



**KINGDOM OF SAUDI ARABIA
MINISTRY OF HIGHER EDUCATION
KING SAUD UNIVERSITY
COLLEGE OF SCIENCE
DEPARTMENT OF GEOLOGY AND GEOPHYSICS**

**GEOLOGY AND GEOPHYSICS
DEPARTMENT HANDBOOK**

2016

PREFACE

King Saud University was established in 1957 and the Department of Geology, which is one of the departments of the College of Science, was founded in 1958 (1378 H). The Department, upon successfully celebrating its Golden Jubilee in 2008, expanded to incorporate the Geophysics teaching curriculum and was re-named as the Department of Geology and Geophysics. The Department has achieved diversification of teaching and research programs at the University in order to cater for the needs of an ever increasing number of qualified earth science graduates in the Kingdom.

The Department of Geology and Geophysics is housed in a three-storied building in the College of Science (Building-4) in the main campus of King Saud University. It is recognized as one of the distinguished science departments in the Arab World because of its teaching standard, wide range of course options offered in the disciplines of geosciences, intense laboratory and field training, the cultivation of the student's capability for independent thinking and research, the use of modern educational tools for teaching, well equipped laboratories and museum, and the maintenance of a reasonably good teacher-student ratio. Furthermore, the Department contains specialist laboratories for Petroleum Geology, Geophysics, Hydrogeology, GIS, and the Seismic Studies Centre for seismic monitoring at the national level and seismological research studies in Saudi Arabia.

The Department is enriched by its scientific interaction with other academic institutions and agencies in Saudi Arabia, including the Saudi Geological Survey, King Abdulaziz City for Science and Technology, ARAMCO, etc. Moreover, the Department participates actively in academic exchanges with internationally renowned research laboratories in countries like USA., Germany and UK.

The Department of Geology and Geophysics has a group of recognized faculty members with broad specialties in different geological and geophysical branches. The majority of them obtained their Ph.D. degrees from high ranked universities in USA, UK, Germany and France. The faculty members are assisted with staff assistants and non-academic technicians.

The Department follows a generous policy in encouraging sabbatical and study leave as well as other scientific visits by its faculty members. All such measures help sustain a good academic and research environment in the Department. The Department also publishes an Earth Science journal; Arabian Journal of Geosciences, published by Springer (Germany). The journal has already been well acclaimed in the scientific world and is included in the Science Citation Index.

Dr. Hussain Jaber Alfaifi
Chairman, Department of Geology and Geophysics

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CHAIRMEN OF THE DEPARTMENT SINCE 1959

Dr. Ibrahim A. Farag	1959-1961
Dr. Khouda Mohamed	1962-1964
Dr. Hamed M. Al Badry	1965-1967
Dr. Ibrahim A. Farag	1967-1973
Dr. Abdullah A. Alhumdan	1974-1976
Dr. Taleb M. S. Obeid	1976-1978
Dr. Abdalmalek A. Alkhayal	1978-1980
Dr. Fayez Sh. Anan	1980-1982
Dr. Abdalmalek A. Alkhayal	1982-1986
Dr. Ali A. Al Furaih	1986-1988
Dr. Mohamed A. Meshref	1988-1990
Dr. Ahmed A. Al Mohandes	1990-1992
Dr. Abdalmalek A. Alkhayal	1992-1997
Dr. Mohamed E. Al Dabbagh	1997-2001
Dr. Abdulaziz M. Al Bassam	2001-2003
Dr. Nasser S. Al Araify	2003-2007
Dr. Abdullah M. Al Amri	2007-2010
Dr. Saad M. Al Mogren	2010-2012
Dr. Abdullah M. Al Amri	2012-2016
Dr. Hussain Jaber Alfaifi	2016-present

ACADEMIC PROGRAMS OFFERED

The Department offers two Undergraduate Programs leading to the B.Sc. Degree in Geology and Geophysics, as well as two Postgraduate Programs leading to the M.Sc. Degree in Geology and Geophysics. Details of the course modules for these Programs are described in this handbook.

MISSION

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

VISION

To be a leader in the fields of geology, geophysics and hydrogeology, their applications, and culture to contribute to building the knowledge society

OBJECTIVES

1. To achieve excellence in imparting higher education in the fields of earth sciences, with due emphasis on the quality of students at undergraduate and graduate levels.

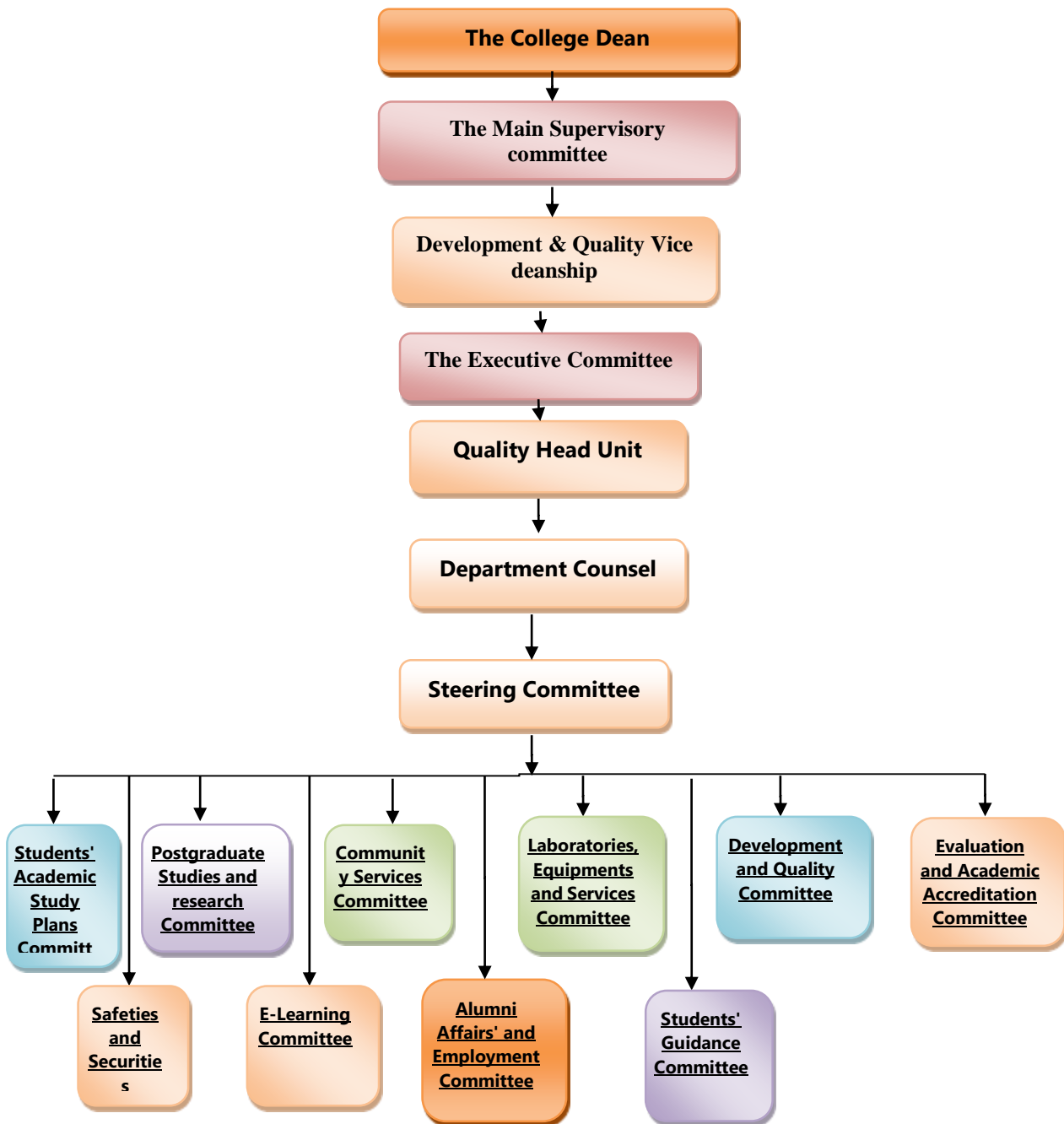
2. To develop applied scientific research through geological, geophysical and hydrogeological projects as per the national plan in the fields of oil, gas, minerals, ground water, environmental and natural hazards investigations.
3. To provide consultations in the field of natural disasters in cooperation with the university based seismic study centre.
4. To ensure an optimal use of resources with modern technology to create a place of higher learning in the fields of Earth sciences.
5. To provide a stimulating environment capable of attracting the best students, staff and faculty members.
6. To establish effective partnerships, both locally and globally, with academic institutions and industrial/research organizations in the fields of oil, gas, minerals, and ground water exploration, as well as environmental and natural hazards investigations.

SCIENTIFIC SCALES AND BENCHMARKS

The benchmark for the Department, in both the Geology and Geophysics Programs, will be the Department of Geosciences in the University of Calgary, Canada.

The Accreditation agency for degree programs in Engineering, Informatics, Natural Sciences and Mathematics e.V. (ASIIN) has accredited the Bachelor's Degree Programs in Geology and Geophysics at the College of Science, King Saud University, Riyadh. The accreditation was issued on 1st April, 2011 by decision of the ASIIN accreditation commission for both the degree programs (Geology and Geophysics) and is valid until 30th September, 2016. Upon successful completion of the program, King Saud University awards the degree of "Bachelor of Science".

QUALITY MANAGEMENT SYSTEM FLOWCHART (COMMITTEE STRUCTURE)



Quality Management System Flowchart

List of members of the Steering Committee and the working groups

	Committee	Members	Tasks
1	Steering Committee	Prof. A. Al-Amri, Prof. H. El-Araby, Prof. E. Ibrahim, Prof. N. Al-Arifi, Dr. S. Mogren, Dr. O. Kassem, Dr. B.Abuamarah, Dr. H. Ghrefat	A. To supervise the implementation of the action - plan of the Program. B. To select a consultant, through coordination with the Vice - Deanship for Development and Quality, to help in qualifying the Department for accreditation according to the standards of the accrediting body. C. To prepare the mission, the vision and the objectives of the Program. D. To complete all preparations of the Academic Accreditation in the Department according to the standards of the National Commission (NCAAA). E. To follow up and coordinate with the Vice - Deanship for Development and Quality and to submit reports to it. F. To prepare the visual display of the Department and the Directory of the Department and the Program.
2	Development & Quality Committee	Prof. E. Ibrahim, Dr. S. Mogren, Dr. O. Kassem, Dr. E. Abdelmotaal, Dr. M. Yousef	a.To develop, administer and follow up the processes of Quality Control in the Department. b. To follow up and select the benchmarks of the Department Program. c To supervise and follow up the schemes for development and future planning in the Department. d. To follow up modern trends of teaching means, methodology and techniques. e. To set training programs in each department for the development of teaching, research and technical skills. f. To prepare, distribute and collect questionnaires from Bachelor's Degree students concerning the extent of usefulness attained from the Training Program during study years, the extent of compatibility of the courses with practical life and their suggestions for the maximization of its usefulness. The Committee is to classify and prepare the results statistically.
3	Evaluation & Academic Accreditation Committee	Prof. H. El-Araby, Prof. E. Ibrahim, Dr.H. Ghrefat, Dr. O. Kassem, Dr. A. Elsorogy, Prof. M. Shehata, Dr. F. Zaidi, Mr. A. Alshamarany	a.To supervise, follow up and collect: (The Program Description - The Program Report – The Courses Description - The Courses Report). b. To supervise the follow- up of the preparation of the Self Study (SSR) of the Program of the Department. c. To supervise the preparation of a room in the Department for the purposes of Evaluation and Academic Accreditation provided with all Program documents and to be used also by visitors during their stay for the Program evaluation. d. To submit a periodic report concerning the extent of completion of the Academic Accreditation requirements. e. To supervise the preparation of students' sample examination papers and model answers for the Program courses. f. To supervise the availability of the means of teaching and learning in coordination with the relevant committees

			in the Department.
4	Student Guidance Committee	Dr. M. Al-Sabrouti, Prof. K. Abdelrahman, Prof. M. Shehata, Dr. O. Attia, Mr.S. Alhumaidan, Mr. A. Alshamarani	<p>a. To spread awareness of the importance of the Academic Accreditation of the Department Program via guidance meetings.</p> <p>b. To maximize the concept of Academic Guidance and the role of the academic guide in directing the student towards his future educational planning.</p> <p>c. To prepare, distribute and collect the necessary questionnaires for the Academic Accreditation pertaining to the Academic Guidance. The Committee is to analyze the results upon which it offers advice to the Program.</p> <p>d. To deepen trust between students and Faculty members.</p> <p>e. To receive and reply to the students' suggestions and complaints.</p> <p>f. To acquaint students with the support services and activities offered by the College and the University and to follow up the availability of study books and means of learning.</p>
5	Laboratories, Equipment & Services Committee	Prof. N. Al-Arifi, Dr. M. Galmad, Mr. S. El-Shaltoni Mr. N. Alotaibi	<p>a. To ensure the availability of all laboratory equipment and students' services specific to the Program.</p> <p>b. To ensure the availability of maintenance plans for the laboratories, equipment and students' services.</p> <p>c. To submit a periodic report to the Chairman of the Department at the end of each academic year to perform the required repairs/modifications.</p> <p>d. To supervise the availability of Security and Safety Procedures in the laboratories and lecture halls before teaching starts and to submit its report to the Chairman of the Department.</p> <p>e. To spread awareness, prepare and distribute guiding publications to the students concerning Security and Safety Procedures pertaining to different risks (chemical – electrical – radioactive) at the beginning of the academic year.</p> <p>g. To put up signs for Security and Safety Procedures along with emergency telephone numbers at a prominent place in each laboratory and lecture hall.</p>
6	The Alumni Affairs & Employment Committee	Dr. T. Zumlot, Dr. M. Elwahidi, Dr. K. El-Kahtani	<p>a. To collect and classify students' personal data in the Department and means of communicating with them (Particularly Bachelor's Degree students).</p> <p>b. To collect and classify data pertaining to employers and means of communicating with them.</p> <p>c. To set programs for strengthening the ties between the graduates and employing bodies.</p> <p>d. To prepare, distribute and collect questionnaires pertaining to the extent of satisfaction of this group with their study program. The committee is to classify and prepare the results statistically upon which it offers advice to the Program.</p> <p>e. To establish an effective mechanism to make available employment opportunities in their fields of specialization (e.g. Via the convening of employment meetings – Exploration of the employers' views on the levels of the graduates from the College - Exploration of the employers' views on the important courses for the Program and the Department.</p>

			<p>f. To activate means of communication with the graduates (e.g. A Students' Association of the Department of.....).</p> <p>g. To explore the views of the already employed graduates pertaining to their evaluation of the extent of the usefulness of the relevant program and the contents of the courses they studied previously.</p>
7	Postgraduate studies & Research Committee	Dr. A.Al-Saleh, Prof. A. Kamel, Dr. O. Attia, Dr B. Abuamarah, Dr. K. Alkahtani	<p>A. Establishing a system of listing, creating and propagation all scientific research project data, and documenting of all faculty members research participation activities. In addition, updating it's propagating via Department's Website.</p> <p>B. Establishing and updating the data base of the published papers of department's faculty members' researches activities.</p> <p>C. Pursuing the Encouraging of faculty members to carryout scientific research and publication via scientific journal of a well-known world classification one, (Collaborated with Department Steering Committee, (DSC)).</p> <p>D. Presenting and listing all research articles of the faculty members via the Department's Website and updating it from time to time.</p> <p>E. Periodically evaluating all postgraduates' studies programs.</p> <p>F. Activating and executing all the different tasks referred to (PSRC) by the College Academic Studies and Research Committee (CSRC).</p> <p>G. Preparing a scientific research list of newly articles executed by the Department's Faculty members, and then propagating them via the Department's Website, at main time pointing out its benefits and shares to the Society.</p> <p>H. Recording all names of the research supervisors of the students' scientific thesis, and mentioning its quantity numbers in order to achieve the global ratios of this matter.</p>
8	Safety and security Committee	Prof. A.Al-Bassam, Mr. S. Alhumaidan, Mr. A. Alshamarani, Mr. H. Toufaha	<p>A. Preparing the (SSC)'s policies, procedures and various forms that are organizing controlling, the in carrying out committees' tasks within the Department.</p> <p>A. Listing all equipment, instruments,... etc in Labs and estimating its requirements from safety materials, and storing it in the right and safe place within the Labs, and writing down all the necessaries' a periodical and preventive maintenance and material status reports from time to time</p> <p>B. Synchronizing in all training workshops and in all Safety related efforts and tasks with the College Main Safety Committee, (CMSC).</p> <p>C. Ensuring the availability and accessibility of the safety and security procedure as well as the emergency phone numbers' are located in all Laboratories and in all lecturing theaters at the commencement date of the study of each semester.</p> <p>D. Spreading out awareness of safeties' affairs by preparing and distributing most of publications and leaflets of safeties and securities, that illustrate all prospective risks issued by utilizing radiated, electrical and chemical materials,</p>

			<p>and listing all Safeties procedures to act with, and to prevent them at the starting date of each semester, and locating them in its proper, right place within the entities.</p> <p>E. Running all evacuation training sessions, and how to operate and deal with the safety apparatus for all faculties' members, in order to ensure its implementation at the time of hazards and risks, (Collaborated with the Department development and Quality Committee,(DQC)).</p>
9	The students' Academic Study Plans Committee	Prof. H.Al-Arabi, Prof. A. Elsorogy, Dr. O. Attia, Dr. M. Yousef, , Dr. T. Zumlot	<p>A. Evaluating and adjusting the students' Academic Study Plans Committee via internal or external bodies to ensure reaching to a unique and to a distinctive academic student study plan, (Collaborated with the Department Steering Committee, (DSC)).</p> <p>B. Updating, modifying and revising all academic taught and educated courses of the academic study plan to cover all the society demands, and needs, that will be depend on the Program's Annual Report (PAR), and on the Department Advisory Council, (DAC). (Collaborated with the Evaluation and Academic Accreditation Committee, (EAAC), and with the Alumni Affairs and Employment Committee, (AAEC)).</p> <p>C. Revising and updating the Vision, Mission and Objectives of the program, habitually. In addition, suggesting any modifications to cope Societies alterations, (Collaborated with the Department Steering Committee, (DSC)).</p> <p>D. Providing and submitting periodical reports on the different study Courses, and on the Scientific Program(s) to the Department Counsel for discussing, authenticating, approving and fixing up all the suggested modification at the end of each semester.</p> <p>E. Ensuring that all the Academic Study Plan is fulfilling all the requirement of the frame works of NCAAA Qualifications; issued by NCAAA, (collaborated with the Evaluation and Academic Accreditation Committee, (EAAC), and with the Development and Quality Committee, (DQC)).</p> <p>F. Documenting all phases of the Academic Study Plan's modifications (ASP), in addition archiving all the collected information, and data to be used in study plan's modifications, (collaborated with the Evaluation and Academic Accreditation Committee, (EAAC)).</p> <p>G. Performing, suggesting, and executing the suggested workshops for the innovative Programs in the Department.</p> <p>H. Activating and turning on all combined taught courses for academic level between AlDaraiyah and Malaz center campuses (male /female students) in order to unify exam's questions and creating written Exam's Question Bank.</p> <p>I. Providing a periodical report at the ceased period of the academic year involving all modifications, and suggested plans have been conducted on academic study plan.</p> <p>J. Preparing the (SASPC)'s policies, procedures and various forms that are organizing, controlling, updating, and improving the established Academic Study Plan or omitting it. In addition, organizing the carrying out committees' tasks.</p> <p>K. Reporting to (DSC) by whichever suggestions, or any pioneering intervening sheared programs' along with the</p>

			<p>others colleges' Scientific Programs.</p> <p>L. Preparing all (SASPC)'s meeting at the end of each Arabic month and providing each meeting report to the Steering, Committee. In addition, all these reports have to be folded (Filed), according to its serial numbers arrangements in the department's Academic Accreditation Room (ACR) filling system.</p> <p>M.</p>
10	E-learning Committee	Dr Sattam Al-Madani, Dr. F Zaidi, Mr. S. Alhumaidan	<p>A. Activating and commencing the digital and e-learning courses technique in all different levels of the Academic studied program. (Collaborated with the Department Steering Committee, (DSC)).</p> <p>B. Obligatory the Blackboard system to be the tool to convey, and to transmit courses' knowledge electronically to students.</p> <p>C. Launching all the appropriate and any other courses' fitting techniques that will lead to improve the syllabus, and to implement e-learning as far as it is deemed as an academic study manner of learning.</p> <p>D. Looking for opportunities and services offered by E-learning Deanship in order to gain advantages that are needed.</p> <p>E. Finding out, and verifying all the e-learning training needs for Faculties' members to implement e-learning techniques in their lecturing. (Collaborated with the Development and Quality Committee, (DQC)). Providing a periodical report at the ceased period of the academic year involving all modifications, and suggested course to be e-courses, and the utilizing tools in building up e-learning course (e-course).</p> <p>F. Preparing the (ELC)'s policies, procedures and various forms that are organizing controlling, in carrying out its above tasks.</p> <p>G. Preparing all (SASPC)'s meeting reports at the end of each Arabic month, and directed to the Department's Steering, Committee (DSC). In addition, all these reports have to be folded (Filed), according to its serial numbers arrangements in the department's Academic Accreditation Room (ACR) filling system.</p>
11	Community Services Committee	Prof. K. Abdelrahman, Prof. M. Shehata, Prof. A. Laboun, Prof. A. Kamel,	<p>a. To collect and classify the projects executed by the Department and its members and the results of the contributions of these projects to the community service and the Development plans.</p> <p>b. To encourage and develop the spirit of entrepreneurship in the students to maximize the return of the community service role through seminars and leaflets in coordination with the relevant committees in the Department.</p> <p>c. To deepen communication between the College and the bodies in charge of the Development plans in the Kingdom of Saudi Arabia.</p> <p>f. To set practical programs to enhance the relation between the Department and the local society and to pursue its implementation.</p>

JOB OPPURTUNITIES

1. Ministry of Petroleum and Mineral Resources, KSA.
2. Ministry of Agriculture, KSA.
3. Mineral and Oil Companies.
4. ARAMCO and other overseas companies operating for petroleum exploration in the Kingdom.
5. Engineering Companies.
6. Civil Defense, KSA.
7. Military Survey and Meteorological Agencies, KSA.
8. Private Sector companies; e.g. Cement and Ceramic Companies and Agriculture Development Companies.
9. Research agencies; e.g. KACST in Riyadh.
10. Teaching at universities, community colleges and high schools in the Kingdom.

PROGRAM COORDINATOR AND ACADEMIC GUIDANCE

Program	Program Coordinator	Contact
B.Sc. (Geology)	Dr Habes Ghrefat	Email: habes@ksu.edu.sa Phone: +966 11 4676233 Fax: +966 11 4673662 Office Location: 2B 119 Postal Address: PO Box# 2455 College of Science, Building 4 King Saud University, Riyadh-11451, Saudi Arabia
M.Sc. (Geology)	Dr Osama Kassem	Email: okassem@ksu.edu.sa Phone: +966 11 4676351 Fax: +966 11 4673662 Office Location: AB 64 Postal Address: PO Box# 2455 College of Science, Building 4 King Saud University, Riyadh-11451, Saudi Arabia
B.Sc. (Geophysics)	Prof. El-Khedr Ibrahim	Email: eibrahim @ksu.edu.sa Phone: +966 11 4676244 Fax: +966 11 4673662 Office Location: 1B 52 Postal Address: PO Box# 2455 College of Science, Building 4 King Saud University, Riyadh-11451, Saudi Arabia

M.Sc. (Geophysics)	Dr. Mahmoud Elwaheidi	Email: melwaheidi@ksu.edu.sa Phone: +966 11 4676205 Fax: +966 11 4673662 Office Location: 2B 129 Postal Address: PO Box# 2455 College of Science, Building 4 King Saud University, Riyadh-11451, Saudi Arabia
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Program	Academic Guidance	Contact
Geology	Dr. Hisham A. Gahlan	E-mail: hjhlan@ksu.edu.sa Office Phone: +966 11 4676211 Office Location : 2B 134 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax: 966 11 4673662
Geophysics	Prof. Chokri A. Jallouli	E-mail: cjallouli@ksu.edu.sa Office Phone: +966 11 4676741 Office Location : AB 41 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax: +966 11 4673662

MAIN SCIENTIFIC AWARDS

Prof. Abdullah M. Al-Amri, the Chairman of the Geology and Geophysics Department, is a prize holder of Arab Admirable Achievers Award, Abha City Prize for Scientific Contributions, Golden Distinguished Researcher Award, KACST, and Al-Maraee Prize for Scientific Innovation.

THE STUDY SYSTEM AT THE COLLEGE OF SCIENCE

Teaching at the College of Science is subject to the following scheme:

1. The academic year consists mainly of two regular semesters and a summer semester, if available.
2. The stage of academic progress is indicated by the academic level since the number of levels to graduate is at least eight levels in conformity with the approved Study Plan.
3. The duration of the level is a full semester (not less than 15 weeks) and this period does not include the periods of registration and final exams.
4. The duration of the summer semester is not less than eight weeks where the teaching time allocated for each course is doubled.

5. A number of courses (subjects) are taught during each academic level according to the program of each specialty in the different departments.
6. Students have to study 136 class units (credit hours) to obtain a Bachelor's Degree as follows:
 - A. The student studies a number of 31 credit hours during the Preparatory Year (two semesters in one academic year).
 - B. The student studies 97 credit hours (optional + compulsory) in the Program of Specialization in the various College departments throughout the six semesters following the Preparatory Year (beginning with the third semester).
 - C. University Requirements: The student selects 8 credit hours of the requirements of the University out of 22 optional credit hours during the period of study at the College.
7. The student chooses the specialty department before the end of the Preparatory Year based on the conditions set by each department.

THE NEW ACADEMIC SYSTEM (e-Register)

Registration is the cornerstone of the academic system, the center of the educational process, and the first step to start university life. The new Academic System (e-Register) offers new students the following opportunities:

1. To create an e-mail through the site of the Deanship of Electronic Transactions and Communications:
<http://www.ksu.edu.sa/sites/KSUArabic/Deanships/Computer/Pages/>
2. To have an access to the academic system by using the link: **<http://edugate.ksu.edu.sa>**; then, entering a user name and a password.
3. **Online Registration** (registration, adding, and dropping): a student can register, in person, from any location during the periods of registration and dropping plus an additional period specified in the academic calendar; thus, without having to visit the College or the Department, the student can perform the following:
 - A. **Registration:** Registration of courses and deciding the required number of credit hours.
 - B. **Adding and dropping:** The student may drop and add courses during the first week of teaching provided that the study load does not go above , or lower than, the allowed course load.
4. To view the course schedule of the College and the available/closed groups.
5. To view the study schedule and print it.
6. To view the Academic Record and print a copy (an unofficial copy).
7. To view the results of the final exams as soon as they are put online.
8. To view the Study Plan, the courses passed by the student, and the ones remaining to be studied.
9. To know about the penalties imposed upon the student.
10. To view the financial rewards.
11. To make suggestions and submit complaints.
12. To write the academic performance evaluation of faculty members.
13. To exchange electronic messages and change the password.

RULES AND MECHANISMS FOR REGISTRATION OF COURSES

- **The Course** is a module that meets the needs of the level specified in the approved Study Plan in each specialty (Program). The Course has a number; a code, a title, and a description depending on the different departments (see the Department's Manual Guide).
- **The Course** is divided into a set of theoretical lectures and practical lessons (study units) taught weekly during the academic level.
- **The Credit Hour** is a weekly theoretical lecture that is not less than fifty minutes, or a practical lesson which is not less than one hundred minutes.
- The registration of the courses for all students is done automatically through the website: **<http://edugate.ksu.edu.sa>**
- The academic levels vary in the number of the units of study, from 12 units to 20 units, for each level.
- The Courses are registered automatically at the beginning of the following semester for the student's convenience. Then, the student can modify the course schedule by adding or dropping.
- The following table shows the student's study load corresponding to the cumulative average:

GPA	2	2.5	3	3.5	4	4.5	5
Hours allowed for registration	14	15	16	17	18	19	20

- **The Processes of dropping and adding** are performed by the student electronically in the first week of the semester by accessing the e-portal of the academic system of the University's Deanship of Admission and Registration (**<http://edugate.ksu.edu.sa>**).
- No student has the right to register a course without passing its pre-requisite course.
- Students, who pass all courses without failures, are registered in the courses of the level beginning gradually with the lower levels according to the study plans approved.
- Students, who fail in some courses, are registered in courses that ensure their minimum study load in each semester taking into account the following points:
 - No conflict in the course study schedule.
 - Satisfying the previous requirements of the course or courses to be registered.

CALCULATING THE AVERAGE AND CUMULATIVE GPA

The Average and cumulative GPA are calculated every semester for the student automatically by the system. To know how to calculate the averages, you should follow the following steps:

Calculating the Semester Average:

The GPA is calculated considering the following points:

1. Knowing the number of hours of the courses.
2. Knowing the mark obtained in each course.
3. Knowing the corresponding grade of each mark.

4. Knowing the value of each grade.
5. Knowing the points = number of hours of the course × value of the grade.
6. Determining the total points obtained in all courses of the semester.
7. Determining the total number of hours registered in the semester.
8. The average is calculated every semester according to the following equation:

$$GPA = \frac{\text{Total Points (Item 6)}}{\text{No. of hours registered for the semester (Item 7)}}$$

The following table shows the percentage of marks, grade and value obtained by the student in each course, which is used to calculate the points:

Mark	Grade	Letter of Grade	Value of Grade
From 95-100	Excellent +	A+	5.00
From 90 to less than 95	Excellent	A	4.75
From 85 to less than 90	Very Good+	B+	4.50
From 80 to less than 85	Very Good	B	4.00
From 75 to less than 80	Good +	C+	3.50
From 70 to less than 75	Good	C	3.00
From 65 to less than 70	Pass +	D+	2.50
From 60 to less than 65	Pass	D	2.00
Less than 60	Failure	E	1.00
Absence from lectures (25% or more)	Debarred	H	1.00

Calculating the Cumulative Average:

1. The GPA semester average is calculated as follows:
2. The grand total of points (for all semesters that have been studied).
3. The grand total of credit hours (for all semesters that have been studied).

The cumulative average is calculated according to the following equation:

$$GPA = \frac{\text{Grand total of points}}{\text{Grand total of credit hours}}$$

Here is an example of how to calculate the grades above:

Calculating the grade of the first semester:

Course	Credit Hours	Mark	Grade	Grade Value	Points
Phys 101	4	67	D+	2.5	4 × 2.5 = 10
Chem101	4	73	C	3	4 × 3 = 12
Eng 121	3	77	C+	3.5	3 × 3.5 = 10.5
Arab 101	2	81	B	4	2 × 4 = 8
	13				40.5
GPA = Total points ÷ No. of hours registered in semester = 40.5 ÷ 13 = 3.12					

Calculating the grade of the second semester:

Course	Credit Hours	Mark	Grade	Grade Value	Points
Math 101	3	61	D	2	$3 \times 2 = 6$
Stat 101	3	73	C	3	$3 \times 3 = 9$
Computer Science 206	3	80	B	4	$3 \times 4 = 12$
Arab 103	3	88	B+	4.5	$3 \times 4.5 = 13.5$
Islam 101	2	92	A	4.75	$2 \times 4.75 = 9.5$
Eng 122	3	97	A+	5	$3 \times 5 = 15$
	17				65
GPA = Total points \div No. of hours registered in semester = $65 \div 17 = 3.82$					

Calculating the average cumulative:

$$\text{GPA} = \text{Total points} \div \text{Total hours of the semester} = 105.5 \div 30 = 3.52$$

DROPPING AND ADDING A COURSE

- The process of dropping and adding is performed through portal (<http://edugate.ksu.edu.sa>) during **the first week of the semester only**; but the number of credit hours registered has to be at least 12 hours.
- The student may drop only one course due to an excuse acceptable to the Dean of the College. This procedure should occur at least five weeks before the final exams begin. The student has the right to apply for such a procedure at a maximum of four courses during the whole period of study at the College.

ATTENDANCE, POSTPONING AND DROPPING OUT OF COLLEGE

- The student must be regular in attendance attending at least 75% of the lectures and the practical classes.
- If any student has a percentage of absence of 25% or more, in any course, he is denied access to the final exam of this course and his result is F.
- A student may apply for postponement of the study before the beginning of the semester for an excuse accepted by the College Board. The postponement should not exceed two consecutive semesters or three intermittent semesters as a maximum limit while studying at the College.
- The University Council may, in case of necessity, exempt the applicant from the previous provision.
- If a student drops out of College for one semester without requesting the postponement of his registration, the University has the right to dismiss his registration. The University Council has the right to do this for a lesser period of time.
- The student is not considered as dropping out of College if he is a visiting student at another university.

VISITING STUDENT

The Visiting Student is a student who studies some courses at another university, or at a branch of the university to which he belongs without being transferred. The courses he studied are accredited according to the following regulations:

- The student has to have a transcript (including a grade point average) for, at least, two semesters at his college before he applies as a visiting student.
- The student must obtain a prior approval from his college permitting him to study as a visiting student while specifying the courses that will be studied. The College has the right to require a specific grade to be achieved by the student to offset the course. The student should obtain an official letter from the Deanship of Admission and Registration directing him to study as a visiting student.
- The student has to join a college or a university officially recognized.
- The courses, under consideration by the student to be studied outside the University, must be equivalent in their description to the University courses, and their course units should be no less than the units of any of the courses contained in the graduation requirements.
- The maximum of the total units of study that can be calculated from outside the University is twenty percent (20%) of the total units required for graduation at King Saud University.
- The courses that are studied by the visiting student are not included in the cumulative average. These courses are recorded in his academic record.
- The student must provide the Deanship of Admission and Registration with the results he obtained during the first two weeks of study in the semester following the period of study as a visitor. If not reported within that period, the student is considered as dropping out of College during those semesters.

DISMISSAL FROM UNIVERSITY

The student is dismissed from the University in the following cases:

- If he receives three consecutive warnings due to a cumulative average below a minimum of 2.
- The student may be given a fourth opportunity by the Council of the University based upon the recommendation of the College Council to raise his cumulative GPA by studying the available courses.
- The University Council may give the dismissed students, due to warnings, an opportunity that does not exceed two semesters as a maximum.
- If the student does not fulfill his graduation requirements at the College in a period of up to half of the period prescribed for graduation in addition to the duration of the Program.
- The student is given an exceptional opportunity by the University Council to meet the graduation requirements during a maximum period not exceeding twice the original term specified for graduation.

- The University Council may allow dismissed students, due to the exhaustion of failure times, to attend twice the duration of the Program. This extension should not exceed a maximum of two semesters.

EXAMINATIONS AND GRADES

- Based on a proposal from the Department Council, the College Council specifies a mark for the student's semester work, varying from 40% to 60% of the final grade of the course.
- The mark of the course's semester work is calculated by one of the following two methods:
 - Oral, practical tests, research, or other forms of classroom activity, or from all the above or some of them, in addition to at least one written exam.
 - Two written exams at least.
- Based on the recommendation of the course teacher, it is permissible for the Council of the Department, that teaches the course, to allow the student to complete the requirements of any course in the following semester and to give the student a grade of I (incomplete) in his academic record. Only the grades achieved by the student are included in the GPA or cumulative after the completion of the requirements of that course.
- If one semester passes without changing the grade incomplete (I), the student is given an F which is calculated in the GPA and cumulative.
- The grades obtained by the student in each course are calculated according to the schedule mentioned above.

RESTRICTIONS OF THE FINAL EXAMINATION

- No student may be tested in more than two courses in one day.
- The student is not allowed to enter the final exam after half an hour of its beginning, and is not allowed to leave the exam room before half an hour after its beginning.
- Based on a recommendation from the relevant Department Council, the College Council specifies the duration of the final written exam to be within a period not less than one hour, and not more than three hours.
- Cheating in the exam, initiating it, or violating the instructions and rules of examination procedures are actions punishable in accordance with the Regulations of the Students' Discipline issued by the University Council.
- In cases of necessity, the College Council, in charge of teaching a course, has the right to approve re-marking of the answer sheets in a period of time not later than the beginning of the following semester in accordance with the following rules:
 - A student may apply for re-marking the answer sheets of only one course per semester.
 - The student, who wishes to re-mark his answer sheets, may apply for re-marking to the department, that teaches this course, not later than one month after taking the final exam.

- A student, who has already applied for re-marking and proved the invalidity of his application, should never apply for re-marking his answer sheets in any exam in the future.

TRANSFERRING

Transferring from one college to another within the University

- It is permissible, with the consent of the respective deans of the colleges, to transfer from one college to another in accordance with the conditions approved by the College Council to which the student wishes to transfer.
- The student's college academic record has to show all courses previously studied, including grades, semester and cumulative averages throughout the study at the college from which he is transferred.

Transferring from one major to another within the College

- The student may, after the approval of the Dean, transfer to another specialty within the College according to the guidelines established by the College Council.
- The student's college academic record has to show all courses previously studied, including grades, semester and cumulative averages throughout the study at the college from which he is transferred.

GRADUATION

The student graduates after completing successfully the graduation requirements in accordance with the study plan, provided that his cumulative average is no less than 2 (Pass).

UNDERGRADUATE STUDY PLAN FOR B.Sc. IN GEOLOGY

Preparatory Year (31 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Lang 140	English Language (1)	8 (8+0+0)
Lang 150	English Language (2)	8 (8+0+0)
Math 140	Introductory Mathematics	2 (1+1+0)
Math 150	Differential Calculus	3 (2+1+0)
Method 140	Learning, Thinking & Research Skills	3 (3+0+0)
Tech 140	Computer Skills	3 (0+0+3)
Science 150	Communication Skills	2 (2+0+0)
Health 150	Health and Fitness	1 (1+0+0)
ENT 101	Entrepreneurship	1 (1+0+0)

Elective course from the university requirement (20 hours, the student has to select 8 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
IC 100	Studies in the Biography of the Prophet	2 (2+0+0)
IC 101	Introduction of Islamic Culture	2 (2+0+0)
IC 102	Islam and Building up the Society	2 (2+0+0)
IC 103	Economic System in Islam	2 (2+0+0)
IC 104	Political System in Islam	3 (2+0+1)
IC 105	Human Rights	3 (2+0+1)
IC 106	Islamic Jurisprudence	2 (2+0+0)
IC 107	Ethics of Occupation	2 (2+0+0)
IC 108	Contemporary Issues	2 (2+0+0)
IC 109	Woman and Her Developmental Role	2 (2+0+0)

Compulsory Courses from other departments (13 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Chem 101	General Chemistry	4 (3+0+1)
Phys 101	General Physics	4 (3+0+1)
Stat 100	Introduction to Statistics	3 (2+1+0)
Chem 253	Fundamentals of Analytical Chemistry	2 (1+0+1)

Compulsory Courses from the Department (69 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Geo 101	Physical Geology	4 (3+0+1)
Geo 106	Historical Geology	3 (2+0+1)
Geo 221	Mineralogy	3 (2+0+1)
Geo 236	Stratigraphy & Sedimentology	3 (2+0+1)
Geo 243	Invertebrate Paleontology	3 (2+0+1)
Geo 262	Environmental Geology	2 (2+0+0)
Geo 323	Igneous & Metamorphic Petrology	3 (2+0+1)
Geo 334	Sedimentary Petrology	3 (2+0+1)
Geo 380	Plate Tectonics	2 (2+0+0)
Geo 381	Structural Geology	3 (2+0+1)
Geo 383	Remote Sensing	3 (2+0+1)
Geo 386	Geology of the Arabian Shield	2 (1+0+1)
Geo 392	Geological Reports	1 (1+0+0)
Geo 393	Field Geology	6 (0+0+6)
Geo 406	Data Analysis in Geology	2 (1+0+1)
Geo 450	Ore Geology	3 (2+0+1)
Geo 452	Petroleum Geology	3 (2+0+1)
Geo 455	Hydrogeology	3 (2+0+1)
Geo 478	Spatial Information Systems	2 (1+0+1)
Geo 482	Sedimentary Geology of Saudi Arabia	3 (2+0+1)
Geo 497	Graduation Project (1)	3 (0+0+3)
Geo 498	Graduation Project (2)	3 (0+0+3)
Gph 201	Principles of Geophysics	3 (2+0+1)
Gph 301	Geophysical Exploration	3 (2+0+1)

Elective Courses (58 hours; the student has to select 15 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Geo 242	Micropaleontology	3 (2+0+1)
Geo 301	Geomorphology	3 (2+0+1)
Geo 341	Paleobotany	3 (2+0+1)
Geo 342	Paleoecology	3 (2+0+1)
Geo 361	Principles of Geochemistry	3 (2+0+1)
Geo 421	Volcanology	3 (2+0+1)
Geo 431	Carbonate Rocks	3 (2+0+1)
Geo 432	Quaternary Geology	3 (2+0+1)
Geo 435	Oceanography	2 (2+0+0)
Geo 441	Vertebrate Paleontology	3 (2+0+1)
Geo 445	Sedimentary Basin Analysis	2 (1+0+1)

Geo 454	Mining Geology	2 (1+0+1)
Geo 456	Applications in Petroleum Geology	2 (2+0+0)
Geo 483	Regional Geology of the Middle East	2 (2+0+0)
Geo 495	History of Geology	1 (1+0+0)
Geo 496	Specialized Topics	1 (1+0+0)
Gph 341	Geophysical Well Logging	3 (2+0+1)
Astr 101	Introduction to Solar and Stellar Systems	3 (2+0+1)
Bot 102	General Botany	3 (2+0+1)
Zoo 103	Principles of General Zoology	3 (2+0+1)
Bus 101	Principles of Business Administration	3 (3+0+0)
Mis 101	Management Information Systems	3 (3+0+0)
Econ 101	Principles of Microeconomics	3 (3+0+0)

STUDY PLAN FOR B.Sc. IN GEOLOGY

1 st Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
CI 140	Learning, Thinking and Research Skills	-	-	3 (3+0+0)
CHS 150	Health and Fitness	-	-	1 (1+0+0)
ENG 140	English Language (1) (E)	-	-	8 (8+0+0)
MATH 140	Introduction to Mathematics (E)	-	-	2(1+1+0)
Total of Credit Hours				14

2 nd Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
CT 140	Computer Skills (E)	-	-	3 (0+0+3)
MC 140	Communication Skills	-	-	2 (2+0+0)
ENG 150	English Language (2) (E)	ENG 140	-	8 (8+0+0)
MATH 150	Differential Calculus (E)	MATH 140	-	3(2+1+0)
ENT 101	Entrepreneurship	-	-	1(1+0+0)
Total of Credit Hours				17

3 rd Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
GEO 101	Physical Geology (E)	-	-	4 (3+0+1)
CHEM 101	General Chemistry (1)	-	-	4 (3+0+1)
PHYS 101	General Physics (1)	-	-	4 (3+0+1)
STAT 100	Introduction to Statistics	MATH 150	-	3 (2+1+0)
Elective course from University Requirement				2 (2+0+0)
Total units				17

4 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
CHEM 253	Analytical chemistry	-	-	2 (1+0+1)
GEO 221	Mineralogy	GEO 101	-	3 (2+0+1)
GEO 106	Historical Geology (E)	-	-	3 (2+0+1)
GPH 201	Principles of Geophysics (E)	-	-	3 (2+0+1)
Elective course from University Requirement				2 (2+0+0)
Elective course				3 (2+0+1)
Total units				16

5 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
GEO 236	Stratigraphy & Sedimentology (E)	GEO 221	-	3 (2+0+1)
GEO 243	Invertebrate Paleontology (E)	GEO 106	-	3 (2+0+1)
GEO 262	Environmental Geology (E)	GEO 221	-	2 (2+0+0)
GEO 381	Structural Geology (E)	-	GEO 236	3 (2+0+1)
GEO 323	Igneous & Metamorphic Petrology (E)	GEO 221	-	3 (2+0+1)
Elective course				3
Total Units				17

6 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
GEO 334	Sedimentary Petrology (E)	-	-	3 (2+0+1)
GEO 392	Geological Reports (E)	GEO 236	-	1 (1+0+0)
GEO 383	Remote Sensing (E)	-	-	3 (2+0+1)
GEO 380	Plate tectonics (E)	-	-	2 (2+0+0)
GEO 386	Geology of the Arabian Shield (E)	GEO 323	-	2 (1+0+1)
Elective course from University Requirement				2 (2+0+0)
Elective course				3
Total Units				16

Summer semester				
Course code	Course title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
GEO 393	Field Geology	GEO 323, GEO381, GEO 392	-	6 (0+0+6)
Total Units				6

7 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
GEO 478	Spatial Information System (E)	GEO 381	-	2 (1+0+1)
GEO 450	Ore Geology (E)	GEO 323	-	3 (2+0+1)
GEO 406	Data Analysis in Geology (E)	GEO 383, STAT 100	-	2 (1+0+1)
GEO 497	Graduation Project (1)	GEO 393	-	3 (0+0+3)
Elective course from University Requirement				2 (2+0+0)
Elective course				2
Total Units				14

8 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exer. - Pract.)
GPH 301	Geophysical Exploration (E)	-	-	3 (2+0+1)
GEO 452	Petroleum Geology	GEO 236, GEO 381	-	3 (2+0+1)
GEO 455	Hydrogeology	GEO 381	-	3 (2+0+1)
GEO 482	Sedimentary Geology of Saudi Arabia	GEO 334	-	3 (2+0+1)
GEO 498	Graduation Project (2)	GEO 497	-	3 (0+0+3)
Elective course				2
Elective course				2
Total Units				19

(Lect - Exer - Pract) = (Lecture - Exercise - Practical)

(E) = Courses in English

COURSE DESCRIPTION FOR B.SC. IN GEOLOGY

Geo 101: Physical Geology (E)

4(3+0+1)

Introduction to physical geology and minerals – volcanism and intrusive igneous rocks – weathering, soil, sediments and sedimentary rocks – metamorphism and metamorphic rocks – water courses and groundwater – glaciers and glaciations – deserts and coasts – geological structures – earthquakes – plate tectonics – mountain belts and continental growth – earth resources. (One day field trip)

Geo 106: Historical Geology (E)

3(2+0+1)

Essentials of earth history – uniformitarianism – the law of superposition – unconformities – mountain building – stratigraphic units – fossils and fossilization – correlation – absolute time and radiometric ages – plate tectonics – evolution of the lithosphere and biosphere through geologic time. (One day field trip)

Geo 221: Mineralogy (E)

3(2+0+1)

Crystallization in solutions and magma – crystal symmetry – crystal forms and habits – crystallographic systems – crystal lattices – chemical and physical properties of minerals – classification and nomenclature of minerals – origin and distribution of minerals - physics of light and its interaction with crystalline matter – the polarizing microscope – thin section preparation – refraction indices – optical indicatrix – optical sign determination – mineral identification – qualitative and quantitative analysis of minerals. (One day field trip)

Geo 236: Stratigraphy and Sedimentology (E)

3(2+0+1)

Erosion, transport and sedimentation – grain morphology – porosity, permeability and diagenesis – classification of sedimentary rocks – sedimentary structures – stratigraphic units and correlation – seismic stratigraphy – sequence Stratigraphy – use and interpretation of stratigraphic maps and sections. (One day field trip)

Geo 242: Micropaleontology (E)

3 (2+0+1)

Marine ecology and zoning- classification of marine organisms- collection and preparation of samples- study of the most important microfossils including: foraminifera, radiolaria, ostracods and conodonts in terms of soft tissue, shell morphology, ecology and evolution.

Geo 243: Invertebrate Paleontology (E)

3(2+0+1)

Introduction – conditions and processes of fossilization – types of preservation – the fossil record – index fossils – biological classification – study of the most important invertebrate phyla: sponges, corals, coelenterates, mollusks, echinoderms, brachiopods, annelids, arthropods and graptolites – trace fossils. (One day field trip)

Geo 262: Environmental Geology (E) 2(2+0+0)

Geologic factors influencing the environment – air, water and soil pollution – radioactive waste disposal – geohazards including: earthquakes, volcanoes, floods, soil erosion and landslides – desertification – population expansion and depletion natural resources – pollution associated with the extractive industries. (One day field trip)

Geo 301: Geomorphology (E) 3 (2+0+1)

Natural processes that create landforms and landscapes - physics and chemistry of weathering and soil formation - dynamics of mass wasting - streams and glaciers - karst processes - topographic response to tectonic and climatic forces - terrain analysis utilizing geomorphic field data, remote sensing imagery, and numerical models - natural hazards. (One day field trip).

Geo 323: Igneous and Metamorphic Petrology (E) 3(2+0+1)

Origin and composition of magma – magmatic differentiation – volcanism and its products – emplacement mechanisms of plutonic rocks – geochemistry of igneous rocks and its relationship with their tectonic settings – types of metamorphism- field relations – metamorphic textures – metamorphic zones – metamorphic reactions and P-T-t paths. (Three days field trip)

Geo 334: Sedimentary Petrology (E) 3(2+0+1)

Grain morphologies and statistical distribution of grain size – classification of sedimentary rocks - mineral composition of detrital rocks and its relationship to the tectonic setting – diagenesis – carbonate rocks and evaporites – phosphorites – ironstones – siliceous rocks – coal and coalification processes. (Two days field trip)

Geo 341: Paleobotany (E) 3 (2+0+1)

Fossil record of the plant kingdom – ancient environments and plant diversity through the Geologic record – origin of life in the Archean – cyanobacteria – emergence and diversity of fungi – appearance of ferns and mosses – vascular plants – dominance of angiosperms in the Mesozoic and Cenozoic.

Geo 342: Paleoecology (E) 3 (2+0+1)

The nature and classification of environments – comparison with living representatives – evidence of biological activity and associated sediments – lateral and vertical variations – geographical distribution of assemblages – trace fossils – biodiversity – environmental changes through Geologic time. (One day field trip).

Geo 361: Principles of Geochemistry (E) 3 (2+0+1)

Meteorites and origin of the solar system - distribution of elements – isotope Geology and radiometric age determination – basic thermodynamics – reaction kinetics - crystal chemistry – water chemistry – organic geochemistry – oxidation and reduction – chemical evolution of magma – metamorphic reactions - hydrothermal processes and ore genesis.

Geo 380: Plate Tectonics (E) 2(2+0+0)

Geophysical and geological observations related to plate tectonic theory - marine magnetic and paleomagnetic measurements - seismicity and volcanism of plate boundaries - reference frames and absolute plate motions - Interpretations of geologic phenomena in the context of plate tectonics – ocean trenches and island arcs - plate tectonic evolution of the ocean basins and continents.

Geo 381: Structural Geology (E) 3(2+0+1)

Stress, strain and rock deformation - kinematic analysis – interpretation of geologic maps – stereographic projections - joints – strike-slip faults – dip-slip faults – geometry of folds – foliation and lineation – balanced cross-sections - rheology – microscopic structures – orogenic belts and plate tectonics. (Three days field trip)

Geo 383: Remote Sensing (E) 3(2+0+1)

Basics of remote sensing – electromagnetic spectrum –types of sensors and platforms – acquiring and processing primary data – spatial corrections – types of filters - image enhancement - interpretation – classification methods – principal component analysis – thermal and radar imaging - geologic applications.

Geo 386: Geology of the Arabian Shield (E) 2(1+0+1)

Origin of the Arabian Shield – stratigraphic schemes – igneous and tectonic activity – island arc and microcontinents - allochthonous terranes – ophiolites and sutures – correlation with the Nubian Shield – the Pan-African episode – Archean terranes in the Arabian Shield – ore deposits in the Arabian Shield. (Three days field trip)

Geo 392: Geologic Reports (E) 1(1+0+0)

Using terms and expressions in their proper geologic context – organizing data - stratigraphic and geographic names - maps and drawings – references and appendices – training on selected local examples.

Geo 393: Field Geology (E) 6(0+0+6)

A 45 day summer field camp devoted to training on mapping and exploration techniques including: field relation of igneous and metamorphic rocks – making stratigraphic sections and

traverses – measurement of structures – using global positioning systems – making topographic and geologic maps – report writing.

Geo 406: Data Analysis in Geology (E)

2(1+0+1)

Sampling methods – data distributions - precision and accuracy - confidence intervals - least squares methods - correlation - time series analysis - multivariate techniques - cluster analysis – principal component analysis – kriging - using statistical software packages - geologic modeling.

Geo 421: Volcanology (E)

3 (2+0+1)

Internal structure of the Earth and magma genesis – distribution of active volcanoes and their relationship to plate tectonics – internal structure of volcanoes – volcanic ejecta – types of eruptions - classification of volcanoes – mid-ocean ridge volcanism – island arcs – intra-plate volcanism – hot spots – volcanic activity in Saudi Arabia. (Three days field trip).

Geo 431: Carbonate Rocks (E)

3 (2+0+1)

Types of carbonate rocks - carbonate minerals - classifications of limestones - limestone diagenesis – depositional environments and facies – lacustrine deposits – coral reefs – pelagic sediments - dissolution and transformation – cementation – silicification - dolomitization – evaporites and sabkhas – Geologic record of carbonate rocks. (One day field trip).

Geo 432: Quaternary Geology (E)

3 (2+0+1)

Characteristics, distribution, and origin of recent deposits - stratigraphy and chronology - paleosols - formation of landforms – glacial and inter-glacial periods – glacial deposits and landforms - changes in sea level – biodiversity and extinction – appearance of man. (One day field trip).

Geo 435: Oceanography (E)

2 (2+0+0)

Physical processes in the oceans – waves, currents and tides – formation of ocean basins – turbidity currents and deep sediment transport – earthquakes and tsunamis – marine chemistry – coastal processes – life in the oceans – ocean mineral resources - changes in the oceanic ecosystem.

Geo 441: Vertebrate Paleontology (E) 3

(2+0+1)

Origin and classification of chordates – extraction and study of vertebrate fossils – the main vertebrate classes and the appearance in the Geologic record – fish and amphibians – age of the dinosaurs – birds – appearance of mammals – primates and hominoids – mass extinction.

Geo 445: Sedimentary Basin Analysis (E) 2 (1+0+1)

Stratigraphic and facies analysis – sub-surface methods – stratigraphic correlations – biostratigraphy and biozones – sequence stratigraphy - basin maps – paleocurrent analysis - subsidence and burial history – basin models – basin classification – processes generating oil, gas and coal. (Two days field trip).

Geo 450: Ore Geology (E) 3(2+0+1)

Basic definitions – morphology of ore bodies – ore textures – theories of ore genesis – classification of ore deposits – orthomagmatic deposits – diamonds and kimberlites – the carbonatite environment – volcanogenic massive sulphides - greisen and skarn – hydrothermal deposits – strata-bound deposits – sedimentary Fe and Mn deposits – metamorphic ores - supergene enrichment – industrial minerals. (Three days field trip)

Geo 452: Petroleum Geology (E) 3(2+0+1)

Physical properties of oil, gas and connate water – porosity and permeability and the effect of diagenesis – origin, migration and accumulation of oil – oil traps and seals – drilling methods - oil exploration – formation evaluation – chemistry and grades of crude oil – reserve estimation - oil in Saudi Arabia. (Two days field trip)

Geo 454: Mining Geology (E) 2 (1+0+1)

Reconnaissance exploration – remote sensing – Geochemical exploration – Geophysical exploration – drilling methods - evaluation techniques – feasibility studies mine mapping – surface and underground mining methods – mineral processing and metallurgy – mining in Saudi Arabia. (Three days field trip).

Geo 455: Hydrogeology (E) 3(2+0+1)

Geologic factors controlling the flow of groundwater – porosity and permeability – groundwater flow - types of aquifers – Darcy's law – groundwater wells – chemistry of groundwater – groundwater exploration – seawater encroachment – groundwater pollution - groundwater resources in Saudi Arabia. (Three days field trip)

Geo 456: Application in Petroleum Geology (E) 2 (2+0+0)

Geologic and seismic exploration – methods and problems of production – tectonic settings of oil-producing basins – depositional environments and oil and gas quality – detailed study of hydrocarbon field in and outside the Kingdom. (Two days field trip).

Geo 478: Spatial Information Systems (E) 2(1+0+1)

The concept of GIS – maps and spatial analysis – data entry, storage and retrieval – computer-based processing of geologic data – vector and raster data models and analysis – linking digital

maps and attribute information - spatial interpolation - practical application through a real-life GIS project.

Geo 482: Sedimentary Geology of Saudi Arabia (E) 3(2+0+1)

Sedimentary basins of Saudi Arabia – Phanerozoic stratigraphic units – sedimentary cycles – intra-basin stratigraphic correlations – biostratigraphy – major structural trends – economic geology of the cover rocks. (Three days field trip)

Geo 483: Regional Geology of the Middle East (E) 2 (2+0+0)

Precambrian relationships in the Arabian-Nubian Shield – the Arabian Shelf and its northerly extension – tectonic movements related to the opening of the Red Sea – Arabian Plate movement and the creation of Zagros and Taurus belts – oil and mineral resources of the Middle East.

Geo 495: History of Geology (E) 1 (1+0+0)

Beginnings of earth sciences and the contribution of Arab and Muslim scholars – evolution of modern concepts in Geology – emergence of the main disciplines of earth sciences - catastrophism and uniformitarianism – plutonists and neptunists – Geologic controversies on the ice age, granitization and age of the Earth – continental drift and the theory of plate tectonics.

Geo 496: Specialized Topics (E) 1 (1+0+0)

Advanced study of detailed aspects of certain Geological problems chosen by the student, which is summarized in a brief report.

Geo 497: Graduation Project – 1 (E) 3(0+0+3)

Training on geologic research methods through an integrated field and laboratory study of an area or topic chosen by the student and his supervisor. (Three day field trip)

Geo 498: Graduation Project - 2 (E) 3(0+0+3)

Completing the laboratory work (Lab work) and a written report must be submitted and oral presentation made for evaluation by a committee appointed by the department.

UNDERGRADUATE STUDY PLAN FOR B.Sc. IN GEOPHYSICS

Preparatory Year (31 Credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Lang 140	English Language (1)	8 (8+0+0)
Lang 150	English Language (2)	8 (8+0+0)
Math 140	Introductory Mathematics	2 (1+1+0)
Math 150	Differential Calculus	3 (2+1+0)
Method 140	Learning, Thinking & Research Skills	3 (3+0+0)
Tech 140	Computer Skills	3 (0+0+3)
Science 150	Communication Skills	2 (2+0+0)
Health 150	Health and Fitness	1 (1+0+0)
ENT 101	Entrepreneurship	1 (1+0+0)

Elective course from the university requirement (20 hours, the student has to select 8 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
IC 100	Studies in the Biography of the Prophet	2 (2+0+0)
IC 101	Introduction of Islamic Culture	2 (2+0+0)
IC 102	Islam and Building up the Society	2 (2+0+0)
IC 103	Economic System in Islam	2 (2+0+0)
IC 104	Political System in Islam	3 (2+0+1)
IC 105	Human Rights	3 (2+0+1)
IC 106	Islamic Jurisprudence	2 (2+0+0)
IC 107	Ethics of Occupation	2 (2+0+0)
IC 108	Contemporary Issues	2 (2+0+0)
IC 109	Woman and Her Developmental Role	2 (2+0+0)

Compulsory Courses from other departments (28 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Chem 101	General Chemistry	4(3+0+1)
Phys 101	General Physics (1)	4(3+0+1)
Phys 102	General Physics (2)	4(3+0+1)
Phys 201	Mathematical Physics	3(2+1+0)
Phys 221	Electromagnetism	3(3+0+0)
Math 111	Integral Calculus	4(3+1+0)

Math 200	Differential and Integral Calculus	3(3+0+0)
Math 204	Differential Equations	3(3+0+0)

Compulsory Courses from the Department (61 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Gph 201	Principles of Geophysics	3(2+0+1)
Gph 211	Gravity & Magnetic Exploration	3(2+0+1)
Gph 221	Seismic Exploration	3(2+0+1)
Gph 231	Geoelectric & Electromagnetic Exploration	3(2+0+1)
Gph 313	Seismology	3(2+0+1)
Gph 341	Geophysical Well Logging	3(2+0+1)
Gph 381	Geophysical Reports	1(1+0+0)
Gph 390	Radiometric and Geothermal methods	2(2+0+0)
Gph 393	Field Geophysics	6(0+0+6)
Gph 401	Physics of the Earth	2(2+0+0)
Gph 411	Geophysical Data Processing	3(2+0+1)
Gph 412	Engineering Seismology	2(2+0+0)
Gph 496	Research Project	3(0+0+3)
Gph 497	Research Project	3(0+0+3)
Geo 101	Physical Geology	4(3+0+1)
Geo 221	Mineralogy	3(2+0+1)
Geo 236	Principles of Stratigraphy & Sedimentation	3(2+0+1)
Geo 320	Petrology	3(2+0+1)
Geo 381	Structural Geology	3(2+0+1)
Geo 452	Petroleum Geology	3(2+0+1)
Geo 478	Geographical information systems	2(1+0+1)

Elective Courses (40 hours; the student elects 8 credit hours)

Course	Name	Credit (Lecture + Exercise + Practical)
Gph 317	Time series analysis	2(2+0+0)
Gph 319	Petrophysics	2(2+0+0)
Gph 416	Seismotectonics of the Middle East	2(2+0+0)
Gph 424	Environmental Geophysics	2(2+0+0)
Geo 323	Igneous and Metamorphic Petrology	3(2+0+1)

Geo 334	Sedimentary Petrology	3(2+0+1)
Geo 383	Remote Sensing	3(2+0+1)
Geo 386	Geology of Arabian Shield	2(1+0+1)
Geo 455	Hydrology	3(2+0+1)
Geo 482	Sedimentary Geology of the Kingdom	3(2+0+1)
Phys 231	Vibrations and Waves	3 (2+0+1)
Math 244	Linear Algebra	3(3+0+0)
Stat 100	Introduction of Statistics	3(2+1+0)
Bus 101	Principles of Business Administration	3(3+0+0)
Econ 101	Principles of Microeconomics	3(3+0+0)

STUDY PLAN FOR B.Sc. IN GEOPHYSICS

1 st Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exre. - Pract.)
CI 140	Learning, Thinking and Research Skills	-	-	3 (3+0+0)
CHS 150	Health and Fitness	-	-	1 (1+0+0)
ENG 140	English Language (1) (E)	-	-	8 (8+0+0)
MATH 140	Introduction to Mathematics (E)	-	-	2(1+1+0)
Total of Credit Hours				14

2 nd Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. - Exre. - Pract.)
CT 140	Computer Skills (E)	-	-	3 (0+0+3)
MC 140	Communication Skills	-	-	2 (2+0+0)
ENG 150	English Language (2) (E)	ENG 140	-	8 (8+0+0)
MATH 150	Differential Calculus (E)	MATH 140	-	3(2+1+0)
ENT 101	Entrepreneurship	-	-	1(1+0+0)
Total of Credit Hours				17

3 rd Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. Exre. -Pract.)
GEO 101	Physical Geology	-	-	4 (3+0+1)
PHYS 101	General Physics	-	-	4 (3+0+1)
CHEM 101	General Chemistry (1)	-	-	4 (3+0+1)
MATH 111	Integral Calculus	MATH 150	-	4 (3+1+0)
Elective course from University Requirement				2 (2+0+0)
Total units				18

4 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. Exre. - Pract.)
GPH 201	Principles of Geophysics	PHYS 101, MATH 150	-	3 (2+0+1)
GEO 221	Mineralogy	GEO 101	-	3 (2+0+1)
PHYS102	General Physics (2)	-	-	4 (3+0+1)
MATH 200	Differential Calculus and Integration	MATH 111	-	3 (3+0+0)
Elective course from University Requirement				2 (2+0+0)
Total units				15

5 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. Exre. -Pract.)
GPH 211	Gravity & Magnetic Exploration	GPH 201	-	3 (2+0+1)
GPH 221	Seismic Exploration	GPH 201	-	3 (2+0+1)
GEO 236	Principles of Stratigraphy & Sedimentation	GEO 221	-	3 (2+0+1)
GEO 320	Petrology	GEO 221	GEO 236	3 (2+0+1)
PHY 201	Mathematical Physics (1)	PHY 101	-	3 (2+1+0)
Elective course from University Requirement				2 (2+0+0)
Total Units				17

6 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. Exre. - Pract.)
GPH 231	Geoelectric & Electromagnetic Exploration	GPH 201	-	3 (2+0+1)
GPH 381	Geophysical Reports	-	GEO 381	1 (1+0+0)
GEO 381	Structural Geology	GEO 236	-	3 (2+0+1)
PHYS 221	Electromagnetism (1)	PHYS 101	-	3 (3+0+0)
MATH 204	Differential Equations	GEO 323	-	3 (3+0+0)
Elective course				3
Total Units				16

Summer semester				
Course code	Course title	Pre-Req.	Co-Req.	Credits (Lect. Exre. - Pract.)
GPH 393	Field Geophysics	GPH 211, GEO320, GEO 236, GEO381	-	6 (0+0+6)
Total Units				6

7 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. Exre. -Pract.)
GPH 313	Seismology	GPH 201	-	3 (2+0+1)
GPH 341	Geophysical Well Loggings	GPH 201	-	3 (2+0+1)
GPH 411	Geophysical Data Processing	GPH 211, GPH 221	-	3 (2+0+1)
GPH 496	Graduation Project (1)	GPH 393, GPH 381	-	3 (0+0+3)
Elective course				3
Total Units				15

8 th Semester				
Course Code	Course Title	Pre-Req.	Co-Req.	Credits (Lect. Exre. - Pract.)
GPH 390	Radiometric and Geothermal methods	GPH 201	-	2 (2+0+0)
GPH 401	Physics of the Earth	-	-	2 (2+0+0)
GPH 412	Engineering Seismology	GPH 313	-	2 (2+0+0)
GEO 478	Geographical information systems	GEO 381	-	2 (1+0+1)
GEO 452	Petroleum Geology	GEO381, GEO236	-	3 (2+0+1)
GPH 497	Graduation Project (2)	GPH 496	-	3 (0+0+3)
Elective course from University Requirement				2 (2+0+0)
Elective course				2
Total Units				18

(Lect - Exer - Pract) = (Lecture - Exercise - Practical)

(E) = Courses in English

COURSE DESCRIPTION FOR B.SC. IN GEOPHYSICS

GPH 201: Principles of Geophysics

3(2+0+1)

Physical and mathematical laws and its relation to the Earth properties, Elasticity theory and properties of wave propagation in seismic reflections, refractions, wave equations, seismic wave characteristics, Potential field theories, Principles of different exploration techniques, Interpretation of earth's structures from geophysical data.

GPH 211: Gravity and Magnetic Exploration

3(2+0+1)

Introduction. Importance of gravity and magnetic exploration methods and its use. Instruments for gravity and magnetic measurements. Gravity and magnetic surveying. Data reduction, and processing. Application of the gravity and magnetic methods to oil, mineral and groundwater exploration. Interpretation of Aeromagnetic maps. Qualitative and quantitative interpretation of gravity and magnetic data. (Field applications – Two days)

GPH 221: Seismic Exploration

3(2+0+1)

Introduction. Importance of seismic exploration. Seismic waves and factors affecting its propagation. Seismic velocities. Reflection and refraction. Time-distance relations for reflected and refracted seismic waves in layered media. Instrumentation and field procedures. Seismic sources. Corrections of seismic data, Seismic noise. Multiple seismic reflections. Measurements of seismic velocities. Data reduction and qualitative and quantitative interpretation. Seismic migration. Seismic Stratigraphy. (Field applications – Two days)

GPH 231: Geoelectric and Electromagnetic Exploration

3(2+0+1)

Introduction. Importance of the electrical and electromagnetic methods and their applications. Electrical conductivity of rocks. Basic theory of direct current conduction and EM induction. Time domain and frequency domain systems. Transient EM. Induced and spontaneous polarization. Down-hole electric and EM techniques. Instrumentation. Field procedures. Qualitative and quantitative interpretation. (Field applications – Two days)

GPH 313: Earthquake Seismology

3(2+0+1)

Earthquakes: Causes, Types. Historical background. Earthquake measurement instruments. Seismic wave propagation in spherically Earth and travel time graphs. Earthquakes source parameters, magnitudes, intensity scales. Processing of Earthquakes data. Earthquakes mechanisms. International observatory networks. Internal structure of the Earth. Solutions of Earthquake focal mechanism. Heterogeneity and inelasticity.

GPH 317: Time Series Analysis

2(2+0+0)

Different types of Fourier series analysis. Digital filtering. Matrix processing techniques. Waves polarity analysis. Application of inverse linear and non-linear theories in solving geophysical

problems.

GPH 319: Petrophysics

2(2+0+0)

A review of rocks (sedimentary, igneous and metamorphic), Physical properties of rocks and fluids that affect the distribution and movement of fluids such as oil, gas, water, or contaminants in porous media including porosity, permeability, capillary pressure, surface and interfacial tension, Wettability, and viscosity. Darcy's law for anisotropic porous media.

GPH 341: Geophysical Well Logging

3(2+0+1)

A review of rocks (sedimentary, igneous and metamorphic), Physical properties of rocks and fluids that affect the distribution and movement of fluids such as oil, gas, water, or contaminants in porous media including porosity, permeability, capillary pressure, surface and interfacial tension, Wettability, and viscosity. Darcy's law for anisotropic porous media. (Field applications – Two days)

GPH 381: Geophysical Reports

1(1+0+0)

Writing scientific papers, theses and reports. Methods of criticism. Geophysical terminologies. Geophysical data presentation. Structure of a geophysical report. How to write an ideal technical report and scientific paper. Manifestation of results.

GPH 390: Radiometric and Geothermal methods

2(2+0+0)

Rocks radiation. Theory of radioactivity and half life. Instruments for measuring natural radiation. Radiometric survey on land and from air. Interpretation of radiation readings. Temperature of the Earth and its relation to the radioactive materials. Theory of Heat flow. Temperature gradient with depth and its change with time and location. Geothermal measurements. The use of radiometric and geothermal methods in modern applications.

GPH 393: Field geophysics

6(0+0+6)

Field study in a summer field camp for forty five days. Introduction to different geologic and geophysical techniques for topographic and geologic mapping. Developing subsurface geologic maps for selected areas under study. Basic geologic relationships with emphasis on geologic structures and stratigraphic correlation for different types of rocks. Geophysical field measurements, data collection, reduction, analysis and interpretation, weekly reports and a final project team report.

GPH 401: Physics of the Earth

2(2+0+0)

Structure of the Earth as deduced from geophysical methods: the crust, mantle and core, their physical and chemical properties. Terrestrial heat flow, convection currents and phase transitions. Geomagnetism and paleomagnetism. Relation between seismology, global gravity, densities, earth's magnetism and the structure of the Earth. Plate tectonics. Hydrostatic sphere.

Free oscillations of the Earth. Principle of the isostasy.

GPH 411: Geophysical Data Processing

3(2+0+1)

Theory of frequency filtering. Separation techniques for regional and residual fields in space and frequency domain. Methods to calculate the second vertical derivatives for potential fields. Downward and upward Modeling magnetic data. Ambiguities in interpretation of potential fields data interpretation. Linear analysis theory for digital data. Fast forward and inverse Fourier analysis and its application in data processing. Seismic data enhancement. Advanced seismic data interpretation. Seismic stratigraphy and direct detection of hydrocarbons

GPH 412: Engineering Seismology

2(2+0+0)

Probabilistic and deterministic theory. Different kinds of earthquake sources and its relation to faulting mechanism. Seismic risk and hazard, Seismic zoning. Attenuation relations, soil liquefaction. Earthquake response of structures, design of earthquake - resistant structures.

GPH 416: Seismotectonics of the Middle East

2(2+0+0)

A comprehensive study of the tectonics of the Middle East. Arabian plate boundaries, Correlation between earthquake occurrences and tectonically active regions. Red Sea spreading , Dead Sea transform fault system . Atlas Mountains, Afar triangle, and Arabian Gulf. Crustal Structures.

GPH 424: Environmental Geophysics

2(2+0+0)

The use of all geophysical methods (seismic, gravity, magnetic, ground penetrating radar, electric, and radiometric) in solving environmental problems. Pollution determination and monitoring. Site selection for waste disposal. Geophysical impact assessment of engineering structures to ensure its safety and suitability for environment protection.

GPH 496: Graduation Project (1)

3(0+0+3)

Senior student's engagement in individual/independent research project with faculty supervision. Investigation of any selected problems in applied or theoretical geophysics. Determine the subject of research and development of systematic planning to conduct research - a review and study of previous studies - studies and field data collection and measurement.

GPH 497: Graduation Project (2)

3(0+0+3)

Analysis and discussion of data - data processing - interpretation of results - a written report must be submitted and oral presentation made for evaluation by a committee appointed by the department.

GRADUATE PROGRAMS LEADING TO M.Sc. GEOLOGY AND M.Sc. GEOPHYSICS

Graduate courses for Master's Degree studies have various domains, e.g. studies on minerals and fossils, structural, geophysical and hydrogeological studies. These studies enrich the way of thinking of the students towards working in a variety of geosciences professions such as exploration and production in companies dealing with petroleum, mineral, mining, ground water, geological mapping, site selection and engineering projects; besides the teaching profession.

PROGRAM OBJECTIVES

1. To offer M. Sc. courses in Geology as well as in Geophysics.
2. To prepare the graduate student for Ph.D. programs in various fields of Geology and Geophysics.
3. To develop the graduate's academic capability to carry out independent scientific research and to present the research results in both applied and academic fields.
4. To ensure the availability of highly trained indigenous scientific manpower in the fields of geosciences.
5. To cultivate interest on geo-scientific problems faced by the Kingdom of Saudi Arabia and its neighbors.
6. To train the student on the uses of advanced technology.

ADMISSION REQUIREMENTS

1. The admission requirements stipulated in the Unified Graduate Studies Statutes for Saudi universities.
2. Candidates should hold a Bachelor's Degree (B.Sc.) in Geology or a related field from universities in Saudi Arabia or their equivalent.
3. Candidates must qualify to specific other departmental requirements such as appearing in an interview arranged by the Department's Admission Committee.

DEGREE REQUIREMENTS

1. A successful completion of 24 credit hours of graduate courses which the student can select from the offered courses with the help of the Student's Guidance Committee.
2. Completing a successful thesis.

GRADUATE STUDY PLAN FOR M.SC IN GEOLOGY

The graduate studies leading to a M.Sc in Geology offers specialization in five subjects. The study plan for each specialization is as follows

M.Sc in Geology with specialization in Sedimentology and Stratigraphy

Level	Course	Name	Credit (Lecture + Exercise + Practical)
First	GEO 501	Advanced Geology of Saudi Arabia	3(2+0+1)
	GEO 532	Advance Stratigraphy	3(2+0+1)
	GEO 533	Advanced Sedimentary Petrology	3(2+0+1)
Second	GEO 534	Carbonate Rocks and Evaporites	3(2+0+1)
	GEO 536	Recent Sediments	2(2+0+0)
	GEO 550	Advanced Palaeoecology	2(2+0+0)
	GEO 598	Seminar Geology	1(1+0+0)
Third	GEO 573	Interpretation of Well Logging	3(2+0+1)
	GEO 586	Geodynamics	3(2+0+1)
	GEO 599	Special Topics	1(1+0+0)
Fourth	GEO 600	Research Project	6(0+0+6)
Total Credit Hours			۳۰

M.Sc in Geology with specialization in Petroleum Geology

Level	Course	Name	Credit (Lecture + Exercise + Practical)
First	GEO 501	Advanced Geology of Saudi Arabia	3(2+0+1)
	GEO 532	Advance Stratigraphy	3(2+0+1)
	GEO 533	Advanced Sedimentary Petrology	3(2+0+1)
Second	GEO 534	Carbonate Rocks and Evaporites	3(2+0+1)
	GEO 556	Advanced Petroleum Geology	3(2+0+1)
	GEO 572	Applied Geophysics	3(2+0+1)
Third	GEO 573	Interpretation of Well Logging	3(2+0+1)
	GEO 586	Geodynamics	3(2+0+1)
Fourth	GEO 600	Research Project	۶(0+0+6)
Total Credit Hours			۳۰

M.Sc in Geology with specialization in Hydrogeology

Level	Course	Name	Credit (Lecture + Exercise + Practical)
First	GEO 501	Advanced Geology of Saudi Arabia	3(2+0+1)
	GEO 532	Advance Metamorphic Petrology	3(2+0+1)
	GEO 533	Advanced Sedimentary Petrology	3(2+0+1)
Second	GEO 512	Carbonate Rocks and Evaporites	(1+0+2) ³
	GEO 555	Advanced Hydrogeology	(0+0+2) ²
	GEO 572	Applied Geophysics	(0+0+1) ¹
Third	GEO 573	Interpretation of Well Logging	(1+0+2) ³
	GEO 586	Geodynamics	(1+0+2) ³
Fourth	GEO 600	Research Project	(0+0+6) ⁶
Total Credit Hours			30

M.Sc in Geology with specialization in Economic Geology

Level	Course	Name	Credit (Lecture + Exercise + Practical)
First	GEO 501	Advanced Geology of Saudi Arabia	3(2+0+1)
	GEO 522	Advance Igneous Petrology	3(2+0+1)
	GEO 523	Advance Metamorphic Petrology	3(2+0+1)
Second	GEO 554	Mining Geology	3(2+0+1)
	GEO 561	Advanced Geochemistry	3(2+0+1)
	GEO 564	Geochronology	2(2+0+0)
Third	GEO 566	Mineral Geochemistry	2(1+0+1)
	GEO 586	Geodynamics	3(2+0+1)
	GEO 598	Seminar Geology	1(1+0+0)
	GEO 599	Special Topics	1(1+0+0)
Fourth	GEO 600	Research Project	6(0+0+6)
Total Credit Hours			30

M.Sc in Geology with specialization in Palaeontology Geology

Level	Course	Name	Credit (Lecture + Exercise + Practical)
First	GEO 501	Advanced Geology of Saudi Arabia	3(2+0+1)
	GEO 532	Advance Metamorphic Petrology	3(2+0+1)
	GEO 542	Invertebrate Palaeontology (I)	3(2+0+1)
Second	GEO 534	Carbonate Rocks and Evaporites	3(2+0+1)
	GEO 543	Invertebrate Palaeontology (II)	3(2+0+1)
	GEO 547	Advanced Microfossils	3(2+0+1)
	GEO 544	Vertebrate Palaeontology	3(2+0+1)
Third	GEO 550	Advanced Palaeoecology	2(2+0+0)
	GEO 551	Advanced Biostratigraphy	1(0+0+1)
Fourth	GEO 600	Research Project	6(0+0+6)
Total Credit Hours			۳۰

COURSE DESCRIPTION FOR M.Sc. IN GEOLOGY

GEO 501: Advanced Geology of Saudi Arabia

3(2+1)

Study of Precambrian with emphasis on the development structure and correlation of the Arabian Shield. Correlation, Paleogeography of the Paleozoic, Mesozoic and Cenozoic sedimentary formations. Field applications.

GEO 522: Advance Igneous Petrology

3(2+0+1)

Evolution and development of igneous rocks, illustrating the magma behavior by different diagrams as AFM. Igneous rocks classification and their field relations. Tectonic movements. Volcanism and Volcanoes. Thermodynamics of rocks. Special reference on problems about the origins of selected rock types from the Arabian Shield. Field work.

GEO 523: Advance Metamorphic Petrology

3(2+0+1)

Origin and classification of metamorphic rocks textures, structures and reactions and their relationship. Physical and chemical principles of the metamorphic minerals, rocks and paragenesis. Metamorphism, metamorphic belts, problems associated with the reactions, progress of metamorphism, and relation to tectonism and tectonic theory. Cataclastic metamorphism and its significance. Facies and subfacies of metamorphic rocks illustrating metamorphism and origin by diagrams e.g., FMA, AKF, ACF. Field work.

GEO 532: Advance Stratigraphy

3(2+0+1)

Latest developments, chronologic and chronostratigraphic records, principles and applications of correlation. Stratigraphic maps, biostratigraphy, lithofacies changes. Correlation in important sedimentary basins. Field applications.

- GEO 533: Advanced Sedimentary Petrology** **3(2+0+1)**
- Bedding and depositions, Sedimentary structures, of eolian, alluvial deposits, shallow and deep marine deposits, and the interaction with wave, tides, and oceanic currents. Field applications.
- GEO 534: Carbonate Rocks and Evaporites** **3(2+0+1)**
- Carbonate sedimentation, marine evaporities, Carbonate facies, facies diagenesis, facis models, Coase histories.
- GEO 536: Recent Sediments** **2(2+0+0)**
- Weathering, Denudation and rates of disposition. lithification and diagenesis of alluvial. Eolian, glacial and marine sediments.
- GEO 542: Invertebrate Palaeontology (I)** **3(2+0+1)**
- Systematic Palaeontology, Morphology, Origin, Classification, The concept of species, Phylogeny, Organic evolution. Stratigraphy and the use of Paleontologic data, Field excursions.
- GEO 543: Invertebrate Palaeontology (II)** **3(2+0+1)**
- Systematic description of Cinidaria, Bryozoa, Brachiopoda, Annelida, and Arthropoda. Palaeoecology, Paeobiogeography. Origin and Evolution. Field applications.
- GEO 544: Invertebrate Palaeontology (III)** **3(2+0+1)**
- Systematic decription of the chiton, Gastropoda, Bivalvia, Cephalopoda, Echinodermata and Graptolithina. Palaeoecology, Palaeobiology, Origin and evolution, Field applications.
- GEO 547: Advanced Microfossils** **3(2+0+1)**
- Advanced study of Microfossils with special emphasis on the most important stratigraphic groups and their Taxonomy.
- GEO 550 : Advanced Palaeoecology** **2 (1+0+1)**
- General view on Paleoecology - Principals of ecological concepts – Diversity – Marine ecosystem – Ecological evidences from preservation - Ecological evidences from evolution – Structural evidences – Distribution if living organisms – Reef communities – Deep communities – Continental communities – Microfacies – Fossil communities – Evolution and fossil record – Extinction – Rate of evolution and extinction – Mass Extinction – Examples of evolution and extinction, Present and past comparison for organisms – Paleogeographic distribution of extinct organisms – Field applications.

GEO 551: Advanced Biostratigraphy**1(1+0+0)**

Introduction to biostratigraphy – Biostratigraphical units – Biozones – Correlation by fossils – Stratigraphic range and biozones – Fossil record and Faunal communities – Index fossils – Morphological characters – Ecological models – Quantitative and qualitative correlation methods – Time and lithostratigraphic units – Correlation of strata according to their faunal content and facies changes – Recognizing of geological structures using Index fossils – Using computer in fossil application.

GEO 554: Mining Geology**3(2+0+1)**

Application of Geologic Methods of Exploration and prospecting Mining Methods. Mapping Study of Geologic setting and structures of ore deposits. Evaluation and Estimation of ore reserves. Study of major associations of ore deposits.

GEO 555: Advanced Hydrogeology**3(2+0+1)**

Study of the climatic factors that affect the aquifer recharge. Estimation of the amount of recharge reaching the saturated zone. Determination of the physical properties which control the flow through aquifers, such as porosity, permeability, hydraulic, conductivity, and storage. Analysis of pumping test data. Study of the partial differential equation that describe ground water flow through porous medium. Solving the flow equation by using numerical methods and simple computer models. Study of the chemicals dissolved in water and their thermodynamic equilibrium status in order to solve some related problems.

GEO 556: Advanced Petroleum Geology**3(2+0+1)**

Sedimentary processes and accumulation of organic matter. Transformation of organic matter, Kerogen - Oil shales and petroleum. Nature of petroleum reservoirs Oil exploration. case histories.

GEO 561: Advanced Geochemistry**3(2+0+1)**

The Phase Rule. Phase Relations and its relationship with textures and fine structures. Thermometry. Barometry. Mineralization, Deposition, and Replacement reactions. Magmatic Evolutions. Mineralizing solution, and distribution of chemical elements and complex Ions. Stable isotopes and their cycles. Late stage magmatic processes. Sedimentation, chemical sediments, and Hydrous solutions under low temperatures. Hydrogeochemistry. Application problems

GEO 564: Geochronology**2(2+0+0)**

Absolute estimation and measuring geologic times. Study of fundamental measurements used in geologic research. Radioactive isotopes and their analytical methods. Potassium - Argon, Rubidium - Strontium, Uranium - Lead, Lead - Lead, and Carbon 12 - Carbon 14 systems and

their Application to study the absolute ages of rocks especially in Precambrian Shields. Application problems.

GEO 566: Mineral Geochemistry **3(2+0+1)**

Stability of minerals, Geochemistry of Transition and Trace Elements. Application of thermodynamic laws and crystal chemistry to study minerals and rocks Phase Equilibrium. Application problems.

GEO 572: Applied Geophysics **3(2+0+1)**

Application of the reflection seismic and the gravity methods for prospecting of oil. Application of resistivity and refraction seismic methods for search of ground water. Application of the magnetic and electromagnetic methods for mineral exploration.

GEO 573: Interpretation of Well Logging **3(2+0+1)**

Principles of well logging (self-potential and resistivity, neutron and sonic logs; applications in determining rock porosity, fluid content, type of rocks thickness, dip and strike of formation; utilization of logging data in determining production pay - zone, producing applications.

GEO 586: Geodynamics **3(2+0+1)**

Study of earth major structures. Principles of isostasy. Orogenic movements, Continental drift, Sea - floor spreading potential causes of earth deformation. Methods of study. Gained results, Data processing. Recent hypothesis and theories.

GEO 598: Seminar Geology **1(1+0+0)**

Discussion of various topics in geology, given by graduate students under faculty supervision.

GEO 599: Special Topics **1(1+0+0)**

Lecturing and discussion of different geologic topics selected and given by the faculty member holding the class.

GEO 600: Research Project **6(6+0+0)**

M. Sc. Thesis research project prepared by the student including field work, laboratory experiments and writing the thesis.

GRADUATE STUDY PLAN FOR M.SC IN GEOPHYSICS

Level	Course	Name	Credit (Lecture + Exercise + Practical)
First	GPH 513	Advanced Seismic Exploration Methods	3 (2+0+1)
	GPH 521	Geophysical Applications in Groundwater	3 (2+0+1)
	GPH 565	Seismotectonics of the Arabian Plate	2 (2+0+0)
Second	GPH 531	Potential Field Theory	3 (2+0+1)
	GEO 553	Geophysical Data Processing	2 (1+0+1)
	GPH 575	Selected Topics in Geophysics	2 (2+0+0)
9 credit hours to selected by the students from the following courses in the third level			
Third	GPH 517	Quantitative Seismology	3 (3+0+0)
	GPH 519	Seismic Hazards	3 (3+0+0)
	GPH 535	Geodesy	3 (3+0+0)
	GPH 541	Environmental Geophysics	3 (3+0+0)
	GPH 543	Engineering Geophysics	3 (3+0+0)
	GPH 555	Advanced Hydrogeology	3 (2+0+1)
	GPH 586	Dynamic Geology	3 (2+0+1)
	GPH 593	Earthquake Engineering	3(3+0+0)
Fourth	GPH 600	Research Project	6 (0+0+6)
Total Credit Hours			30

COURSE DESCRIPTION FOR M.Sc. IN GEOPHYSICS

GPH 513: Advanced Seismic Exploration Methods

3(2+0+1)

Review of theories of seismic waves, recording, and data acquisition. Land and marine refraction procedures. Analog and digital data processing of refraction and reflection. Digital filtering and computer techniques in seismic data processing. Time and depth sections in model interpretation. Case histories.

GPH 517: Quantitative Seismology

3(3+0+0)

Elastic theory. Application of differential equations in three dimension media. Studies of sources of earthquake mechanisms and dynamics. Solutions of focal mechanism, free oscillation of the earth. Application of inverse problems in seismology. Design and analysis of digital seismic networks.

GPH 519: Seismic Hazards

3(3+0+0)

Earthquake prediction. Mapping of maximum intensity and acceleration of earthquakes. Quantitative and qualitative studies on earthquake risk sources and modeling. Field expedition . Programs for assessment of earthquake risk.

GPH 521: Geophysical Applications in Groundwater**3(2+0+1)**

The use of advanced geoelectrical, electromagnetic and radiometric methods in delineating surface and groundwater. Intercalation of fresh water and salt water. Determination of three dimension of aquifers. Observation of groundwater pollution. Interpretation of subsurface models . Selected world groundwater aquifers and case histories.

GPH 531: Potential Field Theory**3(2+0+1)**

Potential field theory. Uses of the potential theory in gravity, magnetic and electrical methods. Upgraded technology in the interpretation of Free air, Bouguer, isostatic, and magnetic anomalies. Advanced technologies in the interpretation of electromagnetic curves and modelling of different gravity and magnetic maps.

GPH 535: Geodesy**3(3+0+0)**

Determination of Geoid from gravity methods. Reference spheroid-absolute gravity observations and gravimeters. the earth's internal structure-attraction of standard bodies. Green's and Clairant's theories. Reference spheroid and standard gravity formulae. Stocke's integral masses outside the geoid, gravity anomalies . Geoid surveys, gravity as a guide to internal densities. Determination of the recent movements of the earth's crust.

GPH 541: Environmental Geophysics**3(3+0+0)**

Uses of Geophysical methods (seismic, gravity, ground penetrating radar, electrical and radioactive) in solving environmental problems. Detection locations and follow-up of pollution. Determination of the suitability of sites for dumping all kind of wastes. Determination of current displacement and fracture zones. Geophysical assessment for insuring the safety of engineering structures and their environmental conservation. Case histories.

GPH 543: Engineering Geophysics**3(3+0+0)**

Theory of rock mechanics. Applications of shallow geophysical techniques (seismic refraction and electrical resistivity) in investigating geological characteristics of building foundations, dams and hidden channels as well as determining mechanical behavior of soil. Using electrical methods in delineating fresh water/salt water interface. Applications of geothermal reservoir as an energy source.

GPH 553: Geophysical Data processing**2(1+0+1)**

Review of Fourier Transforms, Fast Fourier Transforms and time series analysis. Fast Fourier transform application in window functions. Computer techniques in spectral analysis for global, regional and local data. Numerical solutions and digital applications of transforms and filters in the treatment of geophysics data. Examples and case histories.

GPH 555: Advanced Hydrogeology **3(2+0+1)**

Lithostratigraphic investigation of water-bearing zones. Mechanics of water flow in porous media which includes water flow net and delineating of hydrogeological zones. Pumping tests. Design of groundwater wells. Chemical analysis and thermodynamics of ground water. Applications of geophysical methods in determining thickness of water-bearing zones. Case histories.

GPH 565: Seismotectonics of the Arabian Plate **2(2+0+0)**

Studies on tectonics of the Arabian shield and plate. Historical and recent seismicity and its relation to active faults. Crustal deformation studies using global positioning system. Examples and case histories of crustal structures.

GPH 575: Selected Topics in Geophysics **2(2+0+0)**

Discussion of recent and case history of research projects in geophysical domain and its application, variable subjects will be presented according to current research projects and the visiting professors.

GEO 586: Geodynamics **2(2+0+0)**

Studies on earth structure. Isostasy of earth's crust. Geosynlines and continental drift. Ocean bottom spreading. Application of modern theories in interpretation of the probable reasons of earth movement.

GPH 593:Earthquake Engineering **3(3+0+0)**

Earthquake motions and their engineering interpretations. Earthquake effect on foundations. Dynamic stability of earth structures. Earthquake codes for design and construction. Liquefaction and cyclic conditions.

GPH 600:Research Project **6(0+0+6)**

M. Sc. Thesis research project prepared by the student including field work, laboratory experiments and writing the thesis.

FIELD & TEACHING FACILITIES

Over the years the Department has developed the basic infrastructure and laboratories for imparting education to students as well as for faculty research. The Department maintains well equipped geological, hydrogeological and geophysical instrumentation laboratories, Geological Museum, educational tools including projection and reprographic facilities, multimedia projectors, well furnished classrooms, seminar hall for graduate students, library, computational laboratories and e-Lab etc. These details are listed on the Department's website. Examples of these equipment and instruments are: Polarizing Microscopes, Scanning Microscope, XRF, XRD, Microprobe, GIS system, Absolute Gravimeter, Proton Precession Magnetometer, Broadband Seismometers, etc. The Library of the Department maintains a good collection of both Topographical and Geological Maps for greater part of Quadrangles in the Kingdom. The Department also has the basic infrastructure arrangement for Summer Field Training of the students.

DEPARTMENT LIBRARY

The Department of Geology and Geophysics has a small library that is located on the second floor of building-4 of the College of Science. The library has a small reading hall surrounded by shelves that carry a good collection of textbooks, journals, geological and topographic maps. This library serves the students of the Geophysics Program in parallel with the University Central Library (Prince Salman library). Regarding the Geophysics Program, both libraries suffer from the lack of up-to-date geophysics books. However, this shortcoming is overcome by the use of the digital library that is made available to the University staff and students.



The library contains a good collection of textbooks, journals, geological and topographic maps.

GEOLOGICAL MUSEUM

The Department maintains a Geological Museum for students' training and other educational programs where different types of rocks and minerals, identifying the earth's constituents, are maintained. The Museum was founded in 1406 H (1986) and is a valuable resource for students, research workers, and other enthusiasts with an interest to learn about geology in general, and Saudi Arabia in particular. This is more so, since Saudi Arabia encompasses a stable shield, huge sedimentary basins and a large igneous province where a wide variety of rocks, minerals and fossils are found. Moreover, geologists view Saudi Arabia as the gateway between Africa and mainland Asia; a fact of high importance in studying the natural history of the earth. The Museum supports teaching and research in Earth Sciences and Natural History at the University. It also supports active fossil-research program in the Department. Furthermore, as a museum of Practical Geology, it illustrates the application of geology to the useful purposes of life.

The Museum contains a large number of rock samples and fossils collected from Saudi Arabia and the regions worldwide; these are cataloged as rock, mineral and fossil specimens. It includes collections of minerals, rocks and fossils of more than 20,000 samples. Meteorites and their effects on the earth surface are also considered within the main topics of the museum. Mineral collections are exhibited according to the crystal chemical classification whereas geological processes form the basis of the rock and ore collections. Paleontological collections provide an introduction to the development of life on earth. The museum collection is furnished with modern show-cases.

The Museum is housed on the second floor in the Department. It is open to visitors daily for two hours between 10-12 a.m., from Saturday to Wednesday. Visits are organized by the Museum Supervisor, and arrangements for visits can be made by contacting the Chairman of the Department (Tel. 467-6212).



Dinosaur model in the geological museum



Oil well model

LABORATORY/RESEARCH FACILITIES

1. Petrographic Preparation Laboratory: equipped with Rock Cutting Machines, Polishing and Thin-section preparation.
2. Petrologic research microscopes with attached photographic facilities.
3. GIS Laboratory with a server, 5 terminals, one A0 scanner, one A0 plotter, and 3 color laser printers.
4. Geophysical exploration equipment, including 24-channel Seismometer, Magnetometer, Gravimeter, Resistivity meter and Ground Penetrating Radar.
5. Borehole logging and Video Imaging Systems.
6. Petroleum Geology Laboratory.
7. Surveying equipment, which include three electronic total station units, Hand GPS – 20 numbers, Theodolites - 2 numbers.
8. Computer Laboratory for processing and interpretation of geological, geophysical and hydrogeological data.



Rock cutting laboratory



Thin sections prepared in rock cutting lab ready for examination in the petrographic laboratory



Mineralogy and Optics laboratory



Differential Global Positioning System (DGPS)



Resistivitymeter



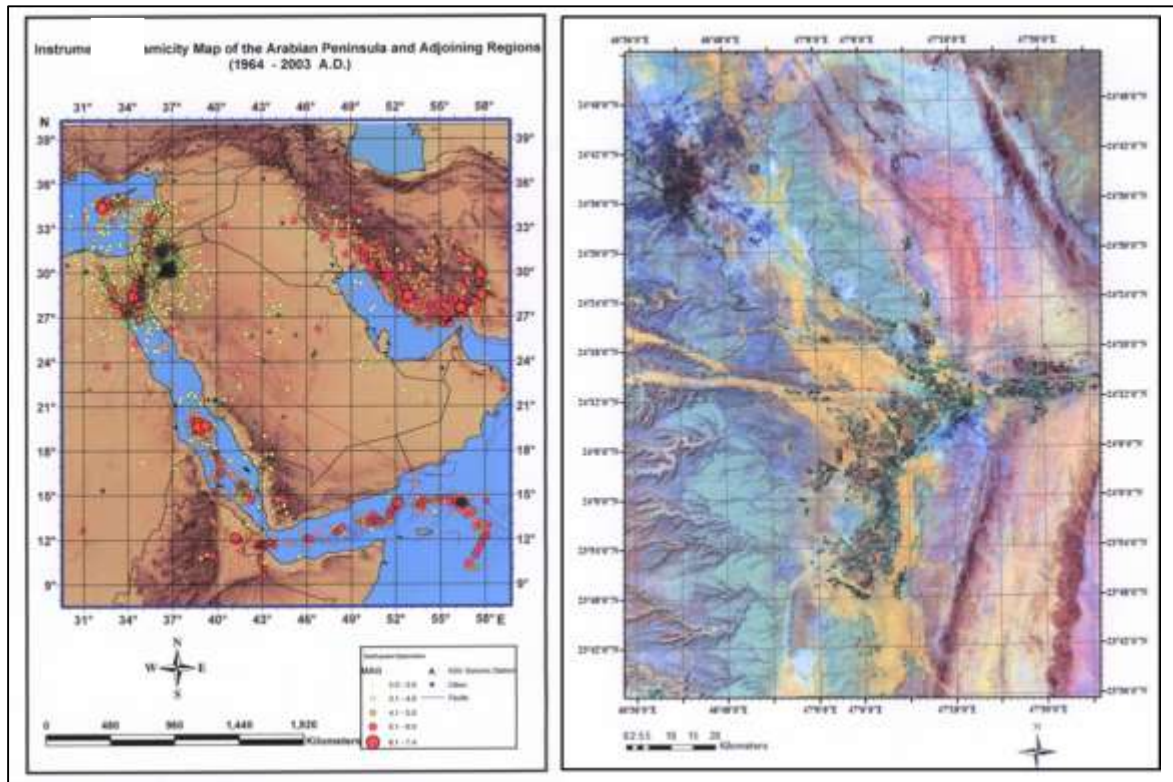
Instruments for analyzing water quality



Borehole logging and Video Imaging Systems



Geographic Information System (GIS) laboratory



GIS outputs: Distribution of earthquakes in the Arabian plate and Kharj satellite image



Stereoscope



Electromagnetic Survey Field Instrument (TEM54)



Rock magnetism unit (AF and Thermal demagnetization units, Spinner magnetometer)



Magnetometers and seismograph unit



Ground penetrating Radar (GPR) and its antennas

TEACHING CLASSROOMS

While The Department of Geology and Geophysics shares lecture halls with other College Programs within the College of Science, it also contains many laboratories, that are used as lecture classrooms and they are located in the Department. The capacity of the lecture classrooms varies from 20 to 40 students per classroom. Most of these classrooms are equipped with audiovisual facilities as follows Other than the normal classrooms with data show facility there are 3 smart classroom which provide and interactive learning environment for the students

Lecturing classrooms	Location	Capacity	Facilities
54 1B	Department	30	Data show
60 1B	Department	30	Data show
62 1B	Department	30	none
68 1B	Department	30	none
70 1B	Department	30	Data show
72 1B	Department	30	none
80/1 AB	Department	30	Smart Classroom
80/2 AB	Department	20	Smart Classroom
80/3 AB	Department	20	Smart Classroom
41 1B	College	40	audiovisual facilities
48 1B	College	40	audiovisual facilities

FIELD ACTIVITIES

The field experience in the Geology and Geophysics Programs is achieved through short field trips (up to three days) and one long field training course (35 days). The field activities supervision staff help in planning and scheduling activities for the students, provide students with material support (geophysical tools, maps, air photos, software), moral support (advice, teaching, knowledge, experience, encouragement, etc), and assessment of performance, practices, activities and aptitude. The Students are thoroughly prepared, through briefings and descriptive material, for participation in the field activities through the following procedures:

1. Make an announcement to the students to join the field trip before at least the mid of the 2nd semester.
2. Study the students' applications and their academic applicability to join the trip.
3. Offer lectures to explain the plan and targets of the field trip and the students' duties and responsibilities.
4. Offer lectures on safety aids.
5. Distribute notices about the requirements the field (e.g. camp gear, clothing, shoes, drafting supplies, etc.).
6. Distribute notices about safety in the field and risks.
7. Arrange follow up meetings and classes with staff and students at least one week before the beginning of the field trip to allow the students to reflect on, and explore, the knowledge vistas of their field experience.

The Department arranges a summer field training camp for students in areas of geological interest within the Kingdom where the students are trained on geological and topographic mapping techniques, to study geologic relationships with emphasis on stratigraphic interpretations of rocks. The students are trained to identify, describe, classify and interpret the different faunal contents and different geological structures.

The students are also trained, in the field, on how to carry out different geophysical surveys including the seismic (refraction and reflection), gravity, magnetic, electrical, and electromagnetic methods. Training is also imparted to students on geophysical data analysis and their geologic interpretation. For effective training purposes, the students are grouped and guided by the Department's faculty and staff. Students are required to prepare written field reports upon completion of field training for evaluation.



◦Studying geological structures during the field training



Geophysical survey during the field training

PROVISION OF FACILITIES AND EQUIPMENT

Each year King Saud University Council assigns a budget for the provision of equipment to the College of Science and consequently the Dean of the College divides the received amount equally among the College departments and requests from the chairmen of the departments to submit their needs for equipment in relation to the available budget. The Equipment and Laboratory Committee in the Department submits to the Chairman a list of the required equipment in accordance with the priorities agreed upon by the Committee in the light of the questionnaire collected from the Department's faculty members.

The budget allocated for the Geological and Geophysical Programs depends on the available budget at the University to be distributed equally among the different departments, and not on the needs of the specific program. However, the program manager could ask for more funds, if he has a good specific reason, and within the availability of more funds in the University, this request could be met.

The Equipment and Laboratory Committee in the Department is responsible for setting the financial planning and management, and formulating the evaluation scheme, in coordination with the Chairman of the Department and with the previous the Chairman, to reach practical and realistic conclusions.

RESEARCH

Faculty members have several research activities extending to the participation in projects supported and funded by international and national organizations. Furthermore, the University Research Centre annually calls for the submission of small research projects and funds them. Besides there are a number of recently completed, ongoing and approved projects under the National Program for Science and Technology (NPST) funded by the King Abdulaziz City for Science and Technology (KACST). All these projects are of strategic importance to the kingdom providing valuable scientific inputs. Most of the research is published in cited scientific journals and most faculty members supervise students' research projects both at the undergraduate and postgraduate levels, in addition to the field studies incorporated in these programs. Moreover, the Department is actively involved in enhancing the role of faculty members in conducting studies and projects for the community in the light of the expertise of the Department in offering solutions to local problems.

COLLABORATING INSTITUTIONS

Regular contact is maintained with international scientists, keeping them abreast with developments and research in the Department, inviting their participation in scientific activities, and encouraging them to cooperate and participate in solving problems through joint projects and/or consultation.

In addition, the Department of Geology and Geophysics is very keen to invite specialists from industry to part- time teaching. Furthermore, specialists from industry and other governmental institutions co-supervise, jointly with faculty members, postgraduate research and undergraduate field studies. The matter of inviting a member from industry and/or government institutions to

attend the meetings of the Department Council, to contribute to the teaching and the research policies, is being discussed by the different committees in the Department.

REVIEW OF COURSES

A Course Planning Committee has been formed by the Department Council to study feedback received from the institutions that have employed the Department's graduates, and to summarise the important changes required in the courses. Also all course reports are reviewed to find out difficulties facing some lecturers in completing their course objectives due to lack of knowledge or skills.

The graduate surveys also give some indication of the missing areas that that should be included in the courses curricula. Finally, each faculty member was asked to rewrite his course syllabus to suit the results of this feedback, and some new courses were suggested by the Committee and the setting of the new syllabi was assigned to specialized faculty members.

The desired benchmark, for the course content in the Geology and Geophysics Programs, is that of the University of Calgary, Canada. All course contents have been updated and some new courses have been added to the study plans as part of the development plan in the Department.

STUDENTS' EVALUATION

Each course taught by the Department undergoes students' evaluation. These evaluations are served electronically through the Deanship of registration and admission of King Saud University. An example of the forms used, and a full description of the evaluation process, can be found on the Deanship website. The numerical results of the course evaluations are made available to the University Council (University Rector, Dean, Head of Department), while the numerical scores and the comment sheets go directly to individual faculty members. The University Council uses these data to keep tabs on how students perceive the quality of the courses, and to look for problematic patterns with certain courses or faculty members. Individual faculty members use the evaluations to monitor the students' perception of their courses, and to make improvements and adjustments as appropriate.

GRADUATE STUDENT QUALITY AND PREPARATION

The Department of Geology and Geophysics works closely with a fair number of its own students and other students from other universities, who pursue their postgraduate studies in the Department. This means that the Department has frequent opportunities to see how its own students' preparation compares with that of students educated elsewhere. This has long provided an implicit feedback loop with regards to observing our own graduates' preparation for advanced study.

EDUCATIONAL ASSISTANCE FOR STUDENTS

The Department of Geology and Geophysics, College of Science and King Saud University systems provide the students with a comprehensive range of students' support services that help the students to achieve the optimal results from their studies. Here is a brief mention of such support services:

1. Every faculty member has at least two hours per week to meet the students in his office. These hours, which are called "office hours", are designed to provide the students with an opportunity to meet the course instructor during teaching days, help the students to make a regular review of their academic progress, and offer academic advice to the students.
2. Disabled students receive good care and attention from the University and the College by offering them suitable tools and facilities to simplify matters and make their study life easier.
3. A Student Handbook is provided to the new students. This handbook contains the essential information concerning departments, programs, courses, grading system, registration system and other available services. In addition, each department provides its own handbook helping the students with the available programs, courses, student assessment methods and grading system.
4. An academic advisor is available in order to monitor the progress and offer assistance and/or counseling the individual students especially those facing difficulties.
5. Librarian Facilities where there Prince Salman Library presents a strong research and learning base for all staff and students. In addition, the department's small library provides staff and students with periodicals, maps, Atlas, and geophysical and geological reports and textbooks.
6. The Students' activities such as sports, cultural, arts and social activities are available to students. These activities are fully supported and supervised by the students' administration.
7. The Students' accommodation: The students who come from outside Riyadh are offered accommodation in KSU students' hostels.
8. Medical and health support to the students is available at the University educational hospitals which are located on the University Campus.

RESEARCH CHAIRS

The Research Chair Program at KSU is a key element in promoting the transition of the Kingdom to a knowledge-based economy. Research Chairs at the King Saud University have the mission of developing scientific research and to generate the knowledge and to adapt it to contribute in the national development and the creation of a distinguished generation of researchers and graduate students. A step in this direction was the establishment of two research chairs at the Department namely the Water Resource Exploration Chair in the Empty Quarter (Rub al Khali) and the Saudi Geological Survey Research Chair for Natural Hazards

Water Resources Exploration Chair in the Empty Quarter (WRECEQ)

Water Resources Exploration Chair in the Empty Quarter (WRECEQ) is utilizing modern geophysical techniques to conduct water research and was established in 2009. Dr. Abdullah Al-Amri, Chairman of the Department and Director of the Seismic Studies Center, is the supervisor of the WRECEQ, which has encouraged KSU students to pursue new scientific water exploration research through specialized graduate programs and research centers at KSU. In addition, the Chair works to create national and international channels of communication in water exploration.

Saudi Geological Survey Research Chair for Natural Hazards (SGSRC)

The Saudi Geological Survey Research Chair for Natural Hazards (SGSRC) was established in the year 2010 at the Geology and Geophysics Department of the King Saud University with the objective of strengthening and spreading innovative research in the field of geological hazards and related domains to support the distinctive participation in national and international research activities and to encourage the scientific publications related to this research in internationally renowned journals/periodicals. The chair is supervised by Prof Abdulaziz M. Al-Bassam and since its inception in 2010, its scientific committee members have published numerous research articles on reputed and peer reviewed international journals.

SAUDI SOCIETY FOR GEOSCIENCES

Saudi Society for Geosciences is a scientific association, administratively and financially independent and is based in the Department of Geology and Geophysics, King Saud University and aims at achieving the following objectives

1. Development of scientific thought in the field of the Assembly and its development.
2. Achieving scientific communication to the members of the Assembly.
3. The provision of scientific advice in the Assembly.
4. Development of scientific and professional performance of members of the Assembly.
5. To facilitate the exchange of scientific production, and scientific ideas in the interests of the assembly between the relevant bodies and organizations within and outside the Kingdom.

More information about the society can be found at <http://www.geoscience.org.sa>

ARABIAN JOURNAL OF GEOSCIENCE

The Arabian Journal of Geosciences (AJG) is the official refereed publication of the Saudi Society for Geosciences and is co-published quarterly with Springer, Germany. AJG is an international medium for the publication of significant original research studies, case studies, short communications, comprehensive and book reviews in all fields of geosciences, environmental sciences and related engineering and geographic subjects. AJG has been published since July 2008. Editor-in-Chief is Prof. Abdullah M. Al-Amri, Present Chairman of the Department. The Editorial Board of AGJ consists of academicians drawn from UAE, Kuwait, Egypt, Morocco, Turkey, Bahrain, France, U.K., Russia, U.S.A. and Germany, besides Saudi Arabia. The journal is listed in the Science Citation Index Journals.


The journals content, scope and online submission information can be obtained at <http://www.springer.com/earth+sciences+and+geography/journal/12517>

SEISMIC STUDIES CENTER


The seismological observatory established in 29/12/1404H was renamed as the Seismic Studies Centre by the Higher Education Board on 29/3/1419H. The center is housed in the Department of Geology and Geophysics. Prof. Abdullah Al-Amri is the present Director of the Center. The vision of the center is to create earthquake database to support research and to assist the governmental authorities in Saudi Arabia for undertaking precautionary and mitigation measures in case of an earthquake. The main objectives of the center include:


1. To alleviate the risk of earthquakes by providing safety measures.
2. Coordination with the concerned authorities to set forth the standard specifications for earthquake resistant buildings, structures, bridges, supply lines, etc.
3. Conducting seismic hazard and environmental studies for densely populated areas, and regions of industrial and economic importance.
4. To create scientific and technical manpower in the field of earthquake studies.


FACULTY MEMBERS


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