ASIIN Seal

Accreditation Report

Bachelor's Degree Programme
Geology
Geophysics

Provided by
King Saud University

Version: 23 March 2018

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
	Ba Geology	ASIIN	2011-2016	TC 11
	Ba Geophysics	ASIIN	2011-2016	TC 11
Date of the contract: 07.05.2016 **Submission of the final version of the self-assessment report:** 09.06.2017 **Date of the onsite visit:** 27-29 November 2017 **at: Riyadh**				
Peer panel: Prof. Dr. Andreas Hoppe, University of Freiburg Dr. Hans-Juergen Weyer, German Association of Professional Geoscientists Prof. Dr. Ugur Yaramanci, Technical University of Berlin (just paper based; due to medical reasons he had to cancel his visit to KSU just before the departure in Germany)				
Representative of the ASIIN headquarter: Dr. Michael Meyer				
Responsible decision-making committee: Accreditation Commission for Degree Programmes				
Criteria used: ASIIN General Criteria, as of 2015-12-10				

[1] ASIIN Seal for degree programmes

[2] TC: Technical Committee for the following subject areas: TC 01 - Mechanical Engineering/Process Engineering; TC 02 - Electrical Engineering/Information Technology; TC 03 - Civil Engineering, Geodesy and Architecture; TC 04 - Informatics/Computer Science; TC 05 - Physical Technologies, Materials and Processes; TC 06 - Industrial Engineering; TC 07 - Business Informatics/Information Systems; TC 08 - Agriculture, Nutritional Sciences and Landscape Architecture; TC 09 - Chemistry; TC 10 - Life Sciences; TC 11 - Geosciences; TC 12 - Mathematics; TC 13 - Physics.

Subject-Specific Criteria of Technical Committee 11 – Geosciences as of 2017-12-09	

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Geology, BSc			Level 6	Full time	--	8 Semester	136 credit hours	Fall Semester
Geophysics, BSc			Level 6	Full time	--	8 Semester	136 credit hours	Fall Semester

For the Bachelor's degree programme in Geology the institution has presented the following profile in the programme specifications and in the self-assessment report:

To promote basic geological, geophysical and hydrogeological concepts, skills and creativity within a high calibrated environment that provides society with knowledge, trained personnel, and competitive graduates capable of meeting the educational and development needs of the Kingdom of Saudi Arabia in all domains relevant to geology, geophysics and hydrogeology and their applications.

The program provides a solid background in the essential of mathematic, physics, chemistry, zoology and geophysics, while at the same time providing knowledge about the entire spectrum of geologic ranging from mineral exploration to oil and ground water exploration.

For the Bachelor's degree programme in Geophysics the institution has presented the following profile in the programme specifications and in the self-assessment report:

To offer educational program and develop research projects in the field of geophysics capable of providing knowledgeable and trained personnel to the society through a stimulating environment of learning, creativity, scientific research. In addition, due emphasis will be paid to sustain quality with optimal use of technology and productive partnerships.

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

C Peer Report for the ASIIN Seal

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Self-assessment report
- Programme specifications
- Website of the faculty
- Discussions with representatives of KSU management, programme coordinators, lecturers, business representatives, students

Preliminary assessment and analysis of the peers:
The University defined study aims and intended learning outcomes for both programmes at a level of higher education which corresponds to learning outcomes equivalent to level 6 of the European Qualifications Framework. Learning outcomes are accessible to students, staff members, and all the other stakeholders on the faculty website. The programme specifications for each of the programmes contain both objectives for the department offering them as well as for the students. The auditors appreciate the strategic specifications for the department, but for this accreditation process the panel focused on the programme objectives while acknowledging that the overarching mission and objectives of the department also served as framework for the programme development. The learning outcomes for the students were found to be aligned with the National Qualifications Framework (NQF) of Saudi Arabia as stipulated by the National Commission for Academic Accreditation & Assessment. The panel positively noted that all modules were linked to the NQF as well as to corresponding teaching and assessment methods.

The auditors referred to the Subject-Specific Criteria (SSC) of the *Technical Committee Geosciences* as a basis for judging whether the intended learning outcomes of the bachelor's degree programmes as defined by King Saud University correspond to the exemplary constituted learning outcomes of these Technical Committees.

Although the objectives of the programmes are described in a more general way and do not define a specific profile of the faculty for geology or geophysics the panel found the areas of competence as set forth by the Subject-Specific Criteria in Geosciences to be largely met by the programmes. Regarding the underlying bases the students shall have basic knowledge and understanding of the natural sciences, of the essential features, processes, materials, history and the development of the Earth and of the of the key aspects and concepts of geology. They shall be aware of the temporal and spatial dimensions in Earth processes and of the applications and responsibilities of Geosciences and its role in society including its environmental aspects. Furthermore the peers found adequate intended learning outcomes regarding to engineering abilities in analysis, design and implementation, technological, methodological and transferable skills and additional professional competences to confirm the engineering aspect in the title of the programme.

The intended profile of the programme offers students good chances at the labour market as lecturers, teachers, industrial experts as well as entrepreneurs in the oil industry or in governmental organizations bearing in mind the actual economic problems in the oil area. Most of the graduates are entering a job after the bachelor's degree. Nearly 50% of the graduates work in private companies followed by the governmental sector and round about 10% stay at a university for further studies either at King Saud University or at universities elsewhere.

The auditors appreciate the efforts of KSU to undertake regular surveys of alumni as well as of employers to get some firsthand feedback on the quality of education provided by KSU, e.g. questionnaires are sent continuously to alumni and companies. In general the business partners stressed during the discussion with the auditors that the graduates are very well educated and better prepared for the job than graduates from other universities; they underline that graduates from KSU can easily adopt to the requirements of the specific working environment. Nevertheless, business partners wished for a more intensive cooperation with the university. A first step could be to send the questionnaires also to companies not only concentrating of geology or geophysics but also acting in broader fields. In this context the panel welcomed the consideration of the faculty to establish additional programmes in hydrogeology and mining. In general the auditors recommend to integrate companies more institutionalised into the evaluation of the programme objectives in order to strengthen the basis for more intensive cooperation between university and companies.

Criterion 1.2 Name of the degree programme

Evidence:

- Programme Specifications, including Program Learning Outcome Mapping Matrix
- Self-Assessment Reports

Preliminary assessment and analysis of the peers:
The panel considered the names of both programmes to fully reflect their objectives and content and thus to be entirely adequate.

Criterion 1.3 Curriculum

Evidence:

- The programme specifications define the curriculum and the single modules.
- The module descriptions inform about the aims and content of the single modules.
- Objective-Matrices provided in the Self-Assessment Report
- Discussions with representatives of King Saud management, programme coordinators, lecturers, business representatives, students

Preliminary assessment and analysis of the peers:
For both study programmes curricula and study plans were presented and the auditors could see that they are also made transparent online. But the panel determined that the description of the curricula differs for both programmes in different documents such as department handbook and programme specification. From their point of view it is necessary to publish the curricula in a consistent way in all documents.

In all programmes of the university students have to pass a preparatory year that includes general subjects of natural sciences (most importantly the “Introduction to Mathematics”), “Computer skills”, “Communication skills” and “English”. Furthermore, the peers learned that the preparatory year will be changed within the next years insofar as the College of Science will gain more responsibility over its design and contents. This modification seemed to be the right step in the perspective of the peers in order to achieve a more subject-oriented approach in this helpful introductory year.

Starting from the third semester all programmes offer specific curricula under the responsibility of the department, including those courses which are obligatory by demand of the university. Besides the field-specific modules students have to choose 8 credit points out of a list of University-wide elective courses like “Introduction to Islamic Culture”, “Economic System in Islam”, “Studies in the Biography of the Prophet”, “Human Rights” etc. The auditors learned that these courses are open also for non-Islamic students. They looked at a

number of examples of module descriptions and gained the impression that the modules deal with cultural topics of Islam which does not contradict the basic principles of scientific research.

The specific curriculum of the bachelor's degree programme in geology starts in the third semester with general introductions in physical geology, chemistry, physics and statistics followed by field-specific basics in the fourth semester (analytical chemistry, mineralogy, historical geology, and principles of geophysics). The third year of the programme concentrates on specific fundamentals like stratigraphy and sedimentology, paleontology, environmental geology, petrology, plate tectonics and the Arabian Shield. The fourth year finished the programme with courses about spatial information systems, ore geology, data analysis, petroleum geology hydrogeology and sedimentary geology. Besides these compulsory courses students have to select modules with 15 credit points out of a field-specific catalogue comprising modules with 60 credit points.

The curriculum of the bachelor's degree programme in geophysics is constructed in a similar way with the basics in natural sciences (physical geology, chemistry, physics, mineralogy, historical geology, and principles of geophysics). Only instead of statistics the students deal with integral calculus. The third and fourth year contain field-specific fundamentals and their applications in modules like gravity and magnetic exploration, seismic exploration, stratigraphy and sedimentology, petrology, mathematical physics, geoelectric and electromagnetic exploration, structural geology, electromagnetism, differential equations, seismology, geophysical well loggin, data processing, radiometric and geothermal methods, physics of the earth, engineering seismology, gis and petroleum geology. Besides these compulsory courses students have to select modules with 10 credit points out of a field-specific catalogue comprising modules with 40 credit points.

In both programmes students complete a seminar "geological or geophysical reports" discussing and reporting about research articles out of journals. Additionally both curricula contain a period of field work between the 6th and 7th semester.

In the 4th year students are requested to register for graduation project-1 and graduation project-2. During the 7th semester students do relevant field work and laboratory studies to collect data, followed by the second part of the project during the 8th semester with analysing collected data and writing down the results.

As outlined under criterion 1.1 the auditors could see that the intended learning out-comes are in line with the Subject-Specific Criteria (SSC) of the Technical Committee of Geosciences. The peers based their assessment whether the curricula of both programmes are suitable to achieve the intended learning outcomes on the module descriptions and the

study plans. The overall objectives and intended learning outcomes for the degree programme are systematically substantiated in modules and it is clear for the auditors which knowledge, skills and competences students will acquire in each module.

The auditors conclude that the curricula of both programmes are designed in a way to develop the competences as exemplified in the Subject-Specific Criteria of ASIIN and the level 6 competences of the European Qualification Framework.

The panel highly welcomed that recommendations from the previous accreditation regarding improvements to the curricula had been implemented. For example the English language skills of the students increased in a way that there was no translator needed during the discussion with the peers. With the kind of seminar (report course) the university introduced more project-oriented work in the curricula and the auditors learned from the students that there were a lot of modules with practical laboratory work including reports and presentations as well.

The auditors were very pleased about the intensity of the field work (35 days during the big field excursion between third and fourth year and additional smaller excursions in different modules) because the practical field experience of the students is one of the main fundamentals for the quality of the programmes. From the point of view of the panel any decrease of field work will have a negative impact on the quality of the programmes. This impression was confirmed by the representatives of companies during their discussion with the peers.

Students are highly satisfied with the intensity of field work but wish that excursions would not only be realised in the Arabian Shield but as well for example in the platform. On the one hand the auditors could follow this wish for different experiences, on the other side most rocks could be found in the shield as well The terms of such field work may be adopted to the specific weather/temperature conditions of Saudi Arabia.

To improve the practical experience of the students the department plans to establish an internship of 4 weeks. But up to now there are only a few companies interested in such cooperation.

Criterion 1.4 Admission requirements

Evidence:

- Programme specifications
- Department handbook
- Report on Programme Requirements and Regulations

- Self assessment Report
- Discussions with management, teaching staff and students

Preliminary assessment and analysis of the peers:
The admission requirements for the programmes are made transparent in the programme handbooks as well as on the university website. Student surveys confirmed that the admission requirements and process were transparent. Generally, in line with national regulations, a secondary school certificate granting access to higher education is mandatory. The peers understand that all students who enter the King Saud University need to conduct a preparatory year to ascertain that all students have obtained basic skills before they can study the professional degree programme. After the Preparatory Year, an additional acceptance grade is defined to be able to continue on to the second year. The necessary *grade point average* (GPA) levels for different degree programmes differ. The students can indicate three wishes which programme they actually want to study and depending on the GPA they are allocated to the different programmes. The programme coordinators highlighted that most students are interested in subjects like medicine or engineering sciences.

In summary, the auditors confirm that the requirements and procedures for admission for all programmes are transparent and clear. All applicants are treated according to the same standards and regulations.

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

As the university relinquished on any comment the auditors confirmed their preliminary assessment. They saw the criterion widely fulfilled and proposed a requirement to publish the defined curricula in a consistent way in the different documents, e.g. in the department handbook and in the programme specifications.

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Self Assessment Report
- Module descriptions:

- Discussions with representatives of KSU management, programme coordinators, lecturers, students

Preliminary assessment and analysis of the peers:
Modularisation:

Both study programmes under review are modularized. The peers determine that each module is a sum of teaching and learning whose contents are concerted. Most of the modules of the Bachelor's degree programmes encompass between 2 and 3 credit points (with some few exceptions). The structure of the programme as well as the individual modules was found to be coherent and consistent. The results from surveys from students and teaching staff also did not show any area of concern with regard to the structure or possible overlap.

Depending on the GPA achieved by students, they are allowed to take courses for a maximum of 20 contact hours per week. In case the GPA drops, students are asked to take fewer courses in order to achieve the intended competences. The panel considered this practice adequate though it might lead to slightly longer study durations. Overall, they found that most students completed their programme within 4 to 5 years.

Modules are offered each semester, all electives courses are offered at least once per year. The offered elective courses allow students to define an individual focus. But from the point of view of the peers the elective courses are oriented very field specific. In order to give students the opportunity to look beyond their own noses the peers recommended to offer more courses out of other disciplines to foster interdisciplinary approaches. That would not mean to extend the number of credit points for elective courses but allow students to attend courses out of other departments or even faculties.

Student mobility

International mobility is organized on an institutional level and currently takes place in the form of summer schools at international universities or research centres. KSU highlights that international mobility is particularly emphasised in the Master's and PhD programmes where the second supervisor needs to come from a foreign university and parts of the programme need to be carried out at an international partner university. Additionally KSU has established programmes to support students to study in Master programmes abroad. After the bachelor degree these students are teaching for one year at KSU before they receive grants from KSU for a master or a PhD study. After finishing their studies abroad they come back to KSU as a professor.

However, during the discussion with teaching staff and programme coordinators the point was brought up that there is no actual mobility window for Bachelor students in neither of

the programmes under review. Students do not really have the opportunity to pass a full semester abroad although the University highlights the importance of internationalization. The programme coordinators lamented this circumstance and underlined that bilateral agreements with international universities would be very helpful to establish such opportunities. Although the peers understood that going abroad for a semester or longer is not an option for many Saudi Arabian students during the Bachelor programme they support the coordinators' ambitions, especially since international partnerships would lead to a higher number of international students visiting KSU and hence increase the academic dialogue.

Recognition of achievements and competences

The recognition of achievements and competences obtained at another university or outside the tertiary education sector is governed by the university regulations. The panel understands that a transfer from another university is very rare. In such cases, the procedures for checking the courses and competences are followed. The peers think that any effort to motivate the students actively for a stay at abroad is very valuable, as it improves the abilities of students and the international visibility of KSU.

Criterion 2.2 Work load and credits

Evidence:

- Self-Assessment Report
- Course specifications attached to the self-assessment-reports
- Discussions with representatives of the management of the university, programme coordinators, lecturers, students

Preliminary assessment and analysis of the peers:
The Bachelor's programmes have a credit point system in place which is not oriented on the student workload but on contact hours. As a rule, the modules are valued at 2 or 3 Saudi Arabian credit points some modules have an extent of 4 credit point and for a few modules there are foreseen even 8 credit points. One credit point is awarded for 1 hour of lectures or 2 hours of tutorial or lab. Between 15 and 19 credit points are awarded per semester. The two parts of the graduation projects are valued at 3 Saudi Arabian credit points each.

As the credit point system used in Saudi Arabia only encompasses the presence hours and not additional students' self-study, the auditors did not find the system comparable to the ECTS system (European Credit Transfer System).

Out of the discussion with the students the auditors got the impression that the student workload including self studies and homework is at the lower line but still in the range of the workload defined in the ECTS for European programmes. Since the course descriptions already contain indications about the expected weekly self-study time, they assumed the university capable of making a comparison of their credit point system to the ECTS system. They judged this helpful for those graduates wishing to pursue further studies at a university in the European Higher education Area. Especially for the graduate projects it would be helpful to outline the student workload for the final project in order to achieve higher international compatibility.

The six credit points of graduate projects only reflect the contact hours each student has in an individual class or meeting with er/his supervisor discussing questions around his project. For the peers this seems to be a very closely guidance of the students which requires an intensive preparation of the students with a high workload. But at least it is up to the single student how much work is invested in the project; consequently, the results of the projects differ in quality. Although the peers were of the opinion that the project reports generally reflect an adequate level of knowledge they did not see any excellent report (see chapter 3, below). In any case, the peers recommended to establish some measurement for the average workload that students need to fulfil in order to prepare the projects. This would not necessarily mean to change the number of credits but it should be made transparent for example in which timeframe maximum and minimum the work has to be prepared. This would be important first of all to make the works more comparable to each other and to improve their evaluation by international (especially European) HEIs and employers.

The peers take positive note that the Course Evaluation Survey (CES) includes the question "The amount of work I had to do in this course was reasonable for the credit hours allocated" which demonstrates that KSU checks each semester systematically whether the overall workload of students is adequate. The students confirm that it is possible to finish the study programmes in the assigned 8 semesters. In summary, the auditors conclude that there is no structural pressure on the quality of teaching and the level of education due to the workload. The workload seems to be realistic and peaks in the workload are avoided.

Criterion 2.3 Teaching methodology

Evidence:

- Self Assessment Report
- Course specifications attached to the self-assessment-reports

- Discussions with representatives of MUST management, programme coordinators, lecturers, business representatives, students

Preliminary assessment and analysis of the peers:
The didactical concept includes elements such as traditional lectures, blended learning (traditional and online), e-learning, seminars and laboratory and field work. Most courses consist of theoretical and practical elements which the peers consider to be a significant improvement resulting from the previous accreditation. Groups are normally made up of no more than 40-45 students for lectures and 20-25 students for labs. The field experience in the Geology and Geophysics programme is achieved through short field trips (up to three days) and one long field training course (35 days). Several courses include presentations and the reports of the long field work as well as the graduation project have to be presented. So the auditors saw enough opportunities for students to train their communication skills.

As mentioned before internships are not yet implemented in the curricula but students gain practical experiences in companies during summer time. The auditors recommended enhancing the links to relevant industry to give students more opportunities to carry out internships.

In total the auditors gained the impression that the teaching methods used for implementing the didactical concept are appropriate to support the attainment of the learning objectives.

Criterion 2.4 Support and assistance

Evidence:

- Self Assessment Report
- Discussions with representatives of management of the university, programme coordinators, lecturers, business representatives, students
- Programme specifications
- Department handbook

Preliminary assessment and analysis of the peers:
The peers examine the measures of support and assistance for the students in both programmes under review and come to the conclusion that a great variety of information is presented for each programme and additional support measures. For programme-related information students can ask senior students; there is also an advisor who can be addressed for more detailed information about specific courses or electives. The lecturers give advice

and support in field-specific questions regarding single modules or courses. Students are very satisfied with the support of the professors and their availability.

Each student has a staff member as a supervisor for the graduation project. The supervisor will help students in identifying and solving problems by the graduation project.

Additionally, there are several centralized institutions at King Saud University for the general support of students. Also dormitories with about 3000 places are available for Saudi Arabian students from outside of Riyadh and for foreign students.

The peers confirmed that there are enough resources available to provide individual assistance, advice and support for all students and that the allocated advice and guidance assist the students in achieving the learning outcomes and in completing the course within the scheduled time.

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

As the university relinquished on any comment the auditors confirmed their preliminary assessment. They saw the criterion generally fulfilled but proposed recommendations to allow students to choose elective courses more widely in order to foster interdisciplinary approaches and to enhance the links to relevant industry to give students more opportunities to carry out internships. Additionally they recommended to clearly outline the student workload especially for the final project in order to achieve higher international compatibility. Further, a clear identification as an equivalent to the Bachelor thesis would be helpful.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Self Assessment Report
- Module descriptions
- Programme specifications
- Department handbook
- Discussions with representatives of management of the university, programme coordinators, lecturers, students

Preliminary assessment and analysis of the peers:
The examinations in the respective programmes can have the form of quizzes and homework (also by electronic devices), written mid-term and written final exams, seminar and project discussions, practical lab exam, presentation and practical reports. Students confirm to the auditors that oral presentations are implemented in several modules. The peers confirmed that exams are structured to cover all of the intended learning outcomes.

The graduation project which replaces the bachelor thesis is divided into two parts. The quality of the project reports corresponds in general with the requirements for final theses for level 6 of the European Qualification Framework. Nevertheless, the peers did not see any excellent reports and only a few good ones while the mass of the reports was satisfying and several only sufficient. This assessment of the auditors is confirmed by the grades given by the university to the reports. For example in 2015 there was no A grade, 15% of the reports were assessed with a B, 65% with a C and 20% with a D.

From the point of view of the auditors it is advisable to have a clear identification of the final project as an equivalent to the Bachelor thesis in order to achieve higher international compatibility. Further, the student workload and not only the contact hours for the graduation project should be clearly outlined.

Failed exams cannot be repeated without repeating the whole module, but the number of the repetitions is unlimited. Students can also drop a course if they feel they cannot pass the final exam. Depending on the grade point average reached in the previous semester, students are allowed to take more or less courses. The programme coordinators explained that this rule helps to give students who have failed an exam more time to study.

The exam period of two weeks is held at the end of each semester. No more than two exams can take place during one day. Registration is made online. Make-up exams for students who could not attend the mid-term exams due to illness are held one week before the final exams.

Grades for each module are calculated on a specific basis detailed in the course description, depending on the number of exams taken. The grade point average per semester or for the whole program is calculated taking into account the credits for each module. The students confirmed that all rules and regulations regarding exams, calculation of grades and pass rates as well as scheduling and re-sits were clear to them and transparently described.

In conclusion, the auditors gained the impression that the chosen exam types are oriented at the learning objectives defined for the individual modules. They positively noted that the

number of oral presentation and practical exams has been increased since the last accreditation and that the programme coordinators are eager to diversify the examination methods while guaranteeing at the same time a great transparency regarding the regulations.

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

As the university relinquished on any comment the auditors confirmed their preliminary assessment. They saw the criterion completely fulfilled.

4. Resources

Criterion 4.1 Staff

Evidence:

- Self-Assessment Reports
- CVs of teaching staff
- Faculty Employment and Promotion Regulations
- Scientific Research Policy
- Reports on Research Strategic Plan
- Discussions with students, teaching staff and management

Preliminary assessment and analysis of the peers:

The auditors analyze the CV and the referenced websites and conclude that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing the degree programmes; many professors come from other countries or have received their certificates from internationally well-known institutions. The panel highly welcomed the plans of the department to offer both programmes for female students as well and to establish an additional programme in hydrogeology. But they noticed as well that additional staff is needed to realise these plans.

The teaching load with 14 credits for assistant professors and 10 for full professors seemed to be quite high but during the on-site discussions the panel learned, that these also comprise a reduction of three hours spent on final project modules. Hence, the teaching load is considered to be still acceptable and leaves some time for limited individual research projects.

The ratio of teaching staff and students is adequate with 1:20 in geology and 1:14 in geophysics. But the auditors marked that the support of the students during their laboratory work could be enhanced. They understood that lecturers or professors can not give the technical support needed by students and from the point of view of the auditors this should not be their duty. On the other side the technical staff was not increased in the same way as the number of students. Therefore, the panel recommended that the department provides adequate assistance and advice to students during laboratory practice by technical staff.

Criterion 4.2 Staff development

Evidence:

- Self-Assessment Reports
- Discussions with teaching staff and management

Preliminary assessment and analysis of the peers:
By a Deanship for Skills Development workshops and seminars are being organized at KSU in order to develop the didactical qualification and competences of the teaching staff. Professional training is offered with a yearly programme, especially for new professors who have to attend a certain number of courses and workshops in order to maintain their teaching permission. Furthermore, the peers found it appreciable that teaching staff can obtain certificates in participating in such courses documenting their advancement in didactical skills. During the discussion several members of the teaching staff declared that they regularly participate in the offered courses and consider them to be very helpful for the further development of the teaching quality.

Regarding to field-specific aspects the department finances the visit of one international conference for each professor each year. Additional visits could be paid out of research projects. For Saudi Arabian professors sabbaticals of one year are possible every five years. Due to the fact that foreign professors only get one year contracts there are no sabbatical for them.

The peers were ascertained that the offers for staff development are adequate to ensure a high level of teaching and learning in the programmes.

Criterion 4.3 Funds and equipment

Evidence:

- Self Assessment Report

- Onsite visit of the institution and laboratories
- Discussions with management of the university, programme coordinators, lecturers, students

Preliminary assessment and analysis of the peers:

The peers discussed the availability of financial funds with the management and learned that the budget for the departments is divided by the college according to the number of students. The management of the programmes confirmed that the funds provided are sufficient to implement the programmes although there is a certain decline in fund for research and projects compared with a very high level some years ago. The peers confirmed that generally the funding still is sufficient and resources are available and that the level compared with was extremely high.

The equipment of the laboratories and classrooms was inspected of the premises during the on-site-visit. In general the peers gained a very good impression of the campus and the learning and teaching facilities. They were impressed by the high standards of supporting measures for students with handicaps.

Concerning some of the laboratories the peers marked that the work places including the quantity of equipment have not been increased adequately to the growing number of students and that some equipments e.g. for rock preparation could be modernised.

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

As the university relinquished on any comment the auditors confirmed their preliminary assessment. They saw the criterion generally fulfilled but proposed one recommendation to increase the number of laboratory work places (including the equipment) in order to educate adequately the growing numbers of students. Additionally, the equipment e.g. for rock preparation should be modernised. Further on the panel proposed to recommend to provide adequate assistance and advice to students during laboratory practice by technical staff.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Module descriptions

Preliminary assessment and analysis of the peers:
The peers positively noticed that short module descriptions for all programmes under review were accessible online in English language and more detailed descriptions are sometimes being provided in the programme handbook. Hence, module descriptions are available for all interested stakeholders. The peers examined the module descriptions and noted that the modules have comprehensible names, the teaching methods are specified and the workload is defined in connection with the credit points for each module. Additionally the contents and objectives of the modules are described, the admission and examination requirements as well as the forms of assessments.

The peers marked that the responsible professors are not mentioned for the single modules. Additionally, in some modules the aimed learning outcomes described what students have to learn in these modules but do not define the competences and abilities the students should have after a successful examination. Here could be room for an optimisation of the information given in the module descriptions.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Examples of the Diploma Supplements are missing.

Preliminary assessment and analysis of the peers:
The institution does not provide for the award of a Diploma Supplement as it was already the case in the previous review. From the point of view of the auditors it seems to be necessary that shortly after graduation the University issues such a document together with the diploma in English language. Diploma supplements should provide information on the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student.

The individual modules and the grading procedure on which the final mark is based should be explained in a way which is clear for third parties. In addition to the final mark, statistical data as set forth in the ECTS User's Guide could optimally be included to allow readers to categorize the individual result or degree.

Criterion 5.3 Relevant rules

Evidence:

- Programme specification

- Department handbook

Preliminary assessment and analysis of the peers:
The peers confirmed that the rights and duties of University, lecturers and students are clearly defined mainly in the programme specifications and in the department handbook. All relevant course-related information is available on the websites of the university.

As mentioned before the curricula of both programmes are described in different ways in the department handbook and the programme specifications. Here the university has to ensure that the curricula have to be published in a consistent way in the different documents.

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

As the university relinquished on any comment the auditors confirmed their preliminary assessment. They saw the criterion widely fulfilled and propose a requirement that a Diploma Supplement is given to graduates which contains detailed information about the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student. Additionally they recommend to rewrite the module descriptions so as to include information about the responsible professor and about the learning outcomes of each module in a way that it becomes transparent what students should be able for and not what they should learn.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Self-Study Reports, incl. statistical data
- QMS Handbook (2009)
- Survey Results and Analysis
- Quality Policy of the College , Quality Management System
- Action Plan, Alignment, Strategic Plan

- Benchmark Report
- Independent reviewer report and answers
- Discussions with management, teaching staff, students, graduates, employers

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

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

In the frame of the self-study, carried out every five years, surveys of teaching staff and students are implemented with the aim of ascertaining to what extent the aims and objectives of the programmes are relevant to the daily teaching and learning activities. These surveys also include satisfaction with the provision of teaching and facilities and resources. However, the students reported that some lecturers give an unofficial feedback on their evaluations but that there is no institutionalised feedback and as they progressed to the next level in their studies they could not judge if any changes were implemented. The peers recommend closing the feedback loops institutionalised to further develop the quality of the degree programmes.

A graduate database was understood to be in the process of being developed. While in principle the contact details of all graduate were available, it appeared that not much systematic use was made of this information. Similarly, personal relations to certain employers existed and companies were formally involved in enhancement surveys and advisory meetings. However, the panel gained the impression that more effects could be achieved to make use of this information and contacts on programme, rather than college or university level. The panel supported the proposals to organize meetings between these groups with a view to both informing students about future employment opportunities and gathering information about skills needed in the labour market that can be used to continuously enhance the programmes.

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

As the university relinquished on any comment the auditors confirmed their preliminary assessment. They saw the criterion generally fulfilled but proposed a recommendation to ensure that students get an institutionalised feedback about the evaluation results.

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution

The university relinquished on any comment.

F Summary: Peer recommendations

The peers recommend the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Ba Geology	With requirements for one year	--	30.09.2025
Ba Geophysics	With requirements for one year	--	30.09.2025

Requirements

A 1. (ASIIN 5.2) Ensure that a Diploma Supplement is given to graduates which contains detailed information about the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student.

A 2. (ASIIN 1.3, 5.3) The curricula defined have to be published in a consistent way in the different documents (department handbook and programme specification).

Recommendations

E 1. (ASIIN 2.1) It is recommended to allow students to choose elective courses more widely in order to foster interdisciplinary approaches.

E 2. (ASIIN 2.2; 3) It is recommended to clearly outline the student workload especially for the final project in order to achieve higher international compatibility. Further, a clear identification as an equivalent to the Bachelor thesis would be helpful.

E 3. (ASIIN 2.3) It is recommended to enhance the links to relevant industry to give students more opportunities to carry out internships.

E 4. (ASIIN 4.3) It is recommended to increase the number of laboratory work places (including the equipment) in order to educate adequately the growing numbers of students. Additionally, the equipment e.g. for rock preparation should be modernised.

E 5. (ASIIN 4.3) It is recommended to provide adequate assistance and advice to students during laboratory practice by technical staff.

E 6. (ASIIN 5.1) It is recommended to rewrite the module descriptions so as to include information about the responsible professor and about the learning outcomes of each module in a way that it becomes transparent what students should be able for (not what they should learn).

E 7. (ASIIN 6) It is recommended to ensure that students get an institutionalised feedback about the evaluation results.

G Comment of the Technical Committee

The Technical Committee discussed the procedure and followed the assessment of the peers without any changes.

The Technical Committee recommend the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Ba Geology	With requirements for one year	--	30.09.2025
Ba Geophysics	With requirements for one year	--	30.09.2025

H Decision of the Accreditation Commission (23.03.2018)

Assessment and analysis for the award of the ASIIN seal:

The Accreditation Commission for Study Programmes discussed the procedure and followed the assessment of the peers and the Technical Committees without any changes.

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

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditaiton
Ba Geology	With requirements for one year	--	30.09.2025
Ba Geophysics	With requirements for one year	--	30.09.2025

Requirements

A 1. (ASIIN 5.2) Ensure that a Diploma Supplement is provided to graduates containing detailed information about the educational objectives, intended learning outcomes, the structure and the academic level of the degree programme as well as about the individual performance of the student.

A 2. (ASIIN 1.3, 5.3) The curricula defined have to be published in a consistent way in the different documents (department handbook and programme specification).

Recommendations

E 1. (ASIIN 2.1) It is recommended to allow students to choose elective courses more widely in order to foster interdisciplinary approaches.

E 2. (ASIIN 2.2; 3) It is recommended to clearly outline the student workload especially for the final project in order to achieve higher international compatibility. Further, a clear identification as an equivalent to the Bachelor thesis would be helpful.

E 3. (ASIIN 2.3) It is recommended to enhance the links to relevant industry to give students more opportunities to carry out internships.

E 4. (ASIIN 4.3) It is recommended to increase the number of laboratory work places (including the equipment) in order to educate adequately the growing numbers of students. Additionally, the equipment e.g. for rock preparation should be modernised.

E 5. (ASIIN 4.3) It is recommended to provide adequate assistance and advice to students during laboratory practice by technical staff.

E 6. (ASIIN 5.1) It is recommended to rewrite the module descriptions so as to include information about the responsible professor and about the learning outcomes of each module in a way that it becomes transparent what students should be able for (not what they should learn).

E 7. (ASIIN 6) It is recommended to ensure that students get an institutionalised feedback about the evaluation results.

Appendix: Programme Learning Outcomes and Curricula

According to programme specifications the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor'sr degree programme Geology:

Knowledge
Gain working knowledge of the geological concepts, laws, terminologies, nomenclature and different classifications. The department aims to provide students with a deep and comprehensive knowledge of the various disciplines of geology, focusing mainly on field skills and basic lab methods.
The student should be able to use the acquired knowledge to solve geologic problems and be capable of making informative geologic maps and reports.
Cognitive Skills
Recognize and use geological subject-specific theories, concepts and principles.
Synthesize, analyse, and summarize geological information critically, including prior research.
Collect and integrate several lines of evidence to formulate and test scientific hypotheses.
Apply knowledge and understanding to address familiar and unfamiliar environmental & geological problems.
Conduct and present an independent project with reliance on guidance.
Apply a range of geological methods to solve problems.
Interpersonal Skills & Responsibility

The student should learn how to conduct a proper field excursion and rely on himself in such situations.
Team work is promoted during field work.
Personal initiative is encouraged through independent work on assignments and field reports
Oral presentation skills are stressed in the seminar and research project courses.
Communication, Information Technology, Numerical
Using the internet to obtain information and data from relevant sites.
Acquire a working knowledge of basic computer skills, with special emphasis on certain geologic programs.
Ability to utilize the full potential of global position systems (GPS) in field surveys
Psychomotor
-Field observations including changes in sedimentary facies, structural deformation, tectonics, and geologic history.
-Field sampling
-Taking measurements in the field such as compass bearing and water level
-Analysis of water quality in the field and in the laboratory

The following **curriculum** is presented:

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
Prep Year					
	ENG 140	English Language (1)	Required	8	College
	ENG 150	English Language (2)	Required	8	College

	Math 140	Introduction to Mathematics -1	Required	2	College
	Math 150	Differential Calculus	Required	3	College
	CI 140	Learning, Thinking, Research Skills	Required	3	College
	CT 140	Computer Skills and IT	Required	3	College
	MC 150	Communication Skills	Required	2	College
	CHS 140	Health and Fitness	Required	1	College
	ENT 101	Entrepreneurship	Required	1	College
University obligatory Courses					
	Islam 101	Introduction to the Islamic culture	Required	2(2+0+0)	
	Islam 102	Islam and Society	Required	2(2+0+0)	
	Islam 103	The economic system in Islam	Required	2(2+0+0)	
	Islam 104	The political system in Islam	Required	2(2+0+0)	
Compulsory Courses in the department					
	GEO 101	Physical Geology	Required	4(3+1)	Department
	GEO 106	Historical Geology	Required	3(2+1)	Department
	GEO 221	Mineralogy	Required	3(2+1)	Department

	GEO 236	Stratigraphy and Sedimen-tology	Required	3(2+1)	Department
	GEO 243	Invertebrate Paleontology	Required	3(2+1)	Department
	GEO 262	Environmental Geology	Required	2(2+0)	Department
	GEO 323	Igneous and Metamorphic Petrology	Required	3(2+1)	Department
	GEO 334	Sedimentary Petrology	Required	3(2+1)	Department
	GEO 380	Plate Tectonics	Required	2(2+0)	Department
	GEO 381	Structural Geology	Required	3(2+1)	Department
	GEO 383	Remote Sensing	Required	3(2+1)	Department
	GEO 386	Geology of the Arabian Shield	Required	2(1+1)	Department
	GEO 392	Geological Reports	Required	1(1+0)	Department
	GEO 393	Field Geology	Required	6(0+6)	Department
	GEO 406	Data analysis in Geology	Required	2(1+1)	Department
	GEO 452	Petroleum Geology	Required	3(2+1)	Department
	GEO 450	Ore Geology	Required	3(2+1)	Department
	GEO 455	Hydrogeology	Required	3(2+1)	Department
	GEO 473	Engineering Geology	Required	2(2+0)	Department
	GEO 478	Spatial information systems	Required	2(1+1)	Department
	GEO 482	Sedimentary Geology of Saudi Arabia	Required	3(2+1)	Department
	GEO 498	Geological Seminar	Required	1(1+0)	Department
	GEO 497	Graduation Project-1	Required	3(0+3)	Department
	GEO 498	Graduation Project-2	Required	3(0+3)	Department
	GPH 201	Principles of Geophysics	Required	3(2+1)	Department
	GPH 301	Geophysical Exploration	Required	3(2+1)	Department

Compul-sory Courses from other depart-ments					
	CHEM 103	General Chemistry	Required	3(3+0+0)	College
	CHEM 104	Experimental General Chemistry	Required	1(0+0+1)	College
	PHYS 101	General Physics	Required	4(3+1)	College
	STAT 100	Statistics and Probability	Required	3(2+1)	College
	CHEM 253	Analytical Chemistry	Required	2(1+1)	College
Elective Courses in the depart-ment					
	GEO 242	Micropaleontology	Elective	3(2+1)	Department
	GEO 301	Geomorphology	Elective	3(2+1)	Department
	GEO 341	Paleobotany	Elective	3(2+1)	Department
	GEO 342	Paleoecology	Elective	3(2+1)	Department
	GEO361	Principles of Geochemistry	Elective	3(2+1)	Department
	GEO 421	Volcanology	Elective	3(2+1)	Department
	GEO431	Carbonate Rocks	Elective	3(2+1)	Department
	GEO 432	Quaternary Geology	Elective	3(2+1)	Department
	GEO 435	Oceanography	Elective	2(2+0)	Department

	GEO 441	Vertebrate Paleontology	Elective	3(2+1)	Department
	GEO 445	Sedimentary Basin Analysis	Elective	2(1+1)	Department
	GEO 454	Mining Geology	Elective	2(1+1)	Department
	GEO 456	Applications in Petroleum Geology	Elective	2(2+0)	Department
	GEO 483	Regional Geology of the Middle East	Elective	2(2+0)	Department
	GEO 495	History of Geology	Elective	1(1+0)	Department
	GEO 496	Specialized Topics	Elective	1(1+0)	Department
	GPH 341	Geophysical Well Logging	Elective	3(2+1)	Department
	ASTR 101	Introduction to Solar and Stellar Systems	Elective	3(2+1)	
	BOT 101	General Botany	Elective	3(2+1)	
	ZOO103	Principles of General Zoology	Elective	3(2+1)	
	ADMIN 101	Principles of Administration	Elective	3(3+0)	
	BUS 101	Principles of Bussiness Administration	Elective	3(2+1)	
	MIS 101	Management Information Systems	Elective	3(3+0)	
	ECON 101	Principles of Microeconomics	Elective	3(3+0)	

According to programme specifications the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor'sr degree programme Geophysics:

	NQF Learning Domains and Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge		
1.1	Aquire studients knowledge about the geophysical concepts, laws, terminologies, nomenclature and different classifications.	Lectures and practical lessons	Mid-term exams Class assignment End of the term exam
1.2	Outline geophysical information with critical understanding about the appropriate aspects and their better utilization concerning the availability and sustainability of natural resources.	-interactive learning - Smaal group discussion - Brain storming -Lab Demonstration	Quizzes Assigments
1.3	Examines Recognize the internal and external processes that shape the earth and its landscapes, nature of tectonic forces, earthquakes, volcanoes, rocks and minerals and mountain building	- Lectures - Lab demonestration - Case studies	Long & Short essays Group Presentation Mid-term exams Final term exam
1.4	Define natural hazards including earthquakes, volcanoes, tsunami, landslides, flooding, and meteor impacts	Presentation of case studies about the subject. Small group work Research activities	Individual/group presentations MCQ
1.5	Describe and discuss the contribution of geophysical sciences/techniques to environmental issues.	Lectures Group discussion In class presentations	Assigment Written assignments
2.0	Cognitive Skills		
2.1	Recognize and use subject-specific geophysical theories, paradigms, concepts and principles.	Lectures and practical lessons	Practical examinations .

2.2	Synthesize, analyze, and summarize geophysical information critically, including any previous research data.	Class Discussion Brain storming Research activities	MCQ's Essays Assignment
2.3	Collect, integrate and apply several lines of evidence to formulate, evaluate and test the scientific hypotheses	Research assignments Projects Prctical Lab Demonstratio Field Work	Group or individual presentations. Assigment Portfilios Log books
2.4	Apply the obtained knowledge in addressing issues related to familiar and unfamiliar environmental & geophysical problems.	Lectures practical lessons Field studies	Written Exams MCQ's Log books
2.5	Conduct and execute an independent research project in the light of knowledge and understanding obtained through the study years under the guidance of teachers/instructors.	Research assignments Case studies geophysical investigations projects.	Group or individual presentations. Class & Field observation Essays
2.6	Capacity to solve a range of geological problems through the application of suitable geophysical techniques.	- Practical field work - laboratory- based work problem solving - case studies -Data processing and interpretation.	Field-based observations. Practical Exams - log books - Lab reports
3.0	Interpersonal Skills and Responsibility		
3.1	Communicate appropriately (both receiving and responding) , both oral and written.	classroom discussion Group or team work activities Research group	Reports Observation Group presention
3.2	Ability to contribute as individual and or as team work to achieve tasks and responsibilities with good performance.	Group or team work activities Research group Field team work	Group or individual presentations Technical reports
3.3	Self-management and lifelong learning (e.g. working independently, managing time efficiently and organizing things/events orderly).	Time bouned projects and research assignments Field work team investigations & surveys	assignment, lab reports log books of achieving tasks & responsibilities.

3.4	Recognize and respect the views and opinions of other team members.	Team work activities Group discussion	Oral discussion and interaction Presentation & Seminars
3.5	Develop and deliver effective presentations for a variety of audiences	In class presentations	Group or individual presentations
4.0	Communication, Information Technology, Numerical		
4.1	Use of Internet facility as means of communication and a source of information.	Web sites-based research papers	research papers
4.2	Utilizes geophysical software effectively	assignments and homework using computer programs	Evaluation of computer program proficiency, written assignments, and homework.
4.3	Present results from geophysical investigations in a number of formats using computer programs.	group discussion and presentations	Presentations (in group and individual)
4.4	Use of special technologies and numerical analysis in addressing geophysical problems. Be able to use computer software for data presentation	Solving geophysical assignments and homework using computer programs.	Through student's scoring in tests and assignments.
4.5	Be proficient in selecting and using reputable web sites for research	Web sites-based research papers	Research papers evaluation
5.0	Psychomotor (if applicable)		
5.1	Identifies and collects samples for analysis	Field trips	Evaluation of the task completed
5.2	Operates and uses equipment/tools/machinery appropriately	Hands on training using geophysical instruments in the field	Evaluation of the task completed
5.3	Takes precise and accurate measurements	Hands on training using geophysical instruments in the field	Measurements and data analysis
5.4	Calibrates instrumentation	Mock measurements in the laboratory	Measurements and data analysis
5.5	instrumentation Troubleshooting	Videos	Verbal questions
5.6	Utilizes safe and careful practices at all times	Hands on training using geophysical instruments in the field	Watching and evaluating the student behavior during field measurements

The following **curriculum** is presented:

Year	Course Code	Course Title	Required or Elective	Credit Hours	College or Department
Prep Year					
	ENG 140	English Language (1)	Required	8	College
	ENG 150	English Language (2)	Required	8	College
	Math 140	Introduction to Mathematics -1	Required	2	College
	Math 150	Differential Calculus	Required	3	College
	CI 140	Learning, Thinking, Research Skills	Required	3	College
	CT 140	Computer Skills and IT	Required	3	College
	MC 140	Communication Skills	Required	2	College
	CHS 150	Health and Fitness	Required	1	College
	ENT 101	Entrepreneurship	Required	1	College
University obligatory Courses					
	Islam 101	Introduction to the Islamic culture	Required	2(2+0+0)	
	Islam 102	Islam and Society	Required	2(2+0+0)	
	Islam 103	The economic system in Islam	Required	2(2+0+0)	
	Islam 104	The political system in Islam	Required	2(2+0+0)	
Compulsory Courses in the department					
	GPH 201	Principles of Geophysics	Required	3(2+0+1)	Department
	GPH 211	Gravity & Magnetic Exploration	Required	3(2+0+1)	Department
	GPH 221	Seismic Exploration	Required	3(2+0+1)	Department

	GPH 231	Geoelectric &Electromagnetic Exploration	Required	3(2+0+1)	Department
	GPH 313	Seismology	Required	3(2+0+1)	Department
	GPH 341	Geophysical Well Loggings	Required	3(2+0+1)	Department
	GPH 381	Geophysical Reports	Required	1(1+0+0)	Department
	GPH 390	Radiometric and Geothermal methods	Required	2(2+0+0)	Department
	GPH 393	Field Geophysics	Required	6(0+0+6)	Department
	GPH 496	Geophysical Project -1	Required	3(0+0+3)	Department
	GPH 401	Physics of the Earth	Required	2(2+0+0)	Department
	GPH 412	Engineering Seismology	Required	2(2+0+0)	Department
	GPH 411	Geophysical Data Processing	Required	3(2+0+1)	Department
	GPH 497	Research Project-2	Required	3(0+0+3)	Department
	GEO 101	Physical Geology	Required	4(3+0+1)	Department
	GEO 221	Mineralogy	Required	3(2+0+1)	Department
	GEO 236	Principles of Stratigraphy & Sedimentation	Required	3(2+0+1)	Department
	GEO 320	Petrology	Required	3(2+0+1)	Department
	GEO 381	Structural Geology	Required	3(2+0+1)	Department
	GEO 452	Petroleum Geology	Required	3(2+0+1)	Department
	GEO 478	Geographical information systems	Required	2(1+0+1)	Department
Compulsory Courses from other departments					
	CHEM 101	General Chemistry (1)	Required	4(3+0+1)	College
	PHYS 101	General Physics (1)	Required	4(3+0+1)	College
	PHYS 102	General Physics (2)	Required	4(3+0+1)	College
	PHYS 201	Mathematical Physics (1)	Required	3(2+1+0)	College
	PHYS 221	Electromagnetism (1)	Required	3(3+0+0)	College
	MATH 111	Integral Calculus	Required	4(3+1+0)	College
	MATH 200	Differential and Integral Calculus	Required	3(3+0+0)	College
	MATH 204	Differential Equations	Required	3(3+0+0)	College
Elective Courses in the					

department					
	GPH 317	Time series analysis	Elective	2(2+0+0)	Department
	GPH 319	Petrophysics	Elective	2(2+0+0)	Department
	GPH 416	Seismotectonics of the Middle East	Elective	2(2+0+0)	Department
	GPH 424	Environmental Geophysics	Elective	2(2+0+0)	Department
	GEO 323	Igneous and Metamorphic Petrology	Elective	3(2+0+1)	Department
	GEO 334	Sedimentary Petrology	Elective	3(2+0+1)	Department
	GEO 383	Remote Sensing	Elective	3(2+0+1)	Department
	GEO 386	Geology of Arabian Shield	Elective	2(1+0+1)	Department
	GEO 455	Hydrology	Elective	3(2+0+1)	Department
	GEO 482	Sedimentary Geology of the Kingdom	Elective	3(2+0+1)	Department
	PHYS 231	Vibrations and Waves	Elective	3(2+1+0)	
	MATH 244	Linear Algebra	Elective	3(3+0+0)	
	STAT 100	Introduction of Statistics	Elective	3(2+1+0)	
	BUS 101	Principles of Business Administration	Elective	3(3+0+0)	
	ECON 101	Principles of Microeconomics	Elective	3(3+0+0)	