)
    - Ba Physics: http://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
- Report about Strategies and teaching methods employed, and evaluation techniques used
- Discussions with teachers, students, graduates

Preliminary assessment and analysis of the peers:
The panel members were satisfied to see that a number of different teaching methods are used that aim at actively engaging the students in the classroom. As the group sizes are

rather small, lectures systematically include discussion with the students and active participation is usually part of the grading. In addition to the use of blackboards or whiteboards, teachers confirm the use of the learning management system in their classes. Most courses include application oriented or small research projects to be elaborated by groups of about 5 students which have to be presented at the end of the semester. Other teaching methods such as flipped classroom are also in use.

The panel positively acknowledged that homework has to be submitted weekly, particularly in the computer based courses. While this had not been fully clear from the corresponding course descriptions, the discussions and review of course reports confirmed the consistent use of homework. Students also pointed out the usefulness of the regular tasks in order to achieve the learning outcomes. Overall, students were very satisfied with the teaching.

With regard to the preparation of students for research, the panel positively noted that the graduation project had been expanded since the first accreditation and that, additionally, a course on research skills had been added. Students had the opportunity to participate in research projects though on a limited scale. The panel considered the level adequate for Bachelor degree programmes.

Criterion 2.4 Support and assistance

Evidence:

- Self-Study Reports, incl. survey results
- Programme Handbooks
- Discussions with students, graduates and teaching staff

Preliminary assessment and analysis of the peers:
The level of motivation of both students and teaching staff and the related support provided to students were considered to be very strong points of the programmes.

A particular feature of the student engagement and support are the self-organized student clubs for both mathematics and physics. Students in the clubs carry out a large number of activities targeted both at schools, future and current students from their own and other programmes with the aim of making the subjects more relatable. Examples of the activities include open days for schools and school visits but also exhibitions at the College. The panel was able to participate in an exhibition during the visit.

The panel lauded that the clubs are supported financially and through providing facilities by the institution and that staff members also support them, for example in the subject committees. The clubs were found to be also very important for students to gain project

and financial management knowledge as well as communication, teamwork and leadership skills. As these skills were highly appreciated by the employer representatives and contribute towards the employability, the panel supported the idea of awarding credits for students whose achievements has been verified. The panel was very impressed by the extracurricular activities of the clubs and also considered the idea to involve graduates in these clubs to be very beneficial. Graduates proposed organizing regular meetings with students in order to provide information about work opportunities in different fields and industries that were less well known.

Furthermore, the panel understood that an additional support programme called hand-in-hand was in place that also involved students helping other students during their studies. Teaching staff members are required to offer at least 8 office hours for student support.

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

As the university relinquished on any comments, the panel confirmed its preliminary assessments. The auditors saw the criterion generally fulfilled but recommended for both programmes to consider means of recognizing the extracurricular activities (clubs) of the students by giving credits for the skills acquired.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Programme Handbooks
- Programme and Course Specifications
- Course Specifications
    - Ba Mathematics: https://sciences.ksu.edu.sa/en/node/4000 (accessed 01.12.2017)
    - Ba Physics: http://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
- Exam Rules and Regulations at KSU
- Annual Course Reports

- Report about Strategies and teaching methods employed, and evaluation techniques used
- Discussions with management, teaching staff and students
- Self-Study Reports, including statistics on cohorts

Preliminary assessment and analysis of the peers:

Examination methods and final project

The assessment of students in use in both programmes is implemented using a variety of different continuous and summative methods. For the majority of courses, these include quizzes, homework and presentations, midterm exams and a final exam. The panel understood that as part of the continuous assessment oral exams were part of the classroom activities. Weekly exercises are also used in the computer-based classes. Furthermore, students usually have to collaborate in small teams in order to implement a research project and present the results. The achievements from these assessments, including classroom engagement, contribute to the final course grade. The panel positively acknowledged that about 60% of the grade was made up of these continuous and interactive assessment forms. In particular, while the teaching staff expressed some doubts about using oral exams, the panel clarified that oral assessments were effectively already used in the courses and contributed to the verification of the achievement of learning outcomes. Nevertheless, the panel encouraged the teaching staff to explore further opportunities for implementing oral exams also in the case of final exams. While students desired the final exam to count even less, the panel considered the current exam and grading mechanism to be highly adequate. It was also confirmed that the assessment rubrics were made available to the students from the beginning of each course and were transparent; they are also indicated in the course specifications.

Furthermore, it was positively noted that the assessment of the graduation project had also been changed following a recommendation from the previous accreditation. All projects included an oral presentation and a poster presentation. The panel lauded the approach of the teaching staff to ensure that the graduation projects were adapted to and implemented at a level adequate for the respective student while challenging them to improve their skills. The review of graduation projects and exams during the onsite visit confirmed that these were implemented at an adequate level comparable to level 6 of the European Qualifications Framework (EQF).

Examination organisation

The organization of exams was found to be smooth as exam dates were planned and published at the beginning of the semester and no issues of overlaps were reported. Make-up

exams are possible for students who could not attend the mid-term exams; they are held one week before the final exams. Failed exams cannot be repeated without repeating the whole module but the number of their repetitions is unlimited. Students confirmed that all rules and regulations regarding exams, calculation of grades and pass rates as well as scheduling and re-sits were clear to them and transparently described.

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

As the university relinquished on any comments, the panel confirmed its' preliminary assessments. The auditors saw the criterion fulfilled completely.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Study Reports with overview of teaching staff, student-staff ration information, satisfaction survey results
- CVs of teaching staff
- Faculty Employment and Promotion Regulations
- Scientific Research Policy
- Report on Research Strategic Plan
- Discussions with students, teaching staff and management

Preliminary assessment and analysis of the peers:
The programmes are taught by 25 female professors, associate and assistant professors for mathematics and 15 for physics at the female College. This leads to student-staff ratios of no more than 25:1 which the panel considered adequate.

The composition and qualifications of the staff for the respective programmes were positively noted as all had acquired a PhD level degree at an international university. About 20% of the staff in the mathematics department and about 50% of the staff in the physics department are international. Normally, two research assistants are employed for each lab to support teaching. Regularly, staff members are offered teaching assistant positions at the College together with support for a local or international Master degree and an international PhD. There was an expectation that these staff members would then return to

teach at the college. As currently a number of staff were abroad to complete their studies, currently some shortages of teaching assistants had been encountered. However, the panel learned that in these cases short term contracts were provided by the university in order to ensure that all teaching needs were adequately covered.

The panel was impressed with the very high level of motivation of the staff members with regard to both teaching and research. In particular, in the physics department, the staff was overall very young so that growth opportunities were given. However, the panel considered that it might be helpful to also recruit some high-profile teaching staff while expanding the research and development opportunities for the younger staff members. While the research carried out by the staff members was found to be satisfactory, the panel supported their need for better access to laboratories and equipment, particularly in the physics department where financial constraints existed for the purchase of research equipment. In view of the intended extension of the programmes towards master degrees this situation has to be improved.

The panel learned that the teaching load was 14 hours for assistant professors, 12 for associate and 10 for full professors. Generally, teaching was carried out during 2-3 days in order to allow research on the other days. Despite the teaching load, which would increase during short term shortages, the panel found that the arrangement supported the research of staff members. The panel also noted that research was often implemented in research groups, also including male colleagues, and that staff members used topics from their own research for students' graduation projects (on the issue of research equipment, see further below, criterion 4.3).

Criterion 4.2 Staff development

Evidence:

- Self-Study Reports
- Faculty Employment and Promotion Regulations
- Scientific Research Policy
- Discussion with teaching staff and management

Preliminary assessment and analysis of the peers:
The panel took note that a number of teaching staff members were currently working on their promotion to a higher level of professorship. This was found to be encouraged by the institution as part of staff development. The panel acknowledged that staff members occasionally delayed their research and consequently promotion for personal reasons but that this was not due to a lack of institutional support.

Staff also confirmed that numerous workshops are available for them at different times dealing with teaching techniques and methodology. These induction workshops are mandatory for new teachers but also available for others who confirmed their interest and participation in these offers. Furthermore, the responsible Deanship for Skills Development was supportive in offering additional development workshops upon request.

Criterion 4.3 Funds and equipment

Evidence:

- Self-Study Reports, including satisfaction surveys
- Discussions with teaching staff and students

Preliminary assessment and analysis of the peers:
Since the last accreditation, a new female campus has opened at the same site as the rest of the university. The facilities and buildings are therefore quite new. Classrooms were well equipped and the library was also found to be adequate, specifically the online access to electronic resources. The panel was particularly impressed with the efforts and material made available to include students with disabilities. The labs were also considered to be suitable for the teaching of the programmes. The panel found the experiments to be traditional, however. Further consideration might be given to big equipment that students are likely to face in their future workplace such as in hospitals.

The budget for the departments is divided by the college according to the number of students, to be used within six months. The management of the programmes confirmed that the funds provided were sufficient to implement the programmes.

While the facilities and funding for teaching were found to be adequate, the panel noted a lack of funds to acquire equipment suitable for carrying out research in physics. The panel pointed out that in order to enable staff members to pursue high level research projects, adequate equipment was conducive to ensure the research orientation of the programme in consequence.

The panel understood that KSU and the different departments maintain close linkages to external institutions and private companies as well as research centres. The issue of cooperation with industry representatives is discussed elsewhere in this report (see criteria 1.1, 1.3, 2.4, 6). Collaboration with the colleagues at the male campus was found to work well though nearly no modules are taught by male colleagues in a change since the first accreditation. Furthermore, the panel identified a particular module with comparatively high fail-

ure rates (Nuclear Physics I) and learned that this was not taught by a member of the female college. The panel therefore encouraged the College to consider hiring a staff member for this subject area as well.

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

As the university relinquished on any comments, the panel confirmed its preliminary assessments. The auditors saw the criterion generally fulfilled but recommended for both programmes to consider recruiting some high-profile teaching staff while ensuring that young researchers and professors are guaranteed sufficient room and time for their research. For the bachelor programme physics they recommended additionally to ensure that sufficient funds and facilities/equipment are available so that staff members can carry out adequate research projects in order to ensure the research orientation of the programme.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Course specifications, course reports
- Course Specifications
    - Ba Mathematics: https://sciences.ksu.edu.sa/en/node/4000 (accessed 01.12.2017)
    - Ba Physics: http://sciences.ksu.edu.sa/en/node/2034 (accessed 01.12.2017)
-
- Course specifications published on website

Preliminary assessment and analysis of the peers:

The panel considered the course specifications to be very informative and containing sufficient details about each course. All course specifications are based on the template of the National Commission for Academic Accreditation & Assessment and contain, in particular, course title and code, credit hours, expected time commitment, name of the responsible faculty member, programme and level of the course, pre-requisites, contact hours and re-

spective mode of instruction, objectives and content outline, an alignment with the National Qualifications Framework, assessment details as well as learning resources and a reading list. The panel noted that students confirmed that course specifications were made available to them and contained all necessary information. They appreciated that the descriptions are also published on the institutional website.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Response to ASIIN recommendations

Preliminary assessment and analysis of the peers:
The introduction of a Diploma Supplement or a similar document had been a recommendation of the previous accreditation process. However, the institution explained that an introduction had not been possible. While no explanation had been given as to the reasons, the panel reinforced the importance of a Diploma Supplement or similar document to provide external stakeholders, in particular international employers or higher education institutions, with information about the programme and graduates competences. Such a document would not have to be official and could be issued by the College or departments.

Criterion 5.3 Relevant rules

Evidence:

- Programme Handbooks
- Students Code of Conduct
- Report on Programme Requirements and Regulations

Preliminary assessment and analysis of the peers:
Rules and regulations for students' admission, progression, grading and graduation are published primarily in the Programme Handbooks.

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

As the university relinquished on any comments, the panel confirmed its preliminary assessments. The auditors saw the criterion widely fulfilled. However, from their point of view it is necessary to provide a Diploma Supplement or a similar document 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.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Study Reports, incl. statistical data
- QMS Handbook (2009)
- Survey Results and Analysis
- Quality Policy of the College , Quality Management System
- Action Plan, Alignment, Strategic Plan
- Benchmark Report
- Independent reviewer report and answers
- Discussions with management, teaching staff, students, graduates, employers

Preliminary assessment and analysis of the peers:
The panel found an extensive quality assurance system, an extensive organisational structure and substantial documentation in place. The quality management system is built on several layers of responsibility and activity, on institutional, College and department level.

The system is closely based on the standards and criteria of the national accreditation agency (NCAAA) as well as the EFQM system. Generally, the College of Science and the departments have developed KPIs for each of their objectives which are annually tracked. The responsibility for this lies with the Steering Committee and its working groups, all of which are jointly implemented by the male and female parts. Annual assessments are implemented to assess the performance on the achievement of objectives. At the same time, the KPIs and benchmarks are used to compare the performance of programmes against each other. An improvement plan is then generated based on the annual check to what extent objectives have been met and to determine improvement actions; responsibilities are assigned.

In the frame of the self-study, carried out every five years, surveys of teaching staff and students are implemented with the aim of ascertaining to what extent the aims and objectives of the programmes are relevant to the daily teaching and learning activities. These surveys also include satisfaction with the provision of teaching and facilities and resources.

The panel was convinced that in addition to the systematic quality assurance activities, direct communication between students and teachers of the programmes also contributed to the quality enhancements. As an improvement from the last accreditation, it was noted that survey results actually lead to changes in the programmes and students felt that their concerns were listened to and remedied where possible. To this extent, the panel considered the feedback loops in the system to be closed.

A graduate database was understood to be in the process of being developed. While in principle the contact details of all graduates were available, it appeared that not much systematic use was made of this information. Similarly, personal relations to certain employers existed and companies were formally involved in enhancement surveys. However, the panel gained the impression that more effects could be achieved to make use of this information and contacts on programme, rather than college or university level. In building up on the activities of the student clubs (see above, criterion 2.4), it might thus be helpful to continue building networks and offering an interface for exchange between employers, graduates, students and staff. The panel supported the proposals to organize meetings between these groups with a view to both informing students about future employment opportunities but also to gathering information about skills needed in the labour market that can be used to continuously enhance the programmes.

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

As the university relinquished on any comments, the panel confirmed its preliminary assessments. The auditors saw the criterion generally fulfilled but recommended to continue building and expanding a strong interface between employers, graduates and students.

D Additional Documents

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

- Rules and regulations on recognition of external periods of study

E Comment of the Higher Education Institution

The university relinquished on any comments to the report.

F Summary: Peer recommendations (16.02.2018)

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 Mathematics	With requirements for one year	--	30.09.2024
Ba Physics	With requirements for one year	--	30.09.2024

Requirements

A 1. (ASIIN 1.1) Ensure that the programme outcomes are published and easily accessible for all stakeholders.

A 2. (ASIIN 5.2) KSU needs to provide a Diploma Supplement or a similar document 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.

Recommendations

For both Bachelors

E 1. (ASIIN 1.3) It is recommended to allow students to choose electives more widely in order to foster interdisciplinary working

E 2. (ASIIN 2.2, 2.4) It is recommended to consider means of recognizing the extracurricular activities (clubs) of the students by giving credits for the skills acquired

E 3. (ASIIN 6) It is recommended to continue building and expanding a strong interface between employers, graduates and students

E 4. (ASIIN 4.1) It is recommended to consider recruiting some high-profile teaching staff while ensuring that young researchers and professors are guaranteed sufficient room and time for their research

For the Ba Physics

E 5. (ASIIN 1.4) It is recommended to increase efforts to raise the level of incoming students by requiring a higher GPA level and at the same time to increase outreach to secondary schools to attract more interested and qualified students

E 6. (ASIIN 1.1, 1.3, 2.3) It is recommended to increase efforts to teach more consistently in English (rather than mixing languages)

E 7. (ASIIN 1.3) It is recommended to continue efforts to further develop students' English competences to enable them to better participate in international mobility and to encourage students whose English competences are low to take up additional English classes

E 8. (ASIIN 4.2, 4.3) It is recommended to ensure that sufficient funds and facilities/equipment are available so that staff members can carry out adequate research projects in order to ensure the research orientation of the programme

G Comment of the Technical Committee

Technical Committee 12 - Mathematics

The Technical Committee discusses the procedure, and in particular, recommendation 2. The TC doubt whether the activities in the clubs are organised in a way to give credit points on it. Therefore, the TC suggested to delete the corresponding recommendation. Apart from this the Technical Committee followed the assessment of the peers.

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

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
Ba Mathematics	With requirements for one year	--	30.09.2024
Ba Physics	With requirements for one year	--	30.09.2024

Requirements

A 1. (ASIIN 1.1) Ensure that the programme outcomes are published and easily accessible for all stakeholders.

A 2. (ASIIN 5.2) KSU needs to provide a Diploma Supplement or a similar document 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.

Recommendations

For both Bachelors

E 1. (ASIIN 1.3) It is recommended to allow students to choose electives more widely in order to foster interdisciplinary working.

E 2. (ASIIN 6) It is recommended to continue building and expanding a strong interface between employers, graduates and students.

E 3. (ASIIN 4.1) It is recommended to consider recruiting some high-profile teaching staff while ensuring that young researchers and professors are guaranteed sufficient room and time for their research.

For the Ba Physics

E 4. (ASIIN 1.4) It is recommended to increase efforts to raise the level of incoming students by requiring a higher GPA level and at the same time to increase outreach to secondary schools to attract more interested and qualified students.

E 5. (ASIIN 1.1, 1.3, 2.3) It is recommended to increase efforts to teach more consistently in English (rather than mixing languages).

E 6. (ASIIN 1.3) It is recommended to continue efforts to further develop students' English competences to enable them to better participate in international mobility and to encourage students whose English competences are low to take up additional English classes.

E 7. (ASIIN 4.2, 4.3) It is recommended to ensure that sufficient funds and facilities/equipment are available so that staff members can carry out adequate research projects in order to ensure the research orientation of the programme.

Technical Committee 13 - Physics

The Technical Committee discusses the procedure, and in particular, recommendation 2. They support the idea of the peers to credit the extracurricular activities of the students. However, in order to avoid that it will be used extensively, the Technical Committee suggests to limit the recognition to a certain number of credits. Apart from this adaption regarding requirement 2, the Technical Committee follows the assessment of the peers.

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

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
Ba Mathematics	With requirements for one year	--	30.09.2024
Ba Physics	With requirements for one year	--	30.09.2024

Requirements

A 3. (ASIIN 1.1) Ensure that the programme outcomes are published and easily accessible for all stakeholders.

A 4. (ASIIN 5.2) KSU needs to provide a Diploma Supplement or a similar document 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.

Recommendations

For both Bachelors

E 1. (ASIIN 1.3) It is recommended to allow students to choose electives more widely in order to foster interdisciplinary working.

E 2. (ASIIN 2.2, 2.4) It is recommended to consider means of recognizing the extracurricular activities (clubs) of the students by giving a limited number of credits for the skills acquired.

E 3. (ASIIN 6) It is recommended to continue building and expanding a strong interface between employers, graduates and students.

E 4. (ASIIN 4.1) It is recommended to consider recruiting some high-profile teaching staff while ensuring that young researchers and professors are guaranteed sufficient room and time for their research.

For the Ba Physics

E 5. (ASIIN 1.4) It is recommended to increase efforts to raise the level of incoming students by requiring a higher GPA level and at the same time to increase outreach to secondary schools to attract more interested and qualified students.

E 6. (ASIIN 1.1, 1.3, 2.3) It is recommended to increase efforts to teach more consistently in English (rather than mixing languages).

E 7. (ASIIN 1.3) It is recommended to continue efforts to further develop students' English competences to enable them to better participate in international mobility and to encourage students whose English competences are low to take up additional English classes.

E 8. (ASIIN 4.2, 4.3) It is recommended to ensure that sufficient funds and facilities/equipment are available so that staff members can carry out adequate research projects in order to ensure the research orientation of the programme.

H Decision of the Accreditation Commission (23.03.2018)

Assessment and analysis for the award of the ASIIN seal:

The Accreditation Commission for Study Programmes discussed the procedure, especially the question whether it should be recommended to give credit points for extracurricular activities. In this special case the Commission followed the peers to honor the extraordinary engagement of the students. Further on the Accreditation Commission followed the assessment of the peers and the Technical Committees without any changes.

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

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
Ba Mathematics	With requirements for one year	--	30.09.2024
Ba Physics	With requirements for one year	--	30.09.2024

Requirements

A 1. (ASIIN 1.1) Ensure that the programme outcomes are published and easily accessible for all stakeholders.

A 2. (ASIIN 5.2) KSU needs to provide a Diploma Supplement or a similar document 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.

Recommendations

For both Bachelors

E 1. (ASIIN 1.3) It is recommended to allow students to choose electives more widely in order to foster interdisciplinary working.

E 2. (ASIIN 2.2, 2.4) It is recommended to consider means of recognizing the extracurricular activities (clubs) of the students by giving a limited number of credits for the skills acquired.

E 3. (ASIIN 6) It is recommended to continue building and expanding a strong interface between employers, graduates and students.

E 4. (ASIIN 4.1) It is recommended to consider recruiting some high-profile teaching staff while ensuring that young researchers and professors are guaranteed sufficient room and time for their research.

For the Ba Physics

E 5. (ASIIN 1.4) It is recommended to increase efforts to raise the level of incoming students by requiring a higher GPA level and at the same time to increase outreach to secondary schools to attract more interested and qualified students.

E 6. (ASIIN 1.1, 1.3, 2.3) It is recommended to increase efforts to teach more consistently in English (rather than mixing languages).

E 7. (ASIIN 1.3) It is recommended to continue efforts to further develop students' English competences to enable them to better participate in international mobility and to encourage students whose English competences are low to take up additional English classes.

E 8. (ASIIN 4.2, 4.3) It is recommended to ensure that sufficient funds and facilities/equipment are available so that staff members can carry out adequate research projects in order to ensure the research orientation of the programme.

Appendix: Programme Learning Outcomes and Curricula

According to the Programme Specifications the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Mathematics:

"1. Knowledge

By completing the program, the student is expected to be able to:

1.1 Recall definitions of basic mathematical terms
1.2 State some fundamental mathematical theorems.
1.3 Describe methods of proof.
1.4 Describe mathematical techniques used for solving applied problems.

2. Cognitive Skills

By completing the program, the student is expected to be able to

2.1 Construct rigorous mathematical proofs with clear identification of assumptions and conclusions.
2.2 Analyse and solve problems and reason logically
2.3 Select and apply the appropriate mathematical method needed for the solution of a problem.
2.4 Explain the importance of mathematics to solve problems posed by the others.

3. Interpersonal Skills & Responsibility

By completing the program, the student is expected to be able to:

3.1 To study, learn and work independently.
3.2 To work effectively in teams.
3.3 To meet deadlines and manage time properly.
3.4 To exhibit ethical behaviour and respect different points of view.

4. Communication, Information Technology, Numerical

4.1 To present mathematics to others, both in oral and written form clearly and in a well-organized manner.
4.2 To use IT facilities as an aid to mathematical processes and for acquiring available information.
4.3 Use library to locate mathematical information."

According to the Programme Specifications the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Physics:

„1. Knowledge

1.1 Define the most fundamental concepts, principles and terminology of physics
1.2 Recognize appropriate tools and techniques that may be used to solve the problems they will face
1.3 Describe and comment on different methodologies in physics

2. Cognitive Skills

2.1 Apply their knowledge and understanding to solve qualitative and quantitative problems of a familiar and unfamiliar nature
2.2 Execute and analyze critically the results of an experimental investigation and draw valid conclusions
2.3 Construct their experimental work to investigate some aspect of a problem

3. Interpersonal Skills & Responsibility

3.1 Learn independently Lectures
3.2 Work as a team
3.3 Acknowledge others' work
3.4 Be self-disciplined

4. Communication, Information Technology, Numerical

4.1 Research in web sites
4.2 Calculate and interpret the results using computer programs

5. Psychomotor

5.1 Operates and uses equipment/tools/machinery appropriately
5.2 Takes precise and accurate measurements“

The following **curriculum** is presented:

Bachelor in Mathematics

3rd Year Semester 1					
	MATH 225	Introduction to Differential Equations (**E**)	Required	4(3+1+0)	
	MATH 243	Number Theory	Required	4(3+1+0)	
	MATH 352	Numerical Analysis (1)	Required	4(3+1+0)	
	MATH 382	Real Analysis (1) (**E**)	Required	4(3+1+0)	
		University Requirement	Required	2	
		Total Credit Hours		18	
3rd Year Semester 2					
	MATH 316	Mathematical Methods (**E**)	Required	4(3+1+0)	
	MATH 343	Group Theory	Required	4(3+1+0)	
	MATH 373	Introduction to Topology (**E**)	Required	4(3+1+0)	
		University Requirement	Required	2	
		Elective Course	Required	4	
		Total Credit Hours		18	
4th Year Semester 1					
	MATH 425	Partial Differential Equations (**E**)	Required	4(3+1+0)	
	MATH 431	Combinatorics and Graph Theory (1)	Required	4(3+1+0)	
	MATH 441	Rings and Fields	Required	4(3+1+0)	
	MATH 481	Real Analysis (2) (**E**)	Required	4(3+1+0)	
		Total Credit Hours		16	
4th Year Semester 2					
	MATH 473	Introduction to Differential Geometry (**E**)	Required	4(3+1+0)	
	MATH 487	Complex Analysis (**E**)	Required	4(3+1+0)	
	MATH 499	Research Project	Required	3(0+0+3)	
		University Requirement	Required	2	
		Elective Course	Required	3	
		Total Credit Hours		16	

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
Prep (1st) Year					
1st Year Semester 1					
	CI 140	Learning, Thinking and Research Skills	Required	3	
	CHS 150	Health and Fitness	Required	1	
	ENG 140	English Language (1) (E)	Required	8	
	MATH 140	Introduction to Mathematics(E)	Required	2 (2+0+0)	
	ENT 101	Entrepreneurship	Required	1	
		Total Credit Hours		15	
1st Year Semester 2					
	CT 140	Computer Skills(E)	Required	3	
	MC 140	Communication Skills	Required	2	
	ENG 150	English Language (2) (E)	Required	8	
	MATH 150	Differential Calculus(E)	Required	3(3+0+0)	
		Total Credit Hours		16	
2nd Year Semester 1					
	CSC 111	Computer programming (1)	Required	4(3+2+1)	
	STAT 100	Introduction to Statistics	Required	3(2+1+0)	
	MATH 111	Integral Calculus (E)	Required	4(3+1+0)	
	MATH 131	Foundations of Mathematics	Required	4(3+1+0)	
		University Requirement	Required	2	
		Total Credit Hours		17	
2nd Year Semester 2					
	STAT 105	Statistical Methods (E)	Required	4(3+1+0)	
	PHYS 101	General Physics (1)	Required	4(3+0+1)	
	MATH 201	Differential and Integral Calculus (E)	Required	4(3+1+0)	
	MATH 202	Vector Calculus (E)	Required	4(3+1+0)	
	MATH 246	Linear Algebra	Required	4(3+1+0)	
		Total Credit Hours		20	

Bachelor in Physics

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
Prep Year					
	140 ENGL	English Language Skills (1)	**Required**	8	
	140 MATH	Introduction to Mathematics	**Required**	2	
	140 CT	Computer Skills	**Required**	3	
	140 MC	Communication Skills	**Required**	2	
	150 ENGL	English Language Skills (2)	**Required**	8	
	150 MATH	Mathematics (2) Calculus	**Required**	3	
	140 CI	Learning, Thinking and Research Skills	**Required**	3	
	101 ENT	Entrepreneurship	**Required**		
2nd Year Semester 1					
	Phys 110	General Physics I	**Required**	4	
	Math 111	Methods of Integration	**Required**	4	
	Phys 111	General Physics II	**Required**	4	
	Phys 201	Mathematical Physics I	**Required**	3	
2nd Year					

Semester 2					
	Math 209	Differential Equations	**Required**	4	
	Phys 210	Classical Mechanics I	**Required**	4	
	Phys 222	Electromagnetism	**Required**	4	
	Phys 234	Vibrations and Waves	**Required**	4	
3rd Year Semester 1					
	Phys 301	Mathematical Physics II	**Required**	3	
	Phys 312	Classical Mechanics II	**Required**	3	
	Phys 331	Optics	**Required**	3	
	Phys 352	Modern Physics	**Required**	4	
	Phys 394	Electromagnetism laboratory	**Required**	2	
	Phys 395	Wave Physics laboratory	**Required**	2	
3rd Year Semester 2					
	Phys 325	Electronics	**Required**	3	
	Phys 343	Thermal and Statistical Physics	**Required**	4	
	Phys 371	Solid State Physics I	**Required**	3	
	Phys 391	Thermal Physics laboratory	**Required**	2	
	Phys 396	Modern Physics laboratory	**Required**	3	
4th Year Semester 1					
	Phys 400	Computational Physics	**Required**	2	
	Phys 404	Mathematical Physics III	**Required**	3	
	Phys 453	Quantum Mechanics	**Required**	4	

	Phys 481	Nuclear Physics I	**Required**	3	
	Phys 490	Research Skills	**Required**	3	
	Phys 411	Astrophysics I	**Elective**	3	
	Phys 412	Astrophysics II	**Elective**	3	
	Phys 456	Atomic and Molecular Spectroscopy	**Elective**	2	
	Phys 477	Energy & Environment Physics	**Elective**	3	
	Phys 480	Elementary Particles Physics	**Elective**	2	
	Phys 483	Nuclear Physics II	**Elective**	2	
	Phys 488	Nuclear Reactors Physics	**Elective**	2	
4th Year Semester 2					
	Phys 491	Solid State Physics laboratory	**Required**	2	
	Phys 492	Nuclear Physics laboratory	**Required**	2	
	Phys 499	Graduation Project	**Required**	3	