ASIIN Accreditation Report

Bachelor's Degree Programmes

Chemistry
Physics
Mathematics

Master's Degree Programme

Pure Mathematics

offered by
Qassim University (male campus), Saudi Arabia

Last update: June 28, 2013

Basic information about the accreditation procedure

Degree programmes	**Bachelor's Degree programmes in *Chemistry*, *Physics*, *Mathematics*** **Master's Degree programme in *Pure Mathematics***
Higher Education Institution	**Qassim University (male campus)**
Seals applied for	The Higher Education Institution has applied for the following seals and labels: • ASIIN Seal for the degree programmes
Peer panel	Prof. Dr. Gerd Knupp, Bonn-Rhein-Sieg University of Applied Sciences Prof. Dr. Michael Müller-Preußker, Humboldt University Berlin Prof. Dr. rer.nat. habil. Helmut Rudolph, Leipzig University of Applied Sciences
ASIIN Procedure Manager	Dr. Siegfried Hermes
On-site visit	The on-site visit took place on February 27 - 28, 2013.

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A Preliminary Remark

The on-site visit for the Bachelor's degree programmes *Chemistry, Physics and Mathematics* and the Master's degree programme *Mathematics* took place at Qassim University (male campus) in Saudi Arabia on 27 and 28 February, 2013.

Prior to the talks with the representatives of the university, the peers met to prepare their questions and to discuss the self-assessment report. Professor Müller-Preußker was asked to act as speaker of the audit team for the aforementioned degree programmes. ASIIN's Technical Committees 09 – "Chemistry", 12 – "Mathematics" and 13 – "Physics" are responsible for the accreditation procedure of these programmes.

The peers held discussions with the following groups: University management, responsible managers of degree programmes, teaching staff and students.

Additionally, the auditors inspected the infrastructure and the technical equipment at Qassim University (male campus).

The following chapters relate to the self-study report (SSR) provided by Qassim University in October 2012 as well as to the discussions and information provided during the on-site visit including samples of exams and final theses.

The assessment and the award of the ASIIN seal are always based on the European Standards and Guidelines (ESG) and the Subject-Specific Criteria of the Technical Committees 09 – "Chemistry", 10 – "Life Sciences", 12 – "Mathematics" and 13 – "Physics", valid at the time of conclusion of the contract.

The report has the following structure: Chapter B presents the facts which are necessary for the assessment of the requested seal. The information principally stems from the self study report (SSR) and related appendices provided by the Higher Education Institution. An analysis and separate assessments of the peers about the compliance with the criteria for the requested seals follow. The assessment of the peers is preliminary and subject to changes based on the subsequent information. The statement of the HEI is included with the exact wording. The final recommendation of the peers is drafted after and based on the statement of the HEI (and additional documents, if applicable). The Technical Committee(s) make a proposal for the accreditation decision (chapter F). The final decision is taken by the Accreditation Commission for Degree Programmes (chapter G).

B Report of the peers (Accreditation Report)

B-1 Formal specifications

a) Name & Awarded Degree	b) Profile	d) Study Mode	e) Programme Duration & Credit points	f) first & annual enrollment	g) expected intake	h) fees
Chemistry / B.Sc. in Chemistry	n.a.	Full time	8 semesters 136 Saudi credit hours	Intake is each semester Programme started in 2011/12	30 per year	no fees
Physics / B.Sc. in Physics	n.a.	Full time	8 semesters 136 Saudi credit hours	Intake is each semester Programme started in 1998	30 per year	no fees
Mathematics / B.Sc. in Mathematics	n.a.	Full time	8 semesters 136 Saudi credit hours	Intake is each semester Programme started in 1998	40 per year	no fees
Pure Mathematics / M.Sc. in Pure Mathematics	research-oriented	Full time	4 semesters 44 Saudi credit hours	Intake is each semester Programme started in 2007/08	5 per year	no fees

Analysis of Peers:

The names of the Bachelor's degree programmes seem to adequately reflect the objectives and contents of the programmes. Though, the Master's degree programme appears not to be entitled in an appropriate way. During the sessions, the peers learned that the intention is to cover all fields of pure mathematics, especially linear algebra. The teaching staff argued that the latter justifies the name of the degree program. Again, it is difficult to follow this rationale, given that linear algebra constitutes the knowledge base and is a fundamental part already of the Bachelor's degree programme. Also, the amount of Applied Mathematics seems to be too high to justify the designation "Pure". Therefore, it seems doubtful at least that any competence aspired with regard to pure as basic mathematics could explain the choice of the addendum "pure".

Standard period of study and allocated credit points are within regular range. A part-time study is not provided. The auditors learned that the maximum of expected intakes per study year is specified by the national accreditation: The accreditation gives a limit of students who can enroll in the study programmes. The auditors noted that no tuition is charged but that, in fact,

students receive remuneration for their studies. They also took note of the other formal aspects of the degree programmes and took those into consideration for their assessment.

Assessment of Peers; ASIIN criterion 1:

The peers judged the requirements of the said criterion to be adequately met *with the exception* of the name of the Master's degree programme. It appears that the name "Pure Mathematics" should be reviewed and, if necessary, be brought into alliance with the objectives and contents of its programme.

B-2 Degree Programme: content concept & implementation

B-2.1 Objectives of the degree programmes

Objectives for the study programmes have been defined and outlined for each programme and are accessible to students and other stakeholders in the Department handbook and on the website of the respective department.

For the Bachelor's degree programme Chemistry, see department handbook, p. 2:

To effectively contribute to preparing generations of scientific calibers who are highly-qualified in the different fields of chemistry. Also, to work towards finding solutions for scientific and developmental problems that the civil community around us faces and to provide education, research and training facilities to a high standard.

For the Bachelor's degree programme Physics, see department handbook, p. 2:

To provide a distinct academician and technical staff and to support researchers in the fields of modern physics to access the community partnership.

For the Bachelor's degree programme Mathematics, see department handbook, p. 2:

Providing excellent educational and research programs approved academically for bachelor [and post graduate studies] in mathematics to meet labor market needs and activate community partnership.

For the Master degree programme Mathematics, see department handbook, p. 4:

The program aims to prepare highly qualified graduates in mathematics who can be able to pursue graduate studies (PhD) in Mathematics.

B-2.2 Learning outcomes of the programme

The following learning outcomes are specified in the Chemistry programme specifications, pp. 8ff.:

Upon successful completion of the programme the graduate should be able to ...

- demonstrate knowledge of the concepts and principles of the chemical sciences.
- demonstrate a knowledge of analytical science and to carry out competently (real world) analyses.
- appreciate quality and quality assurance mechanisms in appropriate industrial settings.
- appreciate fundamental aspects of the manufacture of industrial products.
- work in the laboratory with due regard for safety procedures and the efficient use of materials.
- demonstrate relevant laboratory skills, design experiments, evaluate and interpret the results.
- critically evaluate scientific data and have an awareness of the importance of indicating the uncertainty of data.
- seek out scientific information via a variety of media.
- demonstrate knowledge in selected areas at the forefront of science.
- carry out an appropriate, supervised, research investigation within the chemical, pharmaceutical or biological sciences.
- clearly communicate information orally or in written form to a variety of audiences.
- think logically and critically to solve appropriate problems either as a member of a group or individually.
- demonstrate efficient skills in the use of a personal computer.
- critically evaluate his own professional performance and take responsibility for his own continuing professional and academic development.
- acquire leadership responsibility via working independently.
- manage all facilities, resources, time and other members of the group.
- communicate results of work verbal and written to chemists and non-chemists.
- acquire knowledge of relevant standards or codes of ethics in chemistry.
- punctual attendance of classes and tutorials.
- understand issues of diversity of cultures.
- increase the skills in the usage of computer, network, software packages relevant to chemistry, i.e. Excel, Word, Chem-Draw and Origin.
- develop communication skills such as writing and presenting in front of a group.

The following learning outcomes are specified in the program specifications for the Bachelor's degree programme Physics, pp. 7ff.: Upon successful completion of the programme the candidate should acquire ...

- Core knowledge of basic concepts of modern and classical physics.
- Knowledge of mathematics used in physics.
- Knowledge of the evolution of physics and its relation with other sciences.
- Ability to apply knowledge gained in solving theoretical and experimental problems in physics.
- Ability to carry out physics laboratory experiments.
- Ability to use mathematical techniques in treating physical concepts of solving physical problems.
- Ability to interpret experimental data taking experimental errors into account.
- Effective communication skills (including the ability to communicate ideas in written and oral form).
- Accuracy, discipline and credibility.
- Teamwork abilities.

The following learning outcomes are specified in the program specifications for the Bachelor's degree programme Mathematics, pp. 7ff.: Students …

- have a knowledge of principles, concepts and new theories in the field of mathematics.
- have a knowledge of analytical procedures for evaluation of some numerical problems.
- have a knowledge of basic concepts in searching of information resources and how to be self learning.
- will be able to apply the fundamentals of mathematics (different branches) that they have learnt in their courses in solving problems especially in mathematics topics.
- will be able to identify the suitable technique and the analytical procedures to find the right solution for a given problem.
- will be able to apply skills when asked.
- will be able to think creatively.
- will take the responsibility to solve given assignments on their own and submit the solution on time.
- will be able to apply basic knowledge of mathematics in handling problems in the field of mathematics.
- programming skills.

The following learning outcomes are specified in the department handbook for the Master's degree programme Mathematics, pp. 7ff.: Upon conclusion of the programme graduates should have acquired the following competences:

- Advanced knowledge in Mathematics covering Mathematics, its ideas, concepts and applications and high level understanding in the areas of Algebra and Analysis, Logics, Topology, Differential equations, analytical and numerical techniques.
- The correct use of mathematical language and formalism in mathematical thinking and logical processes.
- Abstract and precise reasoning: Importance and use of precise definitions, organisation of complex formal arguments, relevance of abstraction in unification and generalization.
- In depth-knowledge of at least one area of current research in Mathematics.

In addition, graduates are able ...

- to apply numerical and reasoning skills.
- to identify and analyze problems.
- to solve problems and interpret solutions.
- to demonstrate and exercise independence of mind and thought.
- to bridge disciplines (think flexibly and laterally).
- to make use of mathematical modelling.
- to construct an argument or counterexample.
- to critically evaluate and review mathematical literature.
- to understand problems, formulate them in terms of appropriate theoretical frameworks, to facilitate their analysis and solution.
- to carry out extended investigative mathematical work as an individual project.
- to handle abstract mathematical ideas.
- to have mathematical techniques and problems solving skills and a have a capacity for clear, analytical thought.
- to study and learn independently.
- to manage time independently.
- to collaborate, work and interact constructively with others.

The intended learning outcomes of the respective degree programmes are accessible to the relevant stakeholders on the website of each programme.

Analysis of Peers:

Generally the orally introduced learning outcomes appear to be reasonable. These learning outcomes are largely achievable, valid, and mostly reflect currently foreseeable developments in the subject area. However, *occupational* profiles adequately related to the learning outcomes of at least some of the programmes under consideration turn out to be not clearly stated yet.

With regard to the Chemistry degree programme, the qualification *and* occupational profiles for the graduates which are documented appear reasonable and fully comprehensible. Concerning the Physics and Mathematics degree programmes, it has been outlined during the talks that besides the list of occupational profiles, it is intended to educate for even more fields of activity. For instance in the Bachelor's degree programme Physics, it is sought to train graduates for jobs dealing with X-rays and labs. But apparently it is also intended to qualify students for work in a much greater variety of occupations (i.e. schools, companies, hospitals). With a view to that, it must be clear to students, particularly, from the very beginning what kind of job expectations the study programme aims at in order to adequately align the curricula, the didactical concept and any other means of support.

Assessment of Peers; ASIIN-Criterion 2.2:

The peers found the requirements of the above cited criterion not to be fully met. Thus, they judged the academic and professional classification of the programmes as first and second cycle degree as adequate and, generally, found them reflected in the programme objectives. All in all, it also seemed that the level of objectives and learning outcomes of these degree programmes largely conform to the level of European first and second cycle programmes. Concerning the Bachelor's degree programmes Physics and Mathematics as well as the Master's degree programme Pure Mathematics however, as argued above, the peers deemed it necessary that the learning outcomes formulated for each programme as a whole take into account the mission and characteristics of the HEI, which, in turn, must be reflected by concrete occupational profiles for the graduates. Also, these need to be communicated adequately to the students. In this context, the peers also deem it commendable informing the potential employers about the individual qualification profile of the graduates (see chapter B-7.2).

B-2.3 Learning outcomes of the modules/module objectives

The **objectives of individual modules** are published in the module descriptions (so-called course specifications) in the form of intended learning outcomes (divided into knowledge, skills and sometimes behavior). The module descriptions are available to the stakeholders via module handbook and – as a general overview – via internet. The students confirmed that they have access to the module descriptions.

Analysis of Peers:

Overall, the learning outcomes of the modules have been described sufficiently and transparently yielding a sound basis for the assessment of the students' and graduates' knowledge, skills and competences. Learning objectives not yet clear from the documentation could be explained by the programme coordinators during the audit talks.

However, some of the written module descriptions are found to predominantly focus on the description of knowledge, thereby leaving out skills or competences that are among the objectives defined and expressed during the on-site discussions (e.g. skills corresponding to the

respective overall educational objectives, such as adopting an eagerness to seek new challenges; an ability to think critically, to organize one's own work independently, to solve problems effectively as individuals and as members of a team; an ability to communicate effectively with colleagues about substantive issues and problems related to their chosen discipline, to communicate and present ideas and suggest solutions convincingly in written and verbal form).

Furthermore, the module descriptions could be improved by detailing the content in a clearer, more consistent and readable manner (as in the online version of the Guide to Study Plans), by adding and updating descriptions of courses offered by other departments and of the Bachelor's project, by consistently naming a person responsible for the course and the location, and by mentioning if it is an elective or a mandatory course.

When looking at the course descriptions of the Mathematics programmes, it has been found that the module handbook for the Bachelor's programme is fragmentary and inconsistent, while the module handbook for the Master's degree programme relates to the prior Master's degree programme and is not based on the revised Bachelor's degree programme. In that respect, consistency between the module offers must be attained by indicating reasonable prerequisites from former levels (e.g. MATH 201). Furthermore, it seems that the module titles do not always reflect the intended learning outcomes and the curricular content (e.g. Relational Databases, Object-oriented Programming, Software Engineering). As to that, the most recent developments of module contents and learning outcomes need to be reflected in the titles of the modules.

As to the description of the module content of the Chemistry degree programme, the English translation must be improved and the descriptions should be more detailed. Thus, in modules that combine theoretical and experimental aspects, it must be clearly stated which part of the given contents refers to the theoretical and which to the practical aspects of the module (e.g. Separation methods and Chromatography (CHEM 452)). In the same module as well as in other modules, some literature is indicated in Arab language only. In the module Environmental Chemistry and Pollution, it has to be stated more clearly whether the content description refers to the lab work. In the same module, it would be most helpful to indicate an introductory Environmental Chemistry book. The programme coordinators may also check whether the literature is always up-to-date where newer editions are already available (e.g. in modules Organometallic Chemistry, Chemistry of Heterocyclic Compounds). In some cases, books are almost 20 years old or even older (e.g. in module Spectrophotometric Methods of Analysis). Up from level 6, many module descriptions are simply missing: STAT 406, BCH 402, free courses, most of the elective department courses (CHEM 434, CHEM 445 etc.), most courses in level 7 and 8. With reference to the research project (CHEM 499), one would have expected that all lecturers were listed as contact persons since the project can be conducted with each of them (male and female). Furthermore, both media and references are certainly used in the course of the research project. Thus, adequate information must be added.

The stated objectives and learning outcomes provided the audit team with a reference for the evaluation of the programmes' curricula and resources.

Assessment of Peers; ASIIN-Criterion 2.3:

The peers evaluated the requirements of the criterion as *not sufficiently fulfilled* yet.

In general, the module descriptions are informative, but often not precise enough. In particular, the learning outcomes are described sufficiently and transparently, thereby yielding a sound basis for the assessment of the students' and graduates' knowledge, skills and competences. The stated objectives and learning outcomes provided a reference for the evaluation of the programmes' curricula and resources. Nevertheless, the peers noticed the non-existence of many module descriptions as well as a range of other aspects that need to be improved. Some details are listed above. However, indicating every detail would go beyond the scope of the accreditation mission. Therefore, the list of amendments has been detailed only for the Bachelor's degree programme Chemistry, but the peers suggested that all other module handbooks shall be revised just as thoroughly. In fact, the peers feel confident that revising the study relevant documents will be part of a thorough internal quality assurance system.

B-2.4 Job market perspectives and practical relevance

According to the university, **employment opportunities** of graduates are as follows:

Students of the Bachelor's degree programme Chemistry shall be prepared for occupations in:

- chemical and clinical laboratories (Governmental /Private),
- petrochemical industry and petroleum sector,
- in the industrial sector such as pharmaceutical, food, mining, detergents, cement and others,
- industrial waste-water treatment stations,
- purification and testing drinking water in water stations,
- environmental protection agencies,
- research and development centers,
- working as academic staff in the universities.

Graduates of the Bachelor's degree programme Physics shall be employed in any of the following professions:

- as teaching assistants in this and other physics departments in the kingdom (distinguished ones),
- as research assistants/research technicians in one of the research centers (e.g KACST),
- as school teachers,
- as X-ray or MRI technicians in hospitals and medical research centers,
- as criminal evidence laboratory technicians,

- in the fields aviation defense and metrology.

The Bachelor's degree programme Mathematics prepares students to work in various educational institutions of the preuniversity and the information field. This is in addition to some financial places and work as demonstrators in the faculties of science of the universities and technical colleges in Saudi Arabia.

Graduates of the Master's degree programme Pure Mathematics shall be employed in any of the following professions:

- as administrator
- as teacher of Mathematics (Ministry of Higher Education),
- in the Ministry of Defence and Aviation, Ministry of Interior and National Guard
- as researcher in Mathematics
- as expert in banks, in metrology, in insurance
- in private sectors.

Practical elements of the Bachelor's degree programme Chemistry is practical laboratories which are integrated into courses or held in parallel to theoretical courses. In the Bachelor's degree programme Physics, students apply their knowledge gained by solving theoretical and experimental problems in physics and by carrying out laboratory experiments. Practical elements of the Bachelor's and Master's degree programme Mathematics are problem sheets and practical work that is designed to involve a mix of creative activity and selection of appropriate knowledge to be applied to particular problems. From the on-site discussions with the university the audit team learned that practical elements take less space in the curriculum than classic theoretical classes.

Analysis of Peers:

In principle, it can be concluded that graduates have a chance for finding employment in their fields of qualification and henceforth, that the desired qualifications will allow a professional career in the respective areas. However, as mentioned beforehand, the list of potential occupational activities must be brought in line with the qualification profiles of the graduates, and vice versa (see chapter B-2.2). Apparently, as could be derived from the audit talks some of the students also seek to work abroad.

Programme coordinators, teaching staff and students consonantly agreed that there is a certain mismatch of the practical elements. Even if the students in general appeared to be highly satisfied with the degree programmes and the performance of their teachers, they constructively criticized the amount of practical elements in the curricula suggesting that the current ratio between theory and practice negatively interferes with deepening the students' knowledge. Otherwise, teachers apparently aim at offering more training which is appropriately linked to professional practice.

Assessment of Peers; ASIIN criterion 2.4:

The peers concluded that in general, the requirements of the above mentioned criterion are sufficiently met. Needs for improvement are mentioned in the relevant chapters.

B-2.5 Admissions and entry requirements

The **entrance and admission requirements** for the Bachelor's degree programmes are stated in the handbooks of the corresponding department. The actual entrance to the degree programmes takes place after the completion of a joint preparatory year at an external campus, which is mandatory for all students of the College of Science. The admission to the degree programmes is subject to a minimum GPA.

Admission to the Master's degree programme Pure Mathematics requires a bachelor's degree from an accredited institution with a major in mathematics, or related field. Usually the university announces opening application for admission through the Deanship of Graduate Studies on their homepage. Requirement for admission is also announced. Later on, the application is sent to the department to be studied by the Admission Committee formed by the Graduate Studies Committee in the department. The committee studies the applications, compiles and marks a comprehensive exam and interviews the students, and then every student will be given a mark for admission. In general, admission processes in master's programmes depends on the following three standards:

1. The cumulative average of the student (cumulative GPA) which constitutes 50 % of the admission mark.
2. A comprehensive written exam which constitutes 30 % of the admission mark.
3. Mark of the test measuring the overall capacity and efficiency of university undergraduates that is held by the National Center for Assessment in Higher Education, which constitutes 20 % of the admission mark

Beside the admission criteria stipulated by the Graduate Studies Deanship, the applicant must satisfy the following requirements:

1. The applicant must hold a bachelor's degree of science in mathematics (or a bachelor's degree of education in mathematics with some preparatory courses to be attended by the student before starting the master of mathematics courses) with a GPA of at least 3.75 out of 5.
2. The applicant must score at least 70% in the aptitude test for graduates organized by the National Center for Assessment in Higher Education.
3. The applicant must pass the comprehensive written admission exam arranged by the department.

Each student receives a mark for each of these 3 categories, and the students with the highest marks are accepted in the programme according to the intended number of students that the department wishes to accept in the year of study. With effect from the second semester 1432 - 1433 H (2011 -2012), admission in the programme requires to pass an English test as follows: TOEFL with mark 400 or above or IELTS with mark 350 or above.

Rules for the recognition of external study attainments/achievements are stipulated in the Academic Regulations:

- The student must have studied at least one semester at a recognized college or university.
- Students must satisfy the transfer conditions set by the college council to which they are transferring.
- The number of units, which the transferring student would be required to study at Qassim University, may not be less than 60% of the total number of units required to receive a bachelor's degree from the University.

- Transfer is permissible only once throughout the student's entire period of study at any university in the Kingdom of Saudi Arabia.
    - The duration of time that the student spent at the university being transferred from and the time remaining to be spent at Qassim University must not exceed the average of the minimum and maximum period of stay at the college.

Analysis of Peers:

One of the issues intensively discussed with the representatives of the higher education institution (HEI) has been to what extent the admission requirements have an impact on the quality of the degree programme.

In that respect, the preparatory year can reasonably be characterized as a means to ensure that students meet the necessary prerequisites for entering the programme. Generally, it can be concluded that the applicable regulations are transparent and accessible to all stakeholders involved.

As to the recognition of qualifications gained at another institution of higher education, in particular abroad, there seem to be no particular rules in place so far. In principle, such regulations are meant to encourage and support the mobility of students as a pivotal part of the Lisbon Convention (see in particular: Section III "Convention on the Recognition of Qualifications concerning Higher Education in the European Union"). The university representatives described the process they have in place if a student desires to go abroad for one semester. Reasonably, before the student is going abroad a learning agreement is signed that ensures that the selected modules at the other higher education institution and subsequently the qualifications gained can be recognized. Nevertheless, as can be derived from

the course of the conversation with the students, in some cases the recognition of activities raises difficulties.

Assessment of Peers; ASIIN-Criterion 2.5:

The peers judged the said criterion as being addressed adequately in large part, though not sufficiently yet. With regard to the recognition of activities completed at foreign HEIs or at institutions/learning environments other than HEIs they stated that rules for the recognition of activities have to be adopted ("Lisbon Convention") especially with a view to internationalization and, in particular, the mobility of students.

B-2.6 Curriculum/content

The general structure of the Bachelor's degree programmes Physics and Mathematics is composed as follows, wherein the Saudi Arabian credit points are named *credit hours (CH)*:

Requirements			Credit hour	Total	Percentage %
University Requirements			12	12	8.82
Faculty Requirements	Compulsory		44	49	36.03
	Elective		5		
Perquisites	Necessary courses from other departments		9	69	50.72
	From the department	Necessary	54		
		Optionally	6		
Free courses			6	6	4.41
Total			**136**	**136**	**100**

The university requirements for the Bachelor's degree programmes Physics and Mathematics are: Islamic Culture I, II, III and IV (2 CH each), Language Skills (2 CH) and Arabic Writing (2 CH).

The compulsory college requirements for the Bachelor's degree programme Physics are: Thinking skills and learning styles (2 CH), English 1 + 2 (3 CH each), Introduction to Computer (3 CH), Calculus and Integration (4 CH), Communication skills (2 CH), Statistics and Probabilities (3 CH), Statistics (3 CH), General Physics 1 (4 CH each), Mathematical Physics (3 CH), Classical Mechanics (3 CH), Electromagnetic (3 CH), Waves and vibrations (2 CH), Quantum mechanics (3 CH), Electromagnetic Laboratory (2 CH).

The curriculum of the Bachelor's degree programme Physics is structured as followed:

First level: Introductory to the Islamic culture (2 CH), Arabic language skills (2 CH), Thinking skills and learning systems (2 CH), English language (3 CH), Calculus I (4 CH), General chemistry (4 CH).

Second level: Islam and society (2 CH), Expository writing (2 CH), English language (3 CH), Introductory Computer science (3 CH), Statistics and probability (3 CH), General Physics (4 CH).

Third level: The Economic System of the Islam (2 CH), Calculus for science (3 CH), General Physics (4 CH), Classical Mechanics (3 CH), Vibrations and Waves (2 CH), Thermodynamics (3 CH).

Fourth level: Mathematics Physics (3 CH), Calculus for Physiscists (3 CH), Classical Mechanics (3 CH), Electromagnetic (3 CH), Physical Optics (3 CH), College elective (2 CH).

Fifth level: Communication Skills (2 CH), Differential Equations (3 CH), Mathematical Physics II (3 CH), Electromagnetic (3 CH), Modern Physics (3 CH), Optics laboratory (2 CH), Free elective course (2 CH).

Sixth level: The political system of Islam (2 CH), Mathematical Physics (3 CH), Statistical Physics (3 CH), Quantum Mechanics I (3 CH), Electromagnetic laboratory (2 CH), Modern Physics laboratory (2 CH), Free elective course (2 CH).

Seventh level: Electronics (4 CH), Quantum Mechanics II (3 CH) Solid State Physics I (3 CH), Nuclear Physics I (3 CH), College elective (3 CH).

Eighth level: Atomic and Molecular Physics (3 CH), Solid State laboratory (2 CH), Nuclear Physics laboratory (2 CH), Graduation project (2 CH), Three In-department elective courses (2 CH each), Free elective course (2 CH).

A total of 44 credit hours is needed for the Master's degree programme Pure Mathematics. The maximum study load is 12 credit hours per semester, each module comprises 4 credit hours. The first three semesters are composed of 3 modules each:

First semester: Topology (1), Measure Theory and Integration, Advanced Linear Algebra.

Second semester: Abstract Algebra, Complex Analysis (1), Functional Analysis.

Third semester: Ordinary Differential Equations and two elective courses.

The *fourth semester* comprises an elective course as well as a research project.

The compulsory college requirements for the Bachelor's degree programme Mathematics are: Communication skills (2 CH), Islamic and community building (2 CH), Calculus (4 CH), Principles

of the Theory of Distributions (4 CH), Basic of Mathematics (3 CH), Introduction to Geometry (3 CH), The Political system in Islam (2 CH), Calculus in several (4 CH), Vector Calculus (3 CH), Linear Algebra (4 CH), Mathematical applications to computer (2 CH), Elective Course (College) (3 CH).

The curriculum of the Bachelor's degree programme Mathematics is structured as followed:

First level: Introduction to Islamic Culture (2 CH), Language Skills (2 CH), Thinking skills and learning styles (2 CH), English I (3 CH), Calculus (4 CH), General Chemistry (4 CH).

Second level: Islamic and community-building (2 CH), Arab language (2 CH), English II (3 CH), Introduction to Computers (3 CH), General Physics I (4 CH), Introduction to Statistics (3 CH).

Third level: Islamic and community-building (2 CH), Calculus II (4 CH), Principles of the Theory of Probability Distributions (4 CH), Basics of Mathematics (3 CH), Introduction to Geometry (3 CH).

Fourth level: The political system in Islam (2 CH), Calculus in several variables (4 CH), Vector Calculus (3 CH), Linear Algebra (4 CH), Mathematical Applications to Computer (2 CH), Elective course (College) (3 CH).

Fifth level: Communication Skills (2 CH), Introduction to Differential Equations (4 CH), Numerical Analysis (4 CH), Linear Programming (4 CH), Elective courses (Departm.) (3 CH).

Sixth level: Mathematical methods (4 CH), Group Theory (4 CH), Real Analysis (4 CH), Elective Course (Departm.) (3 CH), Free course (3 CH).

Seventh level: Rings and Fields (4 CH), Introduction to Topology (4 CH), Real Analysis II (4 CH), Project (4 CH).

Eighth level: Introduction to Partial Differential Equation (4 CH), Introduction to Differential Geometry (4 CH), Complex Analysis (4 CH), Elective Course (Departm.) (3 CH), Free course (3 CH).

The university requirements for the Bachelor's degree programme Chemistry are: Islamic Culture I, II, III and IV (2 CH each), Language Skills (2 CH) and Arabic (2 CH).

The compulsory college requirements for the Bachelor's degree programme Chemistry are: Thinking skills (2 CH), English 1 + 2 (3 CH each), Introduction to Computer Sciences (3 CH), Communication skills (2 CH), Mathematics 1 (4 CH), Statistics (3 CH), General Chemistry 1 + 2 (4 CH each), Physics 1 + 2 (4 CH each), Mathematics 2 (3 CH), Chemical Thermodynamics (3 CH), Quantum Chemistry (2 CH).

The elective college requirements for the Bachelor's degree programme Chemistry are: Scientific expressions (2 CH), Skills in using Internet (2 CH), Management of laboratories and safety (2 CH), Applied Inorganic Chemistry (3), Photochemistry (2 CH), Environmental Chemistry and Pollution (2 CH).

The necessary department courses are: Chemistry of main group elements (3 CH), Phases of matter and solution (3 CH), Organic Chemistry I and II (3 CH each), Volumetric and Gravimetric Analysis (4 CH), Chemistry of Transition Elements (2 CH), Coordination Chemistry (2 CH), Kinetic Chemistry (3 CH), Electrochemistry (3 CH), Heterocyclic Chemistry (3 CH), Optical methods of analysis (3 CH), Electroanalytical methods of analysis (3 CH), Field training (2 CH), Inorganic Reaction Mechanism (2 CH), Organometallic Chemistry (2 CH), Surface Chemistry and Catalysis (2 CH), Organic Reaction Mechanism (2 CH), Spectra of Organic Chemistry (3 CH), Chemistry of Natural Products (2 CH), Separation methods and Chromatography (3 CH), Research project (2 CH).

The necessary courses outside the department requirements are: Biology I (3 CH), Principles of Biochemistry (3 CH), Statistics and Data Entering (3 CH).

The elective courses from the department are: Solid state Chemistry (2 CH), Spectra of Inorganic Chemistry (2 CH), Nuclear Chemistry (2 CH), Bioinorganic Chemistry (2 CH), Corrosion (2 CH), Polymer Chemistry (2 CH), Photo Organic Chemistry (2 CH), Petroleum Chemistry (2 CH), Applied Organic Chemistry (2 CH), Analysis of Materials (2 CH).

Analysis of Peers:

The curricula of the degree programmes in principle correspond to the intended learning outcomes with the reservations mentioned in chapter B-2.2. The objectives and the content of the individual modules are coordinated in order to avoid any unintended overlaps.

By means of a thorough assessment of the curriculum it might be concluded that soft skills are underrated. The teaching staff emphasized that they encourage students to apply for (international) students' competitions where they also have to work in teams. However, in order to enhance the competences of students in those fields of learning, which the auditors believe to be integral parts of a study programme, it may be constructive to adjust the curriculum of the degree programmes accordingly (e.g. team work should be institutionalized in several courses).

Concerning the Bachelor's degree programme Physics, there seems to be room for improvement in order to meet the contemporary demands of the industry. The curricular content (and learning outcomes) should be aligned with one of the most current requirements graduates need to comply with, i.e. computational skills. Adjusting the curriculum in this field would contribute in qualifying for modern professional environments. Also, the lack of at least

basic knowledge in the subject area of Nuclear and Elementary Particle Physics seems regrettable because this might provide a better overview of the foundations of the study disciplines.

In a similar vein, the Bachelor's and Master's degree programme Mathematics might be adjusted to modern professional fields of work by improving the computational skills of students. With a view to the curriculum, this might be achieved most convincingly through designing the electives catalogue accordingly.

Assessment of Peers; ASIIN-Criterion 2.6:

Generally, the peers considered the study concepts to be well-founded. Accordingly, they deemed the requirements of this criterion being fulfilled to a large extent. Concerning the so-called "soft skills" of students, they see room for improvement and would support strengthening these skills in an adequate manner. Beyond that and with respect to the Bachelor's degree programme Physics, they recommended enlarging students' computational skills in order to more adequately adjust their qualification profile to applications in highly modern professional environments. In principle, this applies to the Bachelor's degree programmes Mathematics and Chemistry as well. Additionally, the peers deemed it recommendable for the Bachelor's degree programme Physics that students get an insight into the basics of Nuclear and Elementary Particle Physics.

B-3 Degree programme: structures, methods and implementation

B-3.1 Structure and modularity

The Bachelor's degree programmes Physics, Mathematics and Chemistry (first five semesters) and Master's degree programme Pure Mathematics are described in terms of modules (called courses). The modules offered are completed by students of the degree programmes, but also by students from other degree programmes. Some modules offered in the degree programmes discussed are imported from other departments.

Analysis of Peers:

The procedure regarding the possibility to spend some time at another university without loss of time, i.e. the recognition of qualifications gained abroad, has already been taken into account. Although regulations concerning this matter should be adopted, peers have been told that the number of students seeking to spend more time in another (foreign) institution is rising steadily. During the talks with the students, some of them expressed their interest in being part of the international research community by e.g. attending subject-specific conferences. These kinds of activity and such scientific curiosity are highly appreciated and should be supported by any means. The teaching staff emphasized that they offer information on possibilities for going abroad regularly. Therefore it can be concluded, generally, that there are opportunities for

study visits at other HEIs ("mobility window") and that these are integrated into the curriculum in a reasonable way.

Nevertheless, it is considered highly important to further enhance the international competitiveness of the Bachelor's degree programmes. By way of example, this could be done through augmenting scientific, respectively research aspects in the Bachelor's projects. Another aspect joins the idea of improving the educational objective of internationality. Even if English is already an inherent part of the Bachelor's curricula, the current language skills of both, students and teachers, have been found improvable. It should be kept in mind that strengthening the English skills is a fundamental precondition for entering into new cooperations respectively expanding those in the future.

Assessment of Peers; ASIIN-Criterion 3.1:

The peers considered the requirements of the said criterion as sufficiently met already. Nevertheless with a view to the programme educational objective of internationality, they found it commendable that existing efforts to enhancing English language skills in the curriculum of the Bachelor's degree programmes should be strengthened and that research aspects in the Bachelor's projects should be enlarged.

B-3.2 Workload and credit points

The Bachelor's and Master's programmes have a **credit point system** in place. As a rule, the modules are weighted with 2 to 4 Saudi Arabian credit points. One credit point is awarded for 1 hour of lectures or 2 hours of tutorial or lab. Between 15 and 18 credit points are awarded per semester in the Bachelor's programmes. In the Master's programme, the maximum study load is 12 credit hours per semester. The Bachelor's project is weighted with 2 Saudi Arabian credit points; the Master's project is weighted with 4 credit points. According to the programme coordinators, the allocation of credit points to individual modules is based on experiences from previous degree programmes. During the discussion on site, the programme coordinators explained that the number of credit points awarded for the Bachelor's project does not reflect the actual workload invested by the students to complete the module. On average, students work on their projects for 16 hours per week during one semester. The programme coordinators explained that the calculation of credit points for the Bachelor's project is university-wide oriented at the number of weekly contact hours per semester (2). The award of credit points is furthermore limited by the maximum overall number of 136 credit hours per Bachelor's degree programme (compared to 180 or 210 credit points at international level).

Analysis of Peers:

As the credit point system used in Saudi Arabia, which, in effect, is a "credit hour system", only encompasses the presence hours of students without referring to (additional) students' self-study, the national credit hour system is virtually incomparable to the European Credit Transfer

System (ECTS). In particular, the weight, level and scope of the graduation thesis (i.e., the course “Research and Seminar” (BCH) or “Research project” (Chem)) are not properly reflected in the allocated credit hours. However, as the course descriptions already contain information on estimated weekly self-study time, the University may be reasonably considered capable of making a comparison of their credit hour system to the ECTS. This would be most helpful for those graduates wishing to pursue further studies at a university in the European Higher Education Area (EHEA).

A helpful method to raise the international awareness of the actual level of the programme, especially the graduation project, could be a so-called Diploma Supplement. This is a document supplementary to the graduation certificate and transcript, providing a standardized description of the nature, level, structure, content and status of the studies completed by its holder as well as their underlying study objectives and learning outcomes.

Assessment of Peers; ASIIN-Criterion 3.2:

The peers considered the requirements of the criterion not yet fulfilled. In order to allow for international competitiveness of the graduates, the actual workload (contact hours + independent study hours) invested by the students for completing the Bachelor’s and Master’s project and their studies in general, must be made transparent to external stakeholders. In this respect, they also deemed it advisable that the overall student workload shall be evaluated on a regular basis, thus getting more familiar with an approach of workload estimation that is in line with the ECTS.

Furthermore, the peers recommended introducing Diploma Supplements for the study programmes, thus providing more detailed information on each study programme and the individual achievements of the graduate to external stakeholders.

B-3.3 Educational methods

The **didactical concept** includes the following elements: lectures, tutorials, laboratories. Groups are normally made up of usually no more than 45-50 students for lectures and 15-20 students for labs. Usually, two or three students jointly complete an experiment, three staff members are present during the lab session (lecturer, technician/assistant, demonstrator).

Analysis of Peers:

In general, the teaching methods used for implementing the didactical concept prove suitable to support the attainment of the learning objectives.

During the talks, students indicated that they are required to hold oral presentations before the final exam. Yet the attainment of presentation and communication skills could be even more reflected in the teaching and learning methods, as has been refered to already in the previous sections of this report (by referring to so-called “soft skills”).

Assessment of Peers; ASIIN-Criterion 3.3:

In view of the peers, the educational concept complies with the requirements of the respective criterion.

B-3.4 Support and advice

The individual **student support and counseling** is, according to the applicant HEI, guaran-teed by the following persons and regulations: All members of the teaching staff provide educational advice during their office hours (some of them 2 hours per day). Additionally, the Student Guidance Committee and the Deanship of Academic Affairs are responsible for counseling students. Students who have failed a course are obliged to make use of specific additional assistance.

Analysis of Peers:

Apparently, there are sufficient resources to guarantee support and counseling for students. Both, the staff and the students seemed highly engaged in the activities, and good relationships evidently exist between students and staff. Reportedly, the teaching staff is highly responsive towards students' needs, which is not least reflected by the mentioned two office hours per day.

Assessment of Peers; ASIIN-criterion 3.4:

The peers find the said criterion to be fully met by the counseling concept of the college.

B-4 Examinations: system, concept and organization

According to faculty regulations, the students are not allowed to go for final examinations unless they have attended at least 75% of all lectures and laboratory work in addition to midterm exams and course work, according to the following scheme:

- Attendance of at least 75% of the total lectures
- Examinations according to the following configuration:
    - Midterm examination 1: 20% of final mark
    - Midterm examination 2: 20% of final mark
    - Coursework + quizzes: 10% of final mark
    - Final examination: 50% of final mark

- Student must collect 60% of the total mark to pass.

- The system of examinations in *graduate studies* (Master's programme in Mathematics) requires students to achieve a minimum of a "good" (C) grade to pass a course. Master's students must undergo comprehensive oral and written examinations after the completion of all the required coursework. In case of failure in the examination or part of it (written as well as oral), the student will be given the chance to retake the exam

within the following two semesters. Master's degree student passes the written and oral exams, if he achieves at least 70% in written, and 70% in oral examination of the total mark of 100 each.

- The Master's thesis advisors must be of professorial or an associate professorial rank who are faculty members of the University. An assistant professor may be nominator as master thesis advisor if he worked two years as assistant professor and has at least two papers published or accepted for publication in his field of specialty in refereed journals. A professor or associate professor from the same department can participate and help in supervision. The thesis advisor may be a non-faculty member of the University with distinguished qualifications and experience in academic research. This requires the approval of the University Council, based on recommendations by the Department Council concerned, the College Council, and the Council of the Deanship of Graduate Studies.

- Defense of thesis is obligatory at the Master's level.

The HEI also defines relevant methods of assessment of the relevant learning outcomes to be gained in the modules (e.g. knowledge, cognitive skills, as well as interpersonal skills and the capacity to carry responsibility).

- In case of *knowledge* these are usually written, oral or experimental exams, laboratory performance through check list and reports, homework assignments and class work, research and literature search assignments, and short quizzes at the end of each topic.

- Cognitive skills should be assessed through quizzes, case studies, oral and written presentations, performance in laboratory work, research work, eventually through student portfolio.

- Interpersonal skills and the capacity to carry responsibility are said to be assessed through recording of class attendance of students, recording of submission to assignments, surveys asking individual students to share their perception of their own attitudes or behaviors, reports presented from the student group or individually, essays and course tests.

- As methods of assessment of numerical and communication skills HEI refers to presentations (especially in regard to laboratory performance and research project work), exercises, and coursework. These are, more or less, the methods of assessment in all programmes and departments under consideration.

Specific provisions:

- Students hampered by health problems or any other cause are allowed to withdraw from the registration of the term. However, in case students face any reasonable cause not to attend the final exam, he or she has to apply for the faculty commute and present an official document in order to be allowed to repeat the exam.

- The student should not be tested in more than two courses on a day.

- Based on a suggestion by the department council, the college council can allow including an oral or applied section in the final exam of any course and designating grades for this section.

- Based on a recommendation by the instructor, the council of the department to which course belongs can allow the student to complete the requirements of the course in the following semester. In this case, his/her course average is recorded as IC (incomplete) because he/she has not yet completed the requirements of the course. If the student does not complete the requirements of the course during the next semester, his/her average is recorded as F (fail), and it is considered as part of the accumulative and semester average of the student.

According to the resp. programme specifications in the SSR, assessment methods, examination procedure and allocation of grades are regulated by "The Decision of the Higher Education Council No 13/27/1423" on 5/1/2003.

Analysis of Peers:

Principally, the assessment methods are aimed at measuring the extent to which the learning objectives of the courses are achieved by the individual student. The diversity of assessment forms, including midterm and final exams as well as a variety of other assessment types, appears to be typical for an assessment approach that intensively and continuously monitors the students' achievements. Supplementary midterm exams, which are not standard at many HEIs, impose an additional workload on the teachers. Otherwise, students get a helpful feedback which eases their preparation for the final exam and tells them about their actual state of knowledge. All in all, teaching staff and students consider the multitude and varieties of exams well suited to continually and comprehensively cover the learning achievements of students.

The samples of research projects from male students and exam papers provided by the HEI for inspection of the audit team in general contributed to the impression that the level of achievements of the graduates is but, with reservation, acceptable. On request, programme

coordinators stressed the point that credit hours allocated to the research project solely refer to the attendance time of students or, in other words, the working hours of the teaching staff instead of students' workload. From their point of view, the students' invested workload in the research project is poorly reflected in the credit hour-scheme. Choice of topic, project preparation and project realization would take significantly more time. Unfortunately, course descriptions of the research project are missing in all module handbooks (see above section B-2.3), thus precluding any formal confirmation of this argument since the majority of course descriptions contain an overview of students' working hours in addition to the credit hours attributed to them. Nevertheless, for comparison with analogous European First and Second Cycle degree programmes the relatively reduced processing time and invested work load for research projects has to be taken into account. The issue has already been addressed earlier in this report (see above section B-3.2).

The arguable student workload attributed to the research project notwithstanding, the project reports made available to the peers overall corresponded to the expectations of a standard scientific work in terms of subject, depths of study and volume. This applies to a greater extent to the Master's degree programme and to a lesser extent to the Bachelor's degree programmes. Besides, the topics of those projects at least in the Bachelor's degree programmes in a certain sense resembled what has been generally stated with respect to the underlying job profiles of the study programmes. The fields of professional activities or resp. professional profiles, whether being adequately defined or not (see above section B-2.2), were barely adressed in the project topics on a regular basis.

The rules for examinations and advancement, though appearing rather complicated, seemed to be well known and dealt with by students and lecturers alike. Generally, the regulations allow an adequate exam preparation of students. Apparently, they are also judged transparent by the students as far as grading criteria are concerned. On request, students consider the organisation of examinations as appropriate and responsive to their needs.

In general, the discussions with students and lecturers confirmed the impression that the organization of exams is supportive regarding the achievement of the study objectives and in terms of completing studies within the standard period of study. Nevertheless, the examination rules as yet do not require that at least one of the examiners of the research project belongs to the body of full-time lecturers who deliver the programme. Furthermore, there are no rules governing the supervision of research project carried out externally, and ensuring its meaningful incorporation into the curriculum.

Assessment of Peers; ASIIN-criterion 4:

All in all, the peers found the requirements of the aforementioned criterion being met. Concerning the Bachelor's degree programmes however, they considered it strongly

recommendable that, with a view to international competitiveness, scientific/research aspects in the Bachelor's project (graduation/research project) should be enhanced. At the same time, they suggest paying more attention to possible fields of professional activities and job profiles of the graduates when choosing graduation project subjects.

B-5 Resources

B-5.1 Staff involved

According to the SSR, teaching staff in the the Chemistry Department, the Physics Department and the Mathematics Department is each ranked into five categories: full professors, associate professors, assistant professors, lecturers and teaching assistants.

Teaching staff of the *Chemistry Department* (male section) is composed of four full professors, three associate professors, two assistant professors, and three lecturers.

Teaching staff of the *Physics Department* encompasses three full professors, five associate professors, 13 assistant professors, and seven lecturers and six demonstrators.

Teaching staff of the *Mathematics Department* is composed of nine full professors, seven associate professors, 24 assistant professors, three lecturers; additionally, teaching is supported by three teaching assistants, 13 restorative personnel, and eight restorative emissaries.

As to research activities of the *Chemistry Department*, the SSR, inter alia, reports the following: The research conducted by the male Chemistry teaching staff members span both the academic and the applied aspects of science. Research work is done by specialized research groups within the staff members and is obviously mainly limited to the male campus at present. It includes sensors preparation and their application to industrial and environmental analysis, chromatographic separation, the use of molecularly imprinting polymers in enantiomeric separation, corrosion and organometallic synthesis and their application to industry specially in the field of catalysis, organic synthesis and their application to drug design and pre-concentration and pre-treatment fields. Most of the applied research projects are, according to the SSR, dealing with finding solutions of prevailing problems in the community especially those affecting the environment (as is for example pollution). Three labs are specially brought in connection with research work: Microwave digestion and accelerated reaction systems; UV, IR and atomic absorption spectrophotometers; Gas chromatography (GC), ion-exchange chromatography and elemental analysis.

Research activities of the *Physics Department* are mainly attributed to four research groups in the fields of Theoretical Physics, Nuclear and Radiation Physics, Solid State Physics and

Materials Science and Laser Physics. Accordingly, research is supported with related labs like Solid State Physics Research Laboratory, Research Laboratory of spectroscopy, New Material Research Laboratory, Laser Research Laboratory and Nuclear Physics Research Laboratory.

According to SSR, main research areas of the *Mathematics Department* are Linear & Modern Algebra, Numerical Analysis, Mathematical Programming, Statistics and Stochastic Processes, Differential Equations, Computational Mathematics, Applied Mathematics, Real and Functional Analysis and Harmonic Analysis and Special Functions. It also presents a list of research projects funded in the years 2010 to 2012, as well as a list of publications on research works done by individual teaching staff in the master's programme.

Analysis of Peers:

In general, competence, composition and range of staff resources are suited to conduct the said study programmes. The teaching staff's fields of expertise are sufficiently supportive to the structure and content of these programmes. This must be stated against a background of tight budgeting of human resources policy.

Although the College of Science and its departments prove keen to consolidate its human resources and to broaden its scientific/research basis, committee work, teaching of fundamentals, and student support result in a mostly high workload of teaching staff, leading in turn, to time restrictions on research activities of the teaching staff. Consequently, this affects the research strength of the departments and the College of Science itself. Additionally, external lecturers are appointed for one year terms only which may also lead to negative long-term effects with a view to the development of a sustainable research basis. In this regard however, the argument of the programme managers is to be taken into account that approved lecturers normally will get their appointments extended, thereby constituting *de facto* a more or less homogeneous teaching staff over years.

Otherwise, it should be stated that the research qualification of the teaching staff is not in the forefront of the international standards. Nevertheless, the level and quality of the said programmes very much depend on the research foundation they are based on. As research-oriented work is among the best methods to train the capacity of creating new ideas and solving scientific problems independently, teaching in the study programmes would highly benefit from the further development of the research capacity. In this respect, a relief in the teaching load of the staff would allow for more time for setting-up "real" research groups including PhD-candidates.

Assessment of Peers; ASIIN-criterion 5.1:

The peers considered the requirements of the criterion as broadly addressed. However, with respect to the ultimate importance of the research basis for the overall quality and further

development of the degree programmes, the peers strongly recommended that the strategy of recruiting and hiring teaching staff should focus more directly on enhancing the research basis of the individual departments.

B-5.2 Staff development

According to the SSR, measures to continuously upgrade the didactical and subject-specific skills of teaching staff members are coordinated and supervised by the Deanship for Academic Development (which is represented in the departments through a unit for Skills Development and a unit for Quality Assurance). To mention just a few, the SSR refers to:

- Periodic workshops and training courses aiming at sustaining didactical and professional development of faculty members and lecturers alike through new teaching methods and raising staff awareness of the importance of self-development and professional managerial skills. The training courses are offered on and off the university campus as well as abroad.

- Training programmes particularly provided for new faculty members, including effective presentation methods and teaching tools.

- Training courses for technicians, administrative staff, academicians, administrators, and other staff.

- Encouraging staff, researchers and technicians to attend relevant national and/or international conferences, seminars or other subject-related events.

- Providing support to faculty members with regard to using the internet in teaching and adopting e-learning methodologies.

Analysis of Peers:

The SSR repeatedly indicates a clear awareness of the necessity of teaching staff in keeping up with state-of-the-art knowledge in the respective subject area as well as in the didactical skills field. Since further education in their respective field of expertise is much within the teaching staffs' own responsibility, provided that the organizational and temporal conditions of the study courses allow for sufficient time to this end, the College of Science and the departments are keen to offer training courses and programmes suitable to improve the didactical skills of the teaching staff in general and new faculty members in particular.

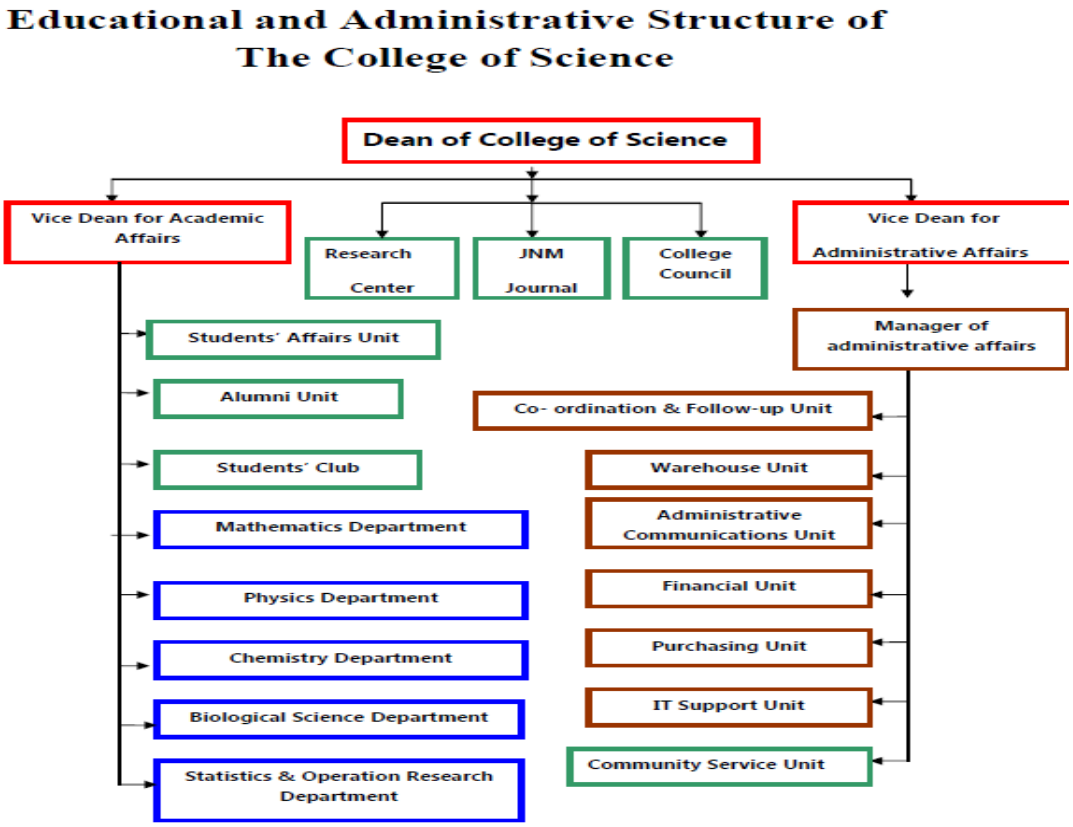
Assessment of Peers; ASIIN-criterion 5.2:

The peers consider the requirements of the said criterion as already met by the human resources policy of the College of Science and the departments responsible for the said

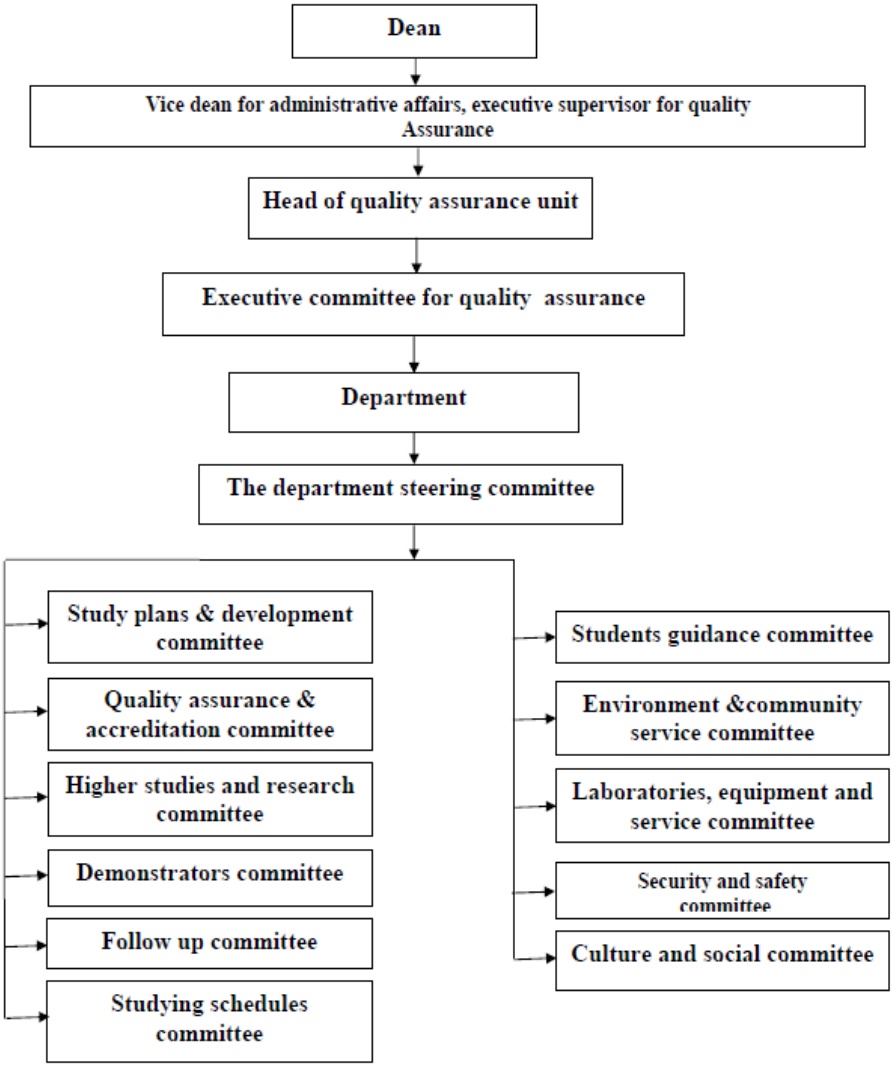
programmes. Yet, they suggest and generally support further initiatives regarding the development of subject-related knowledge and teaching skills.

B-5.3 Institutional environment, financial and physical resources

Qassim University was established in 2004 by merging two Qassim branches of Imam Mohammad Ibn Saud Islamic University and King Saud University. Reportedly, since the establishment of the university it has experienced a significant growth in enrollment and a correspondent expansion of faculty and its administrative staff. The number of male and female students registered at the university during 2010-11 approached 45,000 and the number of faculty members and staff reached well over 3,000. Qassim University Campuses are Main Campus (male), Buraidah Campus (female), Al Raas, Bukariyah, Uqalat us Suqur. According to the SSR, the University has 38 colleges, 40 postgraduate programs, 137 undergraduate and diploma programs. The degree programmes under consideration are offered by the College of Science (resp. College of Sciences and Arts in Buraidah (female); see organizational structure below).



Organizational units of each college are departments whose teaching staff conducts the study programmes. In general, the organizational structure of the departments equates to the following scheme:



The programmes to be dealt with in this accreditation procedure are allocated at the Chemistry Department, the Physics Department and the Mathematics Department.

According to the SSR, the departments which offer the degree programmes under consideration do not have a specific budget plan as the arrangement for financial affairs is carried out within the framework of the central financial system of the university. The process used to determine the budget for each department is based on past and present expenditures and a projection of future expenditures. Each department presents its financial needs in advance at the start of the academic year to the dean. When the University Board approves the university budget, the funding for the College of Science is known. Upon review of the requests from all departments, the dean's office allocates resources to each department based on the instructional commitments that need to be met. Factors such as the total number of sections to be taught, class size and unique needs of the department are considered in determining the allocations for each department. Funding of research projects is done by the Deanship of Scientific Research in the university in collaboration with its branch at Science College Research

Center. Since Qassim University is a governmental type, the total budget of the university is yearly supplied from the Higher Ministry of Education of KSA.

The SSR provides a general overview of facilities and equipment attached to each programme without any in-depth description. With respect to laboratory facilities, core labs meant to support research activities of the departments are mentioned already (see above section B-5.3).

As far as can be stated from the information available, internal cooperation between departments occurs through the exchange of courses between study programmes. Additionally, the Chemistry study programme includes courses broadly covering “field experience activities”, thus establishing and fostering ties to companies or other professional or communal organizations.

Otherwise, almost no or hardly any significant cooperation in research and/or teaching with other HEIs or institutions in Saudi Arabia or abroad are registered.

In addition to the information on human resources, infrastructure and financial budgeting, the peers visited a variety of labs during the on-site visit.

Analysis of Peers:

Overall, the institutional organization of the College of Science and its departments, the organizational processes and available resources satisfactorily support the attainment of the objectives of the degree programmes to be accredited. It is noteworthy that students agree with this assessment.

Although this generally applies for the Bachelor’s degree programme Chemistry too, the basic equipment and in particular the basic analytical equipment available for the programme seemed limited in scope. Furthermore, the on-site visit of the Chemistry labs revealed that the safety devices on the spot do not fully comply with international standards.

One point often referred to in the SSR is also worth mentioning: Cooperation of the HEI with other HEIs or institutions in Saudi Arabia or abroad which may decisively contribute to the overall record in teaching and research cannot be considered as well developed.

Assessment of Peers; ASIIN-criterion 5.3:

In general, the peers came to the conclusion that the requirements of the aforementioned criterion are sufficiently met. However, concerning the Bachelor’s programme Chemistry they recommended in the long run augmenting the basic equipment, in particular the basic analytical equipment, so as to improve capacities and competences in this area of teaching and research as well. Furthermore, the peers urgently recommended that safety devices should be

modernized according to international standards. At last, with a view to further improving the quality in teaching and research they strongly suggested initiating cooperations on the communal, regional and international level.

B-6 Quality Management: further development of degree programmes

B-6.1 Quality assurance and further development

The SSR presents itself as a thorough evaluation of the programmes' "quality taking into account its mission, objectives and professional program requirements, according to the practice of that profession in Saudi Arabia, the standards for quality assurance and accreditation defined by the NCAAA including the National Qualifications framework". The report not only unfolds the information to individual quality-related aspects of study programmes from "Mission and Goals of the Program", "Program Context" and "Programm Developments" to evaluation methods for the key areas of quality assurance. Rather, the SSR deals with the subject matter in sections like "Program Evaluation in Relation to Goals and Objectives for Development of the Program", "Evaluation in Relation to Quality Standards", "Review of Courses" and "Independent Evaluations" resulting almost in a kind of SWOT analysis of the respective topic. This understanding of quality and quality assurance is also reflected in the organizational structure of the College of Science and of each department respectively, in particular regarding the prominent role of quality assurance in its respective constituent units (see above organizational diagram in chapter B-5.3). That way, the administration of the college has a quality assurance unit, and the departments are administered by committees with subject-related responsibilities. In particular, each department has a "Quality Assurance and Accreditation Committee" at its disposal which takes responsibility for quality related questions, either solely or in cooperation with affiliated committees (like the "Study Plans and Development Committee", the "Students Guidance Committee", or the "Studying Schedule Committee"). Core tasks of the Quality Assurance and Accreditation Committee are according to the SSR:

- Supervision, follow-up, preparation and collection of programme specification, programme report, course specification and course report.
- Overseeing the selection of academic counsel, follow-up and preparation of the SSR.
- Overseeing the preparation and conduct of an accreditation procedure.
- Preparing a periodical report on the degree of completion of the requirements for academic accreditation.

- Overseeing the preparation of examination forms and answer models of the programme courses.
- Overseeing the availability of education and learning facilities for students, in coordination with the committees concerned in the department.

Reportedly, the departments have already introduced quality assurance processes to deal with all aspects of the programmes: Courses, faculty, students, graduates, and employers. Hence, questionnaires have been drafted to conduct surveys concerning, inter alia, teaching and learning conditions, study achievements, employers' demands etc. The results of these surveys are said to be used to monitor the quality of each programme and its future developments. Reportedly, in particular the Study Plans and Development Committee and the Quality Assurance and Accreditation Committee are responsible for the implementation of the quality assurance standards through certain indicators, such as, for example, questionnaires targeting the degree of satisfaction of students, graduates and staff. Members of the committee have been trained by attending courses and seminars on quality assurance and in using internationally accepted methods in this regard. The committee also monitors whether improvements have been implemented in respect to deficits and weaknesses which have been identified in the course of quality assurance processes. In this respect the so-called "Follow-up Committee" apparently plays a crucial role in that it should oversee, coordinate and report on the activities of the other committees.

It is noteworthy that students are represented in the Student Advisory Boards (SABs) which are constituted on University, College and Department level alike. Thus, students are given the chance to directly participate in the further development of the study programmes.

Analysis of Peers:

Regarding the material presented in the SSR, the College of Science and the departments responsible for the study programmes under consideration apparently pay much attention to the most relevant aspects of quality assurance. In the first place, this commitment can be attributed to several institutional as well as programme-related accreditation procedures Qassim University, its colleges and departments have undergone recently. The SSR in itself is pervaded with allusions to quality assurance, thus reflecting an understanding of quality assurance which is incorporated to the point of the departmental organization with its multiple committees as constitutive actors. Continuous assessment aiming at identifying strengths and weaknesses with respect to individual dimensions of quality as well as measuring the effectiveness of steering activities confirm a conscious utilization of the quality assurance approach.

Obviously, the College of Science and its individual departments have put in place a number of quality assurance measures which, step by step, have been coordinated and interlocked or shall be integrated and adapted according to the needs of the quality assurance approach of the HEI. Students and teaching staff consonantly confirmed that the diverse evaluation tools in the past have proved to be effective elements of quality assurance. That way, students reported on measures concerning teaching and learning conditions or modifications in study or module content that had been initiated through critical comments of students in the course of evaluations. On general, the means for quality assurance have been found useful as a reliable benchmark for substantially checking whether the intended objectives are achievable and reasonable, and for identifying any failure in achieving those objectives.

Assessment of Peers; ASIIN-criterion 6.1:

The peers found that the requirements of the said criterion have been met sufficiently. Especially, peers strongly support the quality strategy envisaged by the College of Science that has been made accessible to them in the course of the on-site-visit (cf. “College Guide”).

B-6.2 Instruments, methods & data

Reportedly, important methods of quality measurement used by the College of Science and its departments are already implemented or are envisaged in the future:

- Student course evaluation survey
- Graduates’ evaluation surveys and graduates’ database (to be installed)
- Employers’ evaluation surveys (to be installed)
- Annual reports issued by the department.

Additionally, the departments provide planned and actual enrollment figures, completion rates and year-to-year progression rates covering the time span from the inauguration of the respective programme onwards.

Analysis of Peers:

The SSR reasonably describes tools for quality assurance that were already in use or that are planned to be implemented. Survey data and results can be helpful in identifying weaknesses of the programmes and deriving appropriate remedies. Yet, information on graduates’ employment success is scarce, at least with regard to the information available (the general graduation record notwithstanding).

Assessment of Peers; ASIIN-criterion 6.2:

The peers considered the requirements of the said criterion as satisfactorily fulfilled. With a view to the employment success of graduates, they suggested systematically pursuing respective surveys in order to extract relevant information as to whether study objectives and quality expectations of the HEI are fulfilled. Thereby they acknowledged that this aim forms already part of the quality assurance strategy described in the "College Guide" which has been mentioned above (cf. College Guide, "Strategy 4: After graduation services").

B-7 Documentation and transparency

B-7.1 Relevant regulations

The regulations below have been provided for assessment:

- Provisions for Faculty Affairs, Saudi Faculty, The Decision of the Higher Education and Universities Council No 4/6/1417
- Provisions for Faculty Affairs, Non Saudi, The Decision of the Higher Education and Universities Council No 3/4/1417
- Study and Examination Rules, The Decision of the Higher Education and Universities Council No 13/27/1423
- Regulating Rules for Undergraduate Studies and Examinations, The Decision of the Higher Education and Universities Council No 11/6/1416; By-laws for Undergraduate Study and Examinations
- Regulating Rules for Graduate Studies in Universities, The Decision of the Higher Education and Universities Council No 3/6/1417
- Provisions regarding Research, Decision of the Higher Education and Universities Council No 2/10/1416
- Qassim University Policies and Ethics; Code of Ethics and Students' Rights
- By-laws of Student Advisory Board (SAB) at Qassim University

Analysis of Peers:

The regulations for study-relevant issues are in place and made available. These regulations include all the information necessary about the admission, courses and completion of the degree.

Assessment of Peers; ASIIN-criterion 7.1:

The peers conclude that the requirements of the criterion are met.

B-7.2 Diploma Supplement and qualification certificate

Samples of the Diploma Supplement in English language are *not* provided in the report and up to now not conferred to graduates. On a regular basis the student will receive – along with his graduation document (in the sense of graduation certificate) – his academic record which almost resembles the commonly known "Transcript of Records" containing all courses grades and semester resp. accumulative averages the student has received during his study in the university.

Analysis of Peers:

As a result of the omission of subject-specific Diploma Supplements for the study programmes, information about the study objectives, the intended learning outcomes ("qualification profile"), the structure, level, content and status of the studies as well as the resp. workload of students is not available to stakeholders outside the university (potential employers or other HEIs, national and international). Thus, potential stakeholders do not have data at their disposal which seriously allow for a comparison and interpretation of the individual final grade of the graduate.

Assessment of Peers; ASIIN-criterion 7.2:

The peers deemed the requirements of the above cited criterion as not yet fulfilled. For reasons of transparency and international comparability they recommended to additionally award a Diploma Supplement, thus providing more detailed information on the study programme, study goals, intended learning outcomes as well as the individual achievements of the graduate to external stakeholders.

C Additional Information

Before preparing their final recommendation, the auditors 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:

1. Bachelor's degree programme Chemistry: Module descriptions for Level 7 and Level 8.
2. Master's degree programme Pure Mathematics**:** Module handbook.

D Comment of the HEI (May 15, 2013)

The HEI fully agrees with the assessment of the peers and does not submit any further statement.

E Final Assessment of the peers (May 22, 2013)

The peers found the **additional information** provided by the institution to be meaningful.

- The peers take note of the submitted module descriptions for Level 7 and 8 of the Chemistry degree programme. It is now possible to confirm that the intended learning outcomes as a whole are valid and achievable through the offered modules. Though, the peers must stick to their amendments made concerning the module descriptions in general.
- The module handbook for the new degree concept in Pure Mathematics is very helpful in order to understand how the learning outcomes are realized. The peers deem the modules to be adequate for achieving the intended learning outcomes as a whole. Concerning the module titles, they assume that Linear Algebra is taught on an advanced level and therefore the title of the module Linear Algebra must be denominated Advanced Linear Algebra. Though, despite the submitted module descriptions (not only for the Master's degree programme Pure Mathematics), the peers deem it absolutely necessary revising the module descriptions in order to offer students and teachers updated, consistent and complete module handbooks for each degree programme.

Taking into account the additional information and the comments given by Qassim University the peers summarize their analysis and **final assessment** as follows:

For the award of the ASIIN seal:

The additional information from Qassim University entails no further changes to the assessment of the peers.

The peers recommend the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific labels	Accredited until (maximum duration)
Ba Chemistry	With requirements for one year	---	30.09.2018
Ba Physics	With requirements for one year	---	30.09.2018
Ba Mathematics	With requirements for one year	---	30.09.2018
Ma Pure Mathematics	With requirements for one year	---	30.09.2018

Requirements and recommendations for the different seals:

Requirements	**ASIIN**
For all degree programmes	
1. The actual workload of the students (contact hours + indirect self studies) must be made transparent to external stakeholders (i.e. in the course descriptions and the diploma supplement as well). In particular, this needs to be done for the graduate project.	3.2
2. The module handbook ("course descriptions") must be updated with a view to comments made in the accreditation report (learning outcomes, coherence and consistency (prerequisites); content, name of modules (BaMa Math), workload, missing course descriptions, module descriptions for "new" curriculum (Ba Chem, BaMa Math)).	2.3
3. With respect to internationalization and, in particular, the mobility of students rules for the recognition of activities completed at other (foreign) HEIs have to be adopted ("Lisbon Convention").	2.5

For the <u>Bachelor's degree programme Chemistry</u>, <u>Physics</u> and <u>Mathematics</u> as well as the <u>Master's degree programme Pure Mathematics</u>	
4. It is necessary to define study specific learning outcomes, thereby taking into account the mission and peculiarities of the HEI. There must be also some concrete job descriptions which correspond to the qualification profile of the graduates. These need to be communicated adequately to the students.	2.2
Recommendations	**ASIIN**
For all degree programmes	
1. It is recommended that Diploma Supplements should be introduced providing more detailed information on each study programme and the individual achievements of the graduate to external stakeholders.	2.2, 7.2
2. It is recommended that the strategy of recruiting and hiring teaching staff should focus more directly on enhancing the research basis of the individual departments.	5.1
3. It is recommended to further strengthen so called "soft skills" of students and to adequately indicate this in the respective module descriptions.	2.6
For all <u>Bachelor's degree programmes</u>	
4. It is recommended that, with regard to the programme educational objective of internationality, existing efforts to enhancing English language skills in the curriculum should be strengthened.	2.6, 3.1
5. It is strongly recommended that, in view of international competitiveness, scientific/research aspects in the Bachelor's project (graduation/research project) should be enhanced.	3.1, 4
For the <u>Bachelor's degree programme Physics</u>	
6. It is recommended to enlarge students' computational skills in order to more adequately adjust their qualification profile to applications in highly modern professional environments. Furthermore students should have a good command of at least basic knowledge in the subject area of Nuclear and Elementary Particle Physics, thus giving them a better overview of the foundations of their study discipline.	2.6

For the <u>Bachelor's degree programme Chemistry</u>	
7. It is recommended in the long run to augment the basic equipment, in particular the basic analytical equipment, so as to improve capacities and competences in this area of teaching and research as well.	5.3
8. It is recommended that safety devices should be modernized according to international standards.	5.3
For the <u>Bachelor's degree programme Mathematics</u>	
9. With a view to modern professional fields of work it is recommended to improve students' computational skills and also to frame the electives catalogue accordingly.	2.6
For the <u>Master's degree programme Pure Mathematics</u>	
10. It is recommended to review the name of the study programme with regard to its content.	1, 2.6

F Comments of the Technical Committees

a) Technical Committee 09 – Chemistry (June 10, 2013)

Assessment:

The Technical Committee discusses the report of the peers and agrees with the requirements and recommendations as stated in section F.

Awarding of seal:

The Technical Committee recommends the award of the requested seal as described hereafter.

The Technical Committee 09 - Chemistry recommends the award of the seal as follows:

Degree Programme	**ASIIN-seal**	**Subject-specific labels**	**Accredited until (maximum duration)**
Ba Chemistry	With requirements for one year	---	30.09.2018

b) Technical Committee 12 – Mathematics (June 05, 2013)

The Technical Committee makes two editorial changes.

The Technical Committee discusses the didactical concept of the degree programmes. Especially, it is challenged by the question whether the lectures are backed up by practical courses. However, the report does not suggest any doubts concerning the assessment of methodical competencies. Moreover, the group sizes (40 students in the Bachelor's degree programme and 5 students) reveals that practical evidences are held within integrated practical courses.

The Technical Committee agrees with the requirements and recommendations of the peers.

For the award of the ASIIN seal:

The Technical Committee recommends the award of the requested seal as described hereafter.

Degree Programme	**ASIIN-seal**	**Subject-specific labels**	**Accredited until (maximum duration)**
Ba Mathematics	With requirements for one year	---	30.09.2018
Ma Pure Mathematics	With requirements for one year	---	30.09.2018

c) Technical Committee 13 – Physics (June 10, 2013)

The Technical Committee makes editorial changes.

The Technical Committee discusses the recommendation regarding the English language proficiency. The members understand that a few lectures are held in English and that English literature is at the students' regular disposal. The fact that the students are not able to communicate fluently in English is the only deficiency the Technical Committee recognizes. This competency should be further enhanced, for example during the preparatory year, but explicitly not for loss of technical issues.

The Technical Committee supports the peers' critical opinion concerning the degree name "Pure Mathematics", though follows the votes of the Technical Committee 12 – Mathematics only to state a recommendation.

The Technical Committee agrees with the requirements and recommendations of the peers.

For the award of the ASIIN seal:

The Technical Committee recommends the award of the requested seal as described hereafter.

Degree Programme	**ASIIN-seal**	**Subject-specific labels**	**Accredited until (maximum duration)**
Ba Physics	With requirements for one year	---	30.09.2018

Requirements	**ASIIN**
For all degree programmes	
1. The actual workload of the students (contact hours + indirect self studies) must be made transparent to external stakeholders (i.e. in the course descriptions and the diploma supplement as well). In particular, this needs to be done for the graduate project.	3.2
2. The module handbook ("course descriptions") must be updated with a view to comments made in the accreditation report (learning outcomes, coherence and consistency (prerequisites); content, name of modules (BaMa Math), workload, missing course descriptions, module descriptions for "new" curriculum (Ba Chem, BaMa Math), female responsible person for the modules (Ba Chem, Ba Bio)).	2.3
3. With respect to internationalization and, in particular, the mobility of students rules for the recognition of activities completed at other (foreign) HEIs have to be adopted ("Lisbon Convention").	2.5
For the <u>Bachelor's degree programme Physics</u> and <u>Mathematics</u> as well as the <u>Master's degree programme Pure Mathematics</u>	
4. It is necessary to define study specific learning outcomes, thereby taking into account the mission and peculiarities of the HEI. There must be also some concrete job descriptions which correspond to the qualification profile of the graduates. These need to be communicated adequately to the students.	2.2

Recommendations	ASIIN
For all study programmes	
1. It is recommended that Diploma Supplements should be introduced providing more detailed information on each study programme and the individual achievements of the graduate to external stakeholders.	2.2, 7.2
2. It is recommended that the strategy of recruiting and hiring teaching staff should focus more directly to enhancing the research basis of the individual departments.	5.1
3. It is recommended to further strengthen so called "soft skills" of students and to adequately indicate this in the respective module descriptions.	2.6
For the <u>Bachelor's degree programmes</u>	
4. It is recommended that, with regard to the programme educational objective of internationality, existing efforts to enhancing English language skills in the curriculum should be strengthened.	2.2, 2.6
5. It is strongly recommended that, in view of international competitiveness, scientific/research aspects in the Bachelor's project (graduation/research project) should be enhanced.	4
For the <u>Bachelor's degree programme Physics</u>	
6. It is recommended to enlarge students' computational skills in order to more adequately adjust their qualification profile to applications in highly volatile professional environments. Furthermore students should have a good command of at least basic knowledge in the subject area of Nuclear and Elementary Particle Physics, thus giving them a better overview of the foundations of their study discipline.	2.2, 2.6
For the <u>Bachelor's degree programme Chemistry</u>	
7. It is recommended in the long run to augment the basic instrumentation, in particular basic analytical instruments, so as to improve capacities and competencies in this area of teaching and research as well.	5.3

8. It is recommended that safety devices should be modernized according to international standards.	5.3
For the <u>Bachelor's degree programme Mathematics</u>	
9. With a view to modern professional fields of work it is recommended to improve students' computational skills and also to frame the electives catalogue accordingly.	2.2
For the <u>Master's degree programme Pure Mathematics</u>	
10. It is recommended to review the name of the study programme with regard to its content.	1, 2.6

G Decision of the Accreditation Commission (June 28, 2013)

Decision about the award of the ASIIN seal:

The Accreditation Commission agrees with the majority of requirements and recommendations for the degree programmes as proposed by the peers and Technical Committees and makes a few changes following the below stated remarks.

Justification for the decision:

The Accreditation Commission discusses the procedure and adopts minor editorial amendments. With regard to requirement 4 the Accreditation Commission deems it necessary that the study specific learning outcomes should not only be addressed to the students but also to the stakeholders. The issue of an English language Diploma Supplement in addition to a qualification certificate is mandatory and therefore needs to be formulated as additional requirement. Regarding the equipment in the chemical laboratories, the Accreditation Commission emphasizes that the infrastructure needs to meet the qualitative requirements of the degree programme. Thus, the safety devices must compulsorily meet the international standards. As possible proof of fulfillment, the Accreditation Commission would consider an order confirmation to be valid.

The Accreditation Commission for Degree Programmes decides to award the requested seal as described hereafter:

Degree Programme	ASIIN-seal	Subject-specific labels	Accredited until (maximum duration)
Ba Chemistry	With requirements for one year	---	30.09.2018
Ba Physics	With requirements for one year	---	30.09.2018
Ba Mathematics	With requirements for one year	---	30.09.2018
Ma Pure Mathematics	With requirements for one year	---	30.09.2018

Requirements	ASIIN
For all degree programmes	
1. The actual workload of the students (contact hours + indirect self studies) must be made transparent to external stakeholders (i.e. in the course descriptions and the diploma supplement as well). In particular, this needs to be done for the graduate project.	3.2
2. The module handbook ("course descriptions") must be updated with view to comments made in the accreditation report (learning outcomes, coherence and consistency (prerequisites); content, name of modules (BaMa Math), workload, missing course descriptions, module descriptions for "new" curriculum (Ba Chem, BaMa Math)).	2.3
3. With view to internationalization and, in particular, the mobility of students rules for the recognition of activities completed at other (foreign) HEIs have to be adopted ("Lisbon Convention").	2.5
4. Diploma Supplements must be introduced providing more detailed information on each study programme and the individual achievements of the graduate to external stakeholders.	2.2, 7.2

For the <u>Bachelor's degree programme Physics</u> and <u>Mathematics</u> as well as the <u>Master's degree programme Pure Mathematics</u>	
5. It is necessary to define study specific learning outcomes, thereby taking into account the mission and peculiarities of the HEI. There must be also some concrete job descriptions which correspond to the qualification profile of the graduates. These need to be communicated adequately to the students and all stakeholders.	2.2
For the <u>Bachelor's degree programme Chemistry</u>	
6. Safety devices must be modernized according to international standards.	5.3

Recommendations	**ASIIN**
For all degree programmes	
1. It is recommended that the strategy of recruiting and hiring teaching staff should focus more directly to enhancing the research basis of the individual departments.	5.1
2. It is recommended to further strengthen so called "soft skills" of students and to adequately indicate this in the respective module descriptions.	2.6
For all <u>Bachelor's degree programmes</u>	
3. It is recommended that, with view to the programme educational objective of internationality, existing efforts to enhancing English language skills in the curriculum should be strengthened.	2.6, 3.1
4. It is strongly recommended that, with view to international competitiveness, scientific/research aspects in the Bachelor's project (graduation/research project) should be enhanced.	3.1, 4
For the <u>Bachelor's degree programme Physics</u>	
5. It is recommended to enlarge students' computational skills in order to more adequately adjust their qualification profile to applications in highly modern professional environments. Furthermore students should have a good command of at least basic knowledge in the subject area of Nuclear and Elementary Particle Physics, thus giving them a better overview of the	2.6

foundations of their study discipline.	
For the <u>Bachelor's degree programme Chemistry</u>	
6. It is recommended in the long run to augment the basic equipment, in particular the basic analytical equipment, so as to improve capacities and competences in this area of teaching and research as well.	5.3
For the <u>Bachelor's degree programme Mathematics</u>	
7. With view to modern professional fields of work it is recommended to improve students' computational skills and also to frame the electives catalogue accordingly.	2.6
For the <u>Master's degree programme Pure Mathematics</u>	
8. It is recommended to review the name of the study programme with regard to its content.	1, 2.6