

PREFACE

King Saud University was established in 1957 and the Department of Geology, which is one of the departments of the College of Science, founded in 1958 (1378 H). The Department, upon successfully celebrating its Golden Jubilee in 2008, was re-named as the Department of Geology and Geophysics to incorporate the Geophysics teaching curriculum that started in 1986. 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-storey 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 a 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 with 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 the 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 PhD degrees from high ranked universities in the USA, UK, Germany and France. Staff assistants and non-academic technicians support the faculty members.

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 has recently started co - publishing an Earth Science journal; Arabian Journal of Geosciences, published by Springer (Germany). The journal has already been well acclaimed in the scientific world.

Dr. Saad Mogren Almogren

Chairman, Department of Geology and Geophysics

TABLE OF CONTENTS

CHAIRMEN OF THE DEPARTMENT SINCE 1958.....	3
ACADEMIC PROGRAMS OFFERED	3
VISION	3
MISSION	3
OBJECTIVES	3
SCIENTIFIC SCALES AND BENCHMARKS.....	4
ACADEMIC ACCREDITATION COMMITTEES.....	4
JOB OPPORTUNITIES.....	4
PROGRAM COORDINATOR AND ACADEMIC GUIDANCE.....	5
THE STUDY SYSTEM AT THE COLLEGE OF SCIENCE.....	5
UNDERGRADUATE STUDY PLAN FOR B.Sc. IN GEOLOGY	12
GEOLOGY STUDY PLAN:	14
COURSE DESCRIPTION FOR B.Sc. IN GEOLOGY	15
UNDERGRADUATE STUDY PLAN FOR B.Sc. IN GEOPHYSICS.....	20
IDEAL PLAN FOR THE PROGRAM OF B.Sc. IN GEOPHYSICS	22
COURSE DESCRIPTION FOR B.SC. IN GEOPHYSICS.....	23
GRADUATE PROGRAMS LEADING TO M.Sc. IN GEOLOGY AND M.Sc. GEOPHYSICS	25
COURSE DESCRIPTION FOR M.Sc. IN GEOLOGY	26
COURSES FOR M.Sc. IN GEOPHYSICS	28
COURSE DESCRIPTION FOR M.Sc. GEOPHYSICS	29
FIELD & TEACHING FACILITIES	31
COLLABORATING INSTITUTIONS:	34
REVIEW OF COURSES.....	34
STUDENTS' EVALUATION	34
GRADUATE STUDENT QUALITY AND PREPARATION	34
EDUCATIONAL ASSISTANCE FOR STUDENTS	35
FACULTY MEMBERS.....	36
ASSISTANTS, TECHNICIANS AND EMPLOYEES.....	52

CHAIRMEN OF THE DEPARTMENT SINCE 1958

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 Mogren. Almogren	2010-

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.

VISION

To be a leader in imparting quality education in the fields of applied Earth Sciences, and to contribute in building a knowledge based society.

MISSION

To offer educational programs and develop research projects in the fields of geology and geophysics capable of providing knowledgeable and trained personnel to the society through a will be paid to sustain quality with optimal use of technology and productive partnerships.

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. 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. Ensure an optimal use of resources with modern technology to create a place of higher learning in the fields of Earth sciences.
4. Provide a stimulating environment capable of attracting the best students, staff and faculty members.
5. 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.

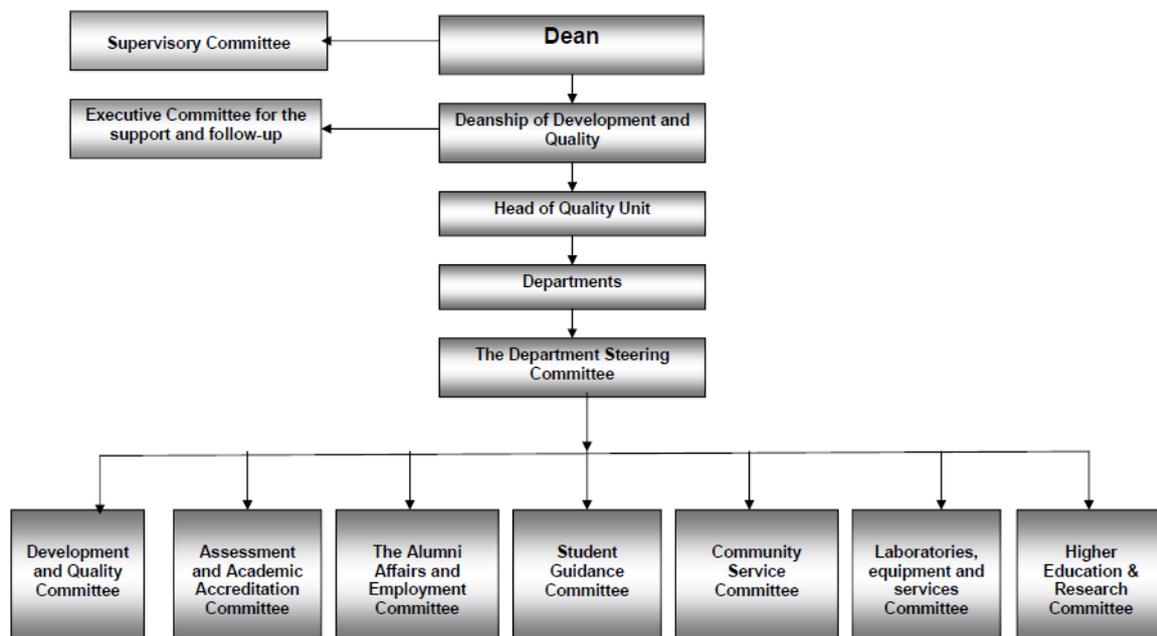
SCIENTIFIC SCALES AND BENCHMARKS

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

Academic accreditation will be sought from the ASIIN e.V., Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V., (Accreditation Agency for Degree Programs in Engineering, Informatics, the Natural Sciences and Mathematics), Germany.

ACADEMIC ACCREDITATION COMMITTEES

Academic accreditation system for the Faculty of Science 1429/30 (2009)



JOB OPPORTUNITIES

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

• **Geology Program:**

Program Coordinator	Contact	Academic Guidance	Contact
Dr. Osama M. Kaoud Kassem	E-mail: okassem@ksu.edu.sa Office Phone: 4676351 Office Location: AB 64 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4676214	Dr. Mohamed N. Al-Sabrouty	E-mail: sabrouty@ksu.edu.sa Office Phone: 4676213 Office Location: 2B 124 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4676214

• **Geophysics Program:**

Program Coordinator	Contact	Academic Guidance	Contact
Prof. Hesham M. Al-Araby	E-mail: elarabi@ksu.edu.sa Office Phone: 4676208 Office Location: 2B 132 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4676214	Prof. El- Khedr H. Ibrahim	E-mail: eibrahim@ksu.edu.sa Office Phone: 4676244 Office Location: 1B 52 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4676214

THE STUDY SYSTEM AT THE COLLEGE OF SCIENCE

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

1. The school 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 (of 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 whereby 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 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. 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. Have 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 Drop and Add 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. **Drop and Add:** 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.
 1. View the course schedule of the College and the available/closed groups.
 2. View the study schedule and print it.
 3. View the Academic Record and print a copy (an unofficial copy).

4. View the results of the final exams as soon as they are put online.
5. View the Study Plan, the courses passed by the student, and the ones remaining to be studied.
6. Know about the penalties imposed upon the student.
7. View the financial rewards.
8. Make suggestions and submit complaints.
9. Write the academic performance evaluation of faculty members.
10. Exchange electronic messages and change the password.

* In case of any problem while registering, please consult the College Registration Office (room 1A7 - Building 4).

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 semester.
- **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 courses.
- 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

- **Processes of dropping and adding** are performed by the student electronically during the first week of the semester through accessing the site of the academic system of the University 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 calculate your averages, you should follow the following steps:

Calculating the Semester Average:

The GPA is calculated considering the following points:

1. Knowing the credit 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:

$$GPA = \frac{\text{Total Points (ites 6)}}{\text{Number of hours registered in the semester (item 7)}}$$

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+	2.5
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 Average Cumulative:

The GPA semester average is calculated as follows:

- 1) The grand total of points (for all semesters that have been studied).
- 2) The grand total of credit hours (for all semesters that have been studied).

3) 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	$4 \times 2.5 = 10$
Chem101	4	73	C	3	$4 \times 3 = 12$
Eng 121	3	77	C+	3.5	$3 \times 3.5 = 10.5$
Arab 101	2	81	B	4	$2 \times 4 = 8$
	13				40.5
GPA = Total points \div No. of hours registered in semester = $40.5 \div 13 = 3.12$					

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:

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

Dropping and adding of 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.
- 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 the 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:

1) 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.

2) 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	Language
ENG 140	English Language (1)	8	E
ENG 150	English Language (2)	8	E

Math 140	Introductory Mathematics	2	E
Math 150	Calculus	3	E
CI 140	Learning, Thinking & Research Skills	3	E
CT 140	Computer Skills	3	E
MC 150	Communication Skills	2	E
CHS 140	Health and Fitness	1	E
ENT 101	Entrepreneurship	1	E
Total Credit		31	

University Compulsory Courses (8 credit hours):

Course	Name	Credit	Language
Islam 101	Introduction to Islamic Culture	2	A
Islam 102	Islam and Society	2	A
Islam 103	Economic System in Islam	2	A
Islam 104	Political System in Islam	2	A

Compulsory Courses from other departments (13 credit hours):

Course	Name	Credit
Chem 103	General Chemistry	3 (3+0+0)
Chem 104	Experimental General Chemistry	1 (0+0+1)
Phys 101	General Physics	4 (3+1)
Stat 100	Statistics & Probability	3 (2+1)
Chem 253	Analytical Chemistry	2 (1+1)

Compulsory Courses from the Department (69 credit hours):

Course	Name	Units	Language
Geo 101	Physical Geology	4 (3+1)	E
Geo 106	Historical Geology	3 (2+1)	E
Geo 221	Mineralogy	3 (2+1)	E
Geo 236	Stratigraphy & Sedimentology	3 (2+1)	E
Geo 243	Invertebrate Paleontology	3 (2+1)	E
Geo 262	Environmental Geology	2 (2+0)	E
Geo 323	Igneous & Metamorphic Petrology	3 (2+1)	E
Geo 334	Sedimentary Petrology	3 (2+1)	E
Geo 380	Plate Tectonics	2 (2+0)	E
Geo 381	Structural Geology	3 (2+1)	E
Geo 383	Remote Sensing	3 (2+1)	E
Geo 386	Geology of the Arabian Shield	2 (1+1)	E
Geo 392	Geological Reports	1 (1+0)	E
Geo 399	Field Geology	6 (0+6)	E
Geo 406	Data Analysis in Geology	2 (1+1)	E
Geo 452	Petroleum Geology	3 (2+1)	E
Geo 450	Ore Geology	3 (2+1)	E
Geo 455	Hydrogeology	3 (2+1)	E
Geo 473	Engineering Geology	2 (2+0)	E
Geo 478	Spatial Information Systems	2 (1+1)	E
Geo 482	Sedimentary Geology of Saudi Arabia	3 (2+1)	E

Geo 498	Geological Seminar	1 (1+0)	E
Geo 499	Research Project	3 (0+3)	E
Gph 201	Principles of Geophysics	3 (2+1)	E
Gph 301	Geophysical Exploration	3 (2+1)	E

Elective Courses (15 credit hours):

Course	Name	Credit	Language
Geo 242	Micropaleontology	3 (2+1)	E
Geo 301	Geomorphology	3 (2+1)	E
Geo 341	Paleobotany	3 (2+1)	E
Geo 342	Paleoecology	3 (2+1)	E
Geo 361	Principles of Geochemistry	3 (2+1)	E
Geo 421	Volcanology	3 (2+1)	E
Geo 431	Carbonate Rocks	3 (2+1)	E
Geo 432	Quaternary Geology	3 (2+1)	E
Geo 435	Oceanography	2 (2+0)	E
Geo 441	Vertebrate Paleontology	3 (2+1)	E
Geo 445	Sedimentary Basin Analysis	2 (1+1)	E
Geo 454	Mining Geology	2 (1+1)	E
Geo 456	Applications in Petroleum Geology	2 (2+0)	E
Geo 483	Regional Geology of the Middle East	2 (2+0)	E
Geo 495	History of Geology	1 (1+0)	E
Geo 496	Specialized Topics	1 (1+0)	E
Gph 341	Geophysical Well Logging	3 (2+1)	E
Astr 101	Introduction to Solar and Stellar Systems	3 (2+1)	
Bot 101	General Botany	3 (2+1)	
Zoo 103	Principles of General Zoology	3 (2+1)	E
Admin 101	Principles of Administration	3 (3+0)	
Bus 101	Principles of Business Administration	3 (3+0)	
Mis 101	Management Information Systems	3 (3+0)	
Econ 101	Principles of Microeconomics	3 (3+0)	

GEOLOGY STUDY PLAN:

3rd Level		
Course	Name	Units
Islam 101	Islamic culture	2(2+0)
Geo 101	Physical Geology	4 (3+1)
Chem 103	General Chemistry(1)	3 (3+0)
Chem 104	Experimental General Chemistry(1)	1 (0+1)
Phys 101	General Physics	4 (3+1)
Stat 100	Statistics & Probability	3 (2+1)
Total Units		17
4th level		
Course	Name	Units
Islam 102	Islam & Society	2 (2+0)
Chem 253	Analytical Chemistry	2 (1+1)
Geo 221	Mineralogy	3 (2+1)
Geo 106	Historical Geology	3 (2+1)
Gph 201	Principles of Geophysics	3 (2+1)

Elective Course		3
Total Units		16
5th Level		
Course	Name	Units
Geo 236	Stratigraphy & Sedimentology	3 (2+1)
Geo 243	Invertebrate Paleontology	3 (2+1)
Geo 262	Environmental Geology	2 (2+0)
Geo 381	Structural Geology	3 (2+1)
Geo 323	Igneous & Metamorphic Petrology	3 (2+1)
Elective Course		3
Total Units		17
6th Level		
Course	Name	Units
Islam 103	Economic System in Islam	2(2+0)
Geo 334	Sedimentary Petrology	3 (2+1)
Geo 392	Geological Reports	1 (1+0)
Geo 383	Remote Sensing	3 (2+1)
Geo 386	Geology of the Arabian Shield	2 (1+1)
Geo 380	Plate Tectonics	2 (2+0)
Elective Course		3
Total No. of Credit Hours		16
Summer Semester		
Course	Name	Units
Geo 399	Field Geology	6 (0+6)
Total Units		6
7th Level		
Course	Name	Units
Gph 301	Geophysical Exploration	3 (2+1)
Islam 104	Political System in Islam	2 (2+0)
Geo 478	Spatial Information Systems	2 (1+1)
Geo 450	Ore Geology	3 (2+1)
Geo 406	Data Analysis in Geology	2 (1+1)
Geo 499	Research Project	3 (0+3)
Elective Course		2
Total Units		17
8th Level		
Course	Name	Units
Geo 473	Engineering Geology	2 (2+0)
Geo 498	Geological Seminar	1 (1+0)
Geo 452	Petroleum Geology	3 (2+1)
Geo 482	Sedimentary geology of Saudi Arabia	3 (2+1)
Geo 455	Hydrogeology	3 (2+1)
Elective Course		2
Elective Course		2
Total Units		16

COURSE DESCRIPTION FOR B.Sc. IN GEOLOGY

Geo 101: Physical Geology

4(3+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

3(2+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

3(2+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

3(2+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

3(2+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

3(2+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

2(2+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

3(2+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 320: Petrology** **3(2+1)**
 Extrusive and intrusive igneous rocks – classification and field relations of igneous rocks - weathering – clastic sedimentary rocks – carbonates and evaporites – metamorphism and metamorphic rocks – metamorphic zones and facies – a brief summary on the Arabian Shield and the sedimentary cover in Saudi Arabia. (Two days field trip)
- Geo 323: Igneous and Metamorphic Petrology** **3(2+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** **3(2+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** **2(1+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** **2(1+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** **3(2+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** **2(2+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** **3(2+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** **3(2+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** **2(1+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** **1(1+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 399: Field Geology** **6(6+0)**
 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** **2(1+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** **2(1+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** **2(1+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** **2(2+0)**
 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** **2(2+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 **2(1+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 **2(1+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 **3(2+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 **3(2+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 **2(1+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 **3(2+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: Applications in Petroleum Geology **2(2+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 473: Engineering Geology **2(2+0)**

Soil classification – construction problems related to swelling and shrinking soils – soil mechanics - rock mechanics - dimension stones – aggregates and crushed rocks – site inspection – tunneling – water reservoirs and dams – roads and bridges – environmental impact - geohazards. (One day field trip)

Geo 478: Spatial Information Systems **2(1+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 **3(2+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 **2(2+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 **1(1+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 **1(1+0)**

An advanced study of detailed aspects of certain geological problems, chosen by the student, is summarized in a brief report.

Geo 498: Seminar in Geology **1(1+0)**

Group discussion of advanced geologic subjects with students giving brief presentations on the more salient aspects of these subjects.

Geo 499: Research Project **3(3+0)**

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

UNDERGRADUATE STUDY PLAN FOR B.Sc. IN GEOPHYSICS

Preparatory Year (31 credit hours):

Course	Name	Credit	Language
ENG 140	English Language (1)	8	E
ENG 150	English Language (2)	8	E
Math 140	Introductory Mathematics	2	E

Math 150	Calculus	3	E
CI 140	Learning, Thinking & Research skills	3	E
CT 140	Computer Skills	3	E
MC 150	Communication Skills	2	E
CHS 140	Health and Fitness	1	E
ENT 101	Entrepreneurship	1	E
Total Units		31	

University Compulsory Courses (8 credit hours):

Course	Name	Credit	Language
Islam 101	Introduction to Islamic Culture	2	A
Islam 102	Islam and Society	2	A
Islam 103	Economic System in Islam	2	A
Islam 104	Political System in Islam,	2	A

Compulsory Courses from within the Department (58 Hours):

Course	Name	Credit	Language
GPH 201	Principles of Geophysics	3(2+0+1)	(E)
GPH 211	Gravity & Magnetic Exploration	3(2+0+1)	(E)
GPH 221	Seismic Exploration	3(2+0+1)	(E)
GPH 231	Geoelectric & Electromagnetic Exploration	3(2+0+1)	(E)
GPH 313	Seismology	3(2+0+1)	(E)
GPH 341	Geophysical Well Logging	3(2+0+1)	(E)
GPH 361	Geophysical Techniques	1(0+0+1)	(E)
GPH 381	Geophysical Reports	1(1+0+0)	(E)
GPH 390	Radiometric and Geothermal methods	2(2+0+0)	(E)
GPH 391	Field Geophysics	4(0+0+4)	(E)
GPH 401	Physics of the Earth	2(2+0+0)	(E)
GPH 412	Engineering Seismology	2(2+0+0)	(E)
GPH 411	Geophysical Data Processing	3(2+0+1)	(E)
GPH 485	Seminar	1(1+0+0)	(E)
GPH 498	Research Project	3(0+0+3)	(E)
GEO 101	Physical Geology	4(3+0+1)	(E)
GEO 221	Mineralogy	3(2+0+1)	(E)
GEO 236	Principles of Stratigraphy & Sedimentation	3(2+0+1)	(E)
GEO 320	Petrology	3(2+0+1)	(E)
GEO 381	Structural Geology	3(2+0+1)	(E)
GEO 452	Petroleum Geology	3(2+0+1)	(E)
GEO 478	Geographical information systems	2(1+0+1)	(E)

Compulsory Courses from other departments (28 Hour):

Course	Name	Credit	Language
CHEM 101	General Chemistry	4(3+0+1)	(E)
PHYS 101	General Physics (1)	4(3+0+1)	(E)
PHYS 102	General Physics (2)	4(3+0+1)	(E)
PHYS 201	Mathematical Physics	3(2+1+0)	(E)
PHYS 221	Electromagnetism	3(3+0+0)	(E)
MATH 111	Integral Calculus	4(3+1+0)	(E)
MATH 200	Differential and Integral Calculus	3(3+0+0)	(E)
MATH 204	Differential Equations	3(3+0+0)	(E)

Elective Courses from the Department (34 Hour):
(Student could select 11 hours)

Course	Name	Credit	Language
GPH 317	Time series analysis	2(2+0+0)	(E)
GPH 319	Petrophysics	2(2+0+0)	(E)
GPH 416	Seismotectonics of the Middle East	2(2+0+0)	(E)
GPH 424	Environmental Geophysics	2(2+0+0)	(E)
GEO 323	Igneous and Metamorphic Petrology	3(2+0+1)	(E)
GEO 334	Sedimentary Petrology	3(2+0+1)	(E)
GEO 383	Remote Sensing	3(2+0+1)	(E)
GEO 386	Geology of Arabian Shield	2(1+0+1)	(E)
GEO 455	Hydrology	3(2+0+1)	(E)
GEO 482	Sedimentary Geology of the Kingdom	3(2+0+1)	(E)
PHYS 232	Vibrations and Waves	3 (2+0+1)	(E)
MATH 244	Linear Algebra	3(3+0+0)	(E)
STAT 100	Introduction of Statistics	3(2+1+0)	(E)
BUS 101	Principles of Business Administration	3(3+0+0)	(A)
ECON 101	Principles of Microeconomics	3(3+0+0)	(A)

IDEAL PLAN FOR THE PROGRAM OF B.Sc. IN GEOPHYSICS

3 rd Level		Credit hours	Prerequisite
GEO 101	Physical Geology	4(3+0+1)	
PHYS 101	General Physics	4(3+0+1)	
CHEM 101	General Chemistry	4(3+0+1)	
MATH 111	Differential Calculus (2)	4(3+1+0)	Math150
ISLAM 101	Introduction to Islamic Culture	2(2+0+0)	
Total Units		18	
4 th Level		Credit hours	Prerequisite
GPH 201	Principles of Geophysics	3(2+0+1)	Phys101, Math150
GEO 221	Mineralogy	3(2+0+1)	Geo101
PHYS 102	General Physics (2)	4(3+0+1)	
MATH 200	Differential Calculus and Integration	3(3+0+0)	Math 111
ISLAM 102	Islam and Society	2(2+0+0)	
Total Units		15	

5 th Level		Credit hours	Prerequisite
GPH 211	Gravity & Magnetic Exploration	3(2+0+1)	Gph 201
GPH 221	Seismic Exploration	3(2+0+1)	Gph 201
GEO 236	Principles of Stratigraphy & Sedimentation	3(2+0+1)	Geo 221
GEO 320	Petrology	3(2+0+1)	Geo 221
PHYS 201	Mathematical Physics	3(2+1+0)	Phys 101
ISLAM 103	Economic System in Islam	2(2+0+0)	
Total Units		17	
6 th Level		Credit hours	Prerequisite

GPH 231	Geoelectric & Electromagnetic Exploration	3(2+0+1)	Gph 201
GPH 361	Geophysical Techniques	1(0+0+1)	Gph 201
GPH 381	Geophysical Reports	1(1+0+0)	Geo381(Co requisite)
GEO 381	Structural Geology	3(2+0+1)	Geo236
PHYS 221	Electromagnetism	3(3+0+0)	Phys101
MATH204	Differential Equations	3(3+0+0)	Math200
Elective Course		3	
Total Units		17	
Summer Term (Field)		Credit hours	Prerequisite
GPH 391	Field Geophysics	4(0+0+4)	Gph211,Geo320, Geo236, Geo381
Total Units		4	
7th Level		Credit hours	Prerequisite
GPH 313	Seismology	3(2+0+1)	Gph 201
GPH 341	Geophysical Well Logging	3(2+0+1)	Gph 201
GPH 411	Geophysical Data Processing	3(2+0+1)	Gph211, Gph221
GPH 498	Research Project	3(0+0+3)	Gph391, Gph381
Elective Course		3	
Elective Course		3	
Total Units		18	
8th Level		Credit hours	Prerequisite
GPH 390	Radiometric and Geothermal methods	2(2+0+0)	Gph 201
GPH 401	Physics of the Earth	2(2+0+0)	Gph313
GPH 412	Engineering Seismology	2(2+0+0)	Gph313
GPH 485	Seminar	1(1+0+0)	
GEO 478	Geographical information systems	2(1+0+1)	Geo381
GEO 452	Petroleum Geology	3(2+0+1)	Geo381, Geo236
ISLAM 104	Political System in Islam	2(2+0+0)	
Elective Course		2	
Total Units		16	

COURSE DESCRIPTION FOR B.SC. IN GEOPHYSICS

GPH 201: Principles of Geophysics

3(2+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+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+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+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 301: Geophysical Exploration** **3(2+1)**
 Magnetic and gravity exploration; Geoelectrical Methods; Electrical resistivity, Self-Potential and Induced Polarization; electromagnetic Methods; Seismic methods; Seismic Reflection and refraction methods; seismology; Ground Penetrating Radar, Radioactive and thermal methods. Different application for natural resources exploration. Qualitative and quantitative interpretation of geophysical exploration methods. (Field applications – Two days)
- GPH 312: Earthquake Seismology** **3(2+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)**
 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)**
 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+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 361: Geophysical Techniques** **1(1+0)**
 Principles, design and operating of various geophysical instruments: such as seismic, earthquakes recording, magnetic, gravity, electric and self potential. Maintenance and operation. (Weekly Field applications)
- GPH 381: Geophysical Reports** **1(1+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)**

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 391: Field geophysics **4(4+0)**

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)**

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 412: Engineering Seismology **2(2+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 413: Geophysical Data Processing **3(2+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 416: Seismotectonics of the Middle East **2(2+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)**

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 485: Seminar **1(1+0)**

Discussion of up-to-date geophysical hot subjects. Weekly presentation by senior students.

GPH 499: Research Project **3(3+0)**

Senior students engage in an independent research with faculty supervision. Investigation of any selected problems in applied or theoretical geophysics. A written report is required.

GRADUATE PROGRAMS LEADING TO M.Sc. IN 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 geoscientific 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.

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: Advanced Igneous Petrology **3(2+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: Advanced Metamorphic Petrology **3(2+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: Advanced Stratigraphy** **3(2+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+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+1)**
 Carbonate sedimentation, marine evaporities, Carbonate facies, facies diagenesis, facis models, Coase histories.
- GEO 536: Recent Sediments** **2(2+0)**
 Weathering, Denudation and rates of disposition. lithification and diagenesis of alluvial. Eolian, glacial and marine sediments.
- GEO 542: Invertebrate Palaeontology (I)** **3(2+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+1)**
 Systematic description of Cinidaria, Bryozoa, Brachiopoda, Annelida, and Arthropoda. Palaeoecology, Paeobiogeography. Origin and Evolution. Field applications.
- GEO 544: Invertebrate Palaeontology (III)** **3(2+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+1)**
 Advanced study of Microfossils with special emphasis on the most important stratigraphic groups and their Taxonomy.
- GEO 548: Advanced Paleoecology** **2(2+0)**
 Skeletal mineralogy, trace chemistry and distribution of trace element in skeletons and their paleoecological significance, Oxygen and carbon stable isotopes, Growth mechanism of different groups adaptive functional morphology, Population dynamics, opportunistic and equilibrium species, Types of dispersion, Ecosystems and communities.
- GEO 554: Mining Geology** **3(2+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+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 war and their thermodynamic equilibrium status in order to solve some related problems.

GEO 556: Advanced Petroleum Geology **3(2+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+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)**
 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+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+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+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+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)**
 Discussion of various topics in geology, given by graduate students under faculty supervision.

GEO 599: Special Topics **1(1+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)**
 M. Sc. Thesis research project prepared by the student including field work, laboratory experiments and writing the thesis.

COURSES FOR M.Sc. IN GEOPHYSICS

FIRST LEVEL:

No.	COURSE No. & SYMBOL	COURSE TITLE	UNITS
-----	---------------------	--------------	-------

1	GPH 513	Advanced Seismic Exploration Methods	3 (2+1)
2	GPH 521	Geophysical Applications in Groundwater	3 (2+1)
3	GPH 565	Seismotectonics of the Arabian Plate	2 (2+0)
	Total		8 units

SECOND LEVEL:

No.	COURSE No. & SYMBOL	COURSE TITLE	UNITS
1	GPH 531	Potential Field Theory	3 (2+1)
2	GEO 553	Geophysical Data Processing	2 (1+1)
3	GPH 575	Selected Topics in Geophysics	2 (2+0)
	Total		7 units

THIRD LEVEL:

(The Department will select 9 Units)

No.	COURSE No. & SYMBOL	COURSE TITLE	UNITS
1	GPH 517	Quantitative Seismology	3 (3+0)
2	GPH 519	Seismic Hazards	3 (3+0)
3	GPH 535	Geodesy	3 (3+0)
4	GPH 541	Environmental Geophysics	3 (3+0)
5	GPH 543	Engineering Geophysics	3 (3+0)
6	GPH 555	Advanced Hydrogeology	3 (2+1)
7	GPH 586	Dynamic Geology	3 (2+1)
8	GPH 593	Earthquake Engineering	3 (3+0)
	Total		24 units

No.	COURSE No. & SYMBOL	COURSE TITLE	UNITS
1	GPH 600	Thesis	6 (0+6)

COURSE DESCRIPTION FOR M.Sc. GEOPHYSICS

GPH 513: Advanced Seismic Exploration Methods **3(2+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)**

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)**

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+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+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)**

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)**

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)**

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+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+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)**

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)**
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)**
Studies on earth structure. Isostasy of earth's crust. Geosynclines 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)**
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: M.Sc. Thesis **6(0+6)**

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 equipments 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.

A- 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. It houses an extensive collection of geological and topographic maps as well as some textbooks and journals in addition to a section devoted to specialized research papers published by faculty members. The University Central Library (Prince Salman library) subscribes digitally to most internationally renowned academic publishers, and their collections are available to faculty and students via the university's intranet.

B- 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).

C- 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 equipments, including 24-channel Seismometer, Magnetometer, Gravimeter, Resistivitymeter and Ground Penetrating Radar.
5. Borehole logging and Video Imaging Systems.
6. Petroleum Geology Laboratory.
7. Surveying equipments, 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.

D- 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 30 to 40 students per classroom. Most of these classrooms are equipped with audiovisual facilities as follows:

Lecturing classrooms	Location	Capacity	Facilities
54 1B	Department	30	Data show
60 1B	Department	30	Data show
62 1B	Department	30	Data show
68 1B	Department	30	none
70 1B	Department	30	Data show
72 1B	Department	30	none
80 AB	Department	40	audiovisual facilities
81 AB	Department	40	audiovisual facilities
82 AB	Department	40	audiovisual facilities

E- 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 (advices , 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.

F- PROVISION OF FACILITIES AND EQUIPMENT

Each year King Saud University Council assigns a budget for the provision of equipments 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 equipments in relation to the available budget. The Equipment and Laboratory Committee in the Department submits to the Chairman a list of the required equipments 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.

G- 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. 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 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.

These changes in the course contents will be applied gradually. Thus, in the year 2008-2009, the students have started enrolment in the Preparatory Year Program. Next year, 2009-2010, the Department will implement the changes in the 3rd and 4th levels (i.e. second year).

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 departments 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.

FACULTY MEMBERS

Name	Dr. Saad Mogren Almogren	
Qualification	Ph.D. Geophysics (Gravity and magnetism), University of New Castle, United Kingdom , 2004 (1424 H)	
Academic rank	Assistant Professor	
Administrative tasks	<ul style="list-style-type: none"> - Chairman of Geology and Geophysics Department, KSU - Supervisor of the Evaluation and Academic Accreditation, College of Science, KSU - Member of some committees in the Department of Geology and Geophysics, KSU 	
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences -American Geophysical Union -Japan Geophysical Union -Brazilian Geophysical Society 	
Research	<ul style="list-style-type: none"> - Interpretation of gravity and magnetic data using 3-D modeling - Determining the Geoid of Saudi Arabia - Observing the changes in Absolute Gravity - Error corrections in the flight altitude during the Aeromagnetic Survey - Supervised several M.Sc. theses - Published several scientific papers 	
Contact	<p>E-mail: smogren @ksu.edu.sa</p> <p>Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia</p> <p>Fax : 966 1 4673662</p> <p>Department website: http://geo.ksu.edu.sa</p>	

Name	Prof. Abdullah M. Al-Amri	
Qualification	Ph.D. Geophysics (Earthquake Seismology), University of Minnesota , Minneapolis , MN , USA , 1990 (1410 H)	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - ex-Chairman of Geology and Geophysics Department, KSU - Supervisor of seismological studies center- KSU - Chairman of the Saudi Society for Earth Sciences - Editor-in-Chief, Arabian Journal of Geosciences 	

	- Main investigator of the Empty Quarter Research Chair
Memberships	<ul style="list-style-type: none"> - Seismological Society of America - American Geophysical Union - European Association for Environmental and Engineering Geophysics - Board of the Saudi Society for Earth Sciences - Board of the Middle East Seismic Forum, USA - National Committee for Assessment and Mitigation of Earthquake hazards in Saudi Arabia - Editorial Board of the Iranian Journal of Seismology - Editorial Board of the Journal of Science, KSU - Saudi Building Code
Research	<ul style="list-style-type: none"> - Consultant for The Saudi Geological Survey - Supervised several M.Sc. theses - Consultant of the Military Survey Administration , Ministry of Defense and Aviation - External examiner for M.Sc. and Ph.D. theses - 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 - Published several scientific papers
Contact	<p>E-mail: amsamri@ksu.edu.sa Office Phone: 4676213 Office Location : 2B 124 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Tel. : 966 1 4676198 - 966 1 4676212 Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>

Name	Prof. Ali A. Al-Furaih	
Qualification	Ph.D. Geology (Micropaleontology and Biostratigraphy), University of Leister , United Kingdom , 1977 (1397 H)	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Ex. Dean of Graduate College, KSU - Ex. Chairman of Geology and Geophysics Department, KSU - Ex. Supervisor of Seismological Studies Center- KSU 	
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences - British Society of Micropaleontology - International and British Societies of Paleontology 	

Research	<ul style="list-style-type: none"> - Study of Jurassic microfauna in Saudi Arabia - Study of stratigraphic paleoecology of Hanifa Formation in Saudi Arabia - Study of recent Ostracods in the Arabian Gulf and Red Sea - Supervising several M.Sc. theses - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers
Contact	<p>E-mail: furaih@ksu.edu.sa Office Phone: 4676201 Office Location : 2B 126 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>

Name	Prof. Ahmed A. Al-Muhandes	
Qualification	Ph.D. Geology (Mineralogy and chemistry of minerals and rocks), University of Manchester , United Kingdom , 1977 (1397 H)	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Ex. Vice-Dean of Students' Affairs, KSU - Ex. Vice-Dean of College of Science, KSU - Ex. Chairman of Geology and Geophysics Department, KSU - Ex. Supervisor of Department of Astronomy, KSU - Ex. Director of Translation Center, KSU 	
Memberships	<ul style="list-style-type: none"> - British Geological Society - Saudi Society for Earth Sciences - British Society of Mineralogy - American Society of Mineralogy 	
Research	<ul style="list-style-type: none"> - Study of basic and ultrabasic rocks and gemstones in Saudi Arabia - Study of evaporate minerals (gypsum and anhydrite) and clay minerals - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers 	
Contact	<p>E-mail: mohandis@ksu.edu.sa Office Phone: 4676203 Office Location : 2B 127 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>	

Name	Prof. Saleh M. Okla	
Qualification	Ph.D. Geology (Stratigraphy and Petroleum Geology), University of Indiana , USA , 1976 (1396 H)	
Academic rank	Professor	
Administrative tasks	- Ex. Dean of Students' Registration, KSU	
Memberships	- American Association of Petroleum Geologists - Saudi Society for Earth Sciences	
Research	- Study of microfacies in several geological formation made up of carbonates in Saudi Arabia - Supervising several M.Sc. theses - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers	
Contact	E-mail: sokla @ksu.edu.sa Office Phone: 4676202 Office Location : 2B 109 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Prof. Abdul Aziz M. Al-Bassam	
Qualification	Ph.D. Geology (Geology and Chemistry of Groundwater), University of Birmingham , United Kingdom , 1987 (1408 H)	
Academic rank	Professor	
Administrative tasks	- Ex. Vice-Dean of College of Science, KSU - Consultant to the Saudi Ministry of Water and Electricity - Ex. Chairman of Geology and Geophysics Department, KSU	
Memberships	- Board of the Saudi Society for Earth Sciences - Consultant of the International Organization of Prince Soltan for Water - International Society of Water Resources - Ex. Board of Water Sciences and Technology - British Geological Society - Saudi Society for Earth Sciences	

Research	<ul style="list-style-type: none"> - Used computer programs in designing models of flow and chemistry of groundwater - Supervised several M.Sc. theses - External examiner for M.Sc. and Ph.D. theses - Published "Groundwater" book - Translated into Arabic a book titled " Water in the Middle East- probable conflicts and hopeful cooperation" - Published several scientific papers in the field of Hydrogeology
Contact	<p>E-mail: ambassam@ksu.edu.sa Office Phone: 4676206 Office Location : 2B 129 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>

Name	Prof. Hesham M. Al-Araby	
Qualification	Ph.D. Geophysics (Potential methods), Channel System between Cairo University, Cairo, Egypt, and Free Univ., Berlin, Germany, 1990 (1410 H).	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Coordinator of Geophysics Program -Supervisor of the International Publishing Unit of the Distinguished Scientist Fellowship Program in King Saud University -Member of the Distinguished Research and Publication Quality Award Committee in King Saud University. -Head of the Laboratories, equipment and services Committee in the Geology and Geophysics Department. - Ex. Manager of Information and Data Analysis Laboratory in Cairo University Center for Environmental Hazard Mitigation 	
Memberships	<ul style="list-style-type: none"> - Geophysical Society of Egypt - Saudi Society for Earth Sciences 	
Research	<ul style="list-style-type: none"> - Application of geographical information systems GIS in geophysical research projects - Conducting more than ten projects for water shade and flash flood analysis to protect existing and planed urban communities - GIS Applications in Geophysical Environmental Hazard Mitigation - Integrated interpretation of different geophysical branches to solve environmental problems - Magnetic and geoelectric studies for groundwater exploration - Supervised several M.Sc. and Ph.D. theses - Published 45 scientific papers in different international scientific journals. 	
Contact	<p>E-mail: elarabi@ksu.edu.sa Office Phone: 4676208 Office Location : 2B 132 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4676214 Department website: http://geo.ksu.edu.sa</p>	

Name	Prof. El- Khedr H. Ibrahim	
Qualification	Ph.D. Applied Geophysics (Geomagnetic), Channel System between Mansoura University, Egypt and Plymouth University, United Kingdom, 1993 (1413 H)	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Head of the Development and Quality Committee in the Department of Geology and Geophysics, KSU - Member of the Steering Committee in the Department of Geology and Geophysics, KSU - Member of the Evaluation and Academic Accreditation Committee in the Department of Geology and Geophysics, KSU - Ex. Vice-head of the Quality Unit, College of Science, Mansoura University, Egypt 	
Memberships	<ul style="list-style-type: none"> - Geophysical Society of Egypt - Saudi Society for Earth Sciences - Geological Society of Egypt 	
Research	<ul style="list-style-type: none"> - Application of Geomagnetic in geophysical research projects - Application of Seismic Refraction and Goelectric Resistivity in geophysical research projects - GIS Applications in Geophysical Environmental Hazard Mitigation - Integrated interpretation of different geophysical branches to solve environmental problems - Supervised several M.Sc. and Ph.D. theses - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers 	
Contact	E-mail: eibrahim @ksu.edu.sa Office Phone: 4676244 Office Location : 1B 52 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Prof. Essam Abd El-Motaal Mohamed	
Qualification	Ph.D. Geology (Structural Geology), Al-Azhar University, Cairo, Egypt , 1993 (1413 H)	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Member in some committees in the Department of Geology and Geophysics, KSU 	

	<ul style="list-style-type: none"> - Member of the Alumni Affairs and Employment Committee in the Department of Geology and Geophysics, KSU - Member of the Students' Guidance Committee in the Department of Geology and Geophysics, KSU
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences - Geological Society of Egypt - Egyptian-Dutch Friendship Society
Research	<ul style="list-style-type: none"> - Structural architecture and tectonic evolution of the Red Sea Rift (specially its coastal plain) - Analysis of the structural features and constructing block diagrams to interpret their evolution - Neotectonic evolution of the Nile Delta and Red Sea Rift - Structures of the Syrian Arc System - Tectonics and morphotectonics of the Gulf of Suez, Egypt - Neotectonics and seismotectonics of the Gulf of Suez and Gulf of Aqaba - Using Remote Sensing techniques in assessment of the natural hazards and land-use - Supervised several M.Sc. and Ph.D. theses - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers
Contact	<p>E-mail: emohamed @ksu.edu.sa Office Phone: 4676486 Office Location : AB 55 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>

Name	Prof. Manoj Mukhopadhyay	
Qualification	Ph.D. Geophysics, Indian School of Mines, Dhanbad; National Geophysical Research Institute (Hyderabad), India, 1976 (1396 H).	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Ex. Head of Department of Applied Geophysics, Indian School of Mines, Dhanbad, India - Ex. Coordinator, M.Tech. (Petroleum Exploration) Program, ISM Dhanbad, India - Ex. Advisor to Director, ISM Dhanbad, India 	
Memberships	- Saudi Society for Earth Sciences	
Research	<ul style="list-style-type: none"> - Seismotectonics of the Himalayas and Burmese-Andaman Arc - Proterozoic Plate Tectonics in Canadian Shield - Gravity Interpretation Studies - Geodynamic Modeling - Petroleum Geosciences 	
Contact	<p>E-mail: mmukhopodhyay @ksu.edu.sa Office Phone: 4676097 Office Location : AB 65 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662</p>	

	Department website: http://geo.ksu.edu.sa
--	---

Name	Prof. Nasser S. Al- Arifi	
Qualification	Ph.D. Geophysics (Seismology), University of Manchester , United Kingdom , 1997 (1417 H)	
Academic rank	Professor	
Administrative tasks	- Ex. Chairman of Geology and Geophysics Department, KSU	
Memberships	<ul style="list-style-type: none"> - Board member of the Saudi Society for Earth Sciences - British Royal Society of Earth Scientists, London - American Geophysical Union 	
Research	<ul style="list-style-type: none"> - Study of natural hazards e.g. earthquakes, volcanoes, landslides..etc. - Study of local seismic activity - Study of artificial seismic activity - Study of the crustal structure of the Arabian Peninsula - Developing the local seismic observatory stations - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers 	
Contact	E-mail: nalarifi @ksu.edu.sa Office Phone: 4676199 Office Location : 2B 131 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Prof. Mohamed T. Hussein	
Qualification	Ph.D. Geology (Hydrogeology), University of , Grenoble, France, 1980 (1400 H)	
Academic rank	Professor	
Administrative tasks	<ul style="list-style-type: none"> - Departmental Board Secretary, Department of Geology and Geophysics, KSU - Ex. Head of Hydrogeology Department, Faculty of Earth Sciences, King Abdulaziz University - Vice-President, Red Sea university, Sudan 	
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences - Geological Society of Africa - Geological Society of France - Geological Society of London 	

	<ul style="list-style-type: none"> - International Society of Thermal Techniques - The International Association of Hydrological Sciences (IAHS)
Research	<ul style="list-style-type: none"> - Hydrogeological studies of dry regions - Environmental Geology - Applications of recent techniques in exploration and evaluation of groundwater resources - Supervised several M.Sc. theses - External examiner for M.Sc. and Ph.D. theses - Published several scientific papers in the field of Hydrogeology
Contact	<p>E-mail: mhussein @ksu.edu.sa Office Phone: 4676211 Office Location : 2B 134 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>

Name	Dr. Ahmad M. Al-Saleh	
Qualification	Ph.D. Geology (Petrology/geochemistry), University of Liverpool, United Kingdom, 1993 (1413 H)	
Academic rank	Associate Professor	
Administrative tasks	<ul style="list-style-type: none"> - Consultant to the Faculty of graduate studies, KSU - Member of the college of science graduate studies council - Member of various faculty and departmental committees 	
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences - Geological Society of London - Society of Applied Geochemistry - Society of Economic Geology 	
Research	<ul style="list-style-type: none"> - origin and evolution of the Arabian Shield - geochemical exploration of mineral ores - environmental influence of mining - Supervised several M.Sc. theses - Published several scientific papers 	
Contact	<p>E-mail: asaleh @ksu.edu.sa Office Phone: 4676204 Office Location : 2B 128 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>	

Name	Dr. Mohamed N. Al-Sabrouty	
Qualification	Ph.D. Geology (Palynology), Languedoc University, Montpellier, France, 1985 (1405 H)	
Academic rank	Associate Professor	
Administrative tasks	- Academic Coordinator in Department of Geology and Geophysics, KSU - Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	- Saudi Society for Earth Sciences - Geological Society of Egypt - French Association of Palynologists in France	
Research	- Creating computer programs in Palynological studies - Study of deformation of pollen grains and spores to determine the direction of environmental pollution - Environmental Geology - Supervised several M.Sc. theses - External examiner for M.Sc. - Published several scientific papers	
Contact	E-mail: sabrouty @ksu.edu.sa Office Phone: 4676213 Office Location : 2B 124 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Dr. Mahmoud A. Galmed	
Qualification	Ph.D. Geology (Minerals and Rocks), Cairo University, Cairo, Egypt , 1996 (1416 H)	
Academic rank	Associate Professor	
Administrative tasks	- Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	- Saudi Society for Earth Sciences - Geological Society of Egypt - Mineralogical Society of Egypt - Sedimentological Society of Egypt	

Research	<ul style="list-style-type: none"> - Description and interpretation of thin sections of sedimentary rocks - Study of Heavy Minerals - Study of diagenesis in sedimentary rocks - Study of deposits of phosphate, coal and evaporates - Supervised several M.Sc. theses - Published several scientific papers
Contact	<p>E-mail: mgalmed @ksu.edu.sa Office Phone: 4676096 Office Location : AB 68 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>

Name	Dr. Awni T. Batayneh	
Qualification	Ph.D. Geophysical Engineering, Jilin University, Changchun, China , 1996 (1416 H)	
Academic rank	Associate Professor	
Administrative tasks	- Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	<ul style="list-style-type: none"> - Environmental and Engineering Geophysical Society (EEGS) - International Association of Environmental Hydrology (IAEH) - Jordan Engineers Association (JEA) - Jordan Geologists Association (JGA) - Saudi Society for Geosciences (SSG) 	
Research	<ul style="list-style-type: none"> - Geophysical investigation for the location of prehistoric sites - Using the head-on resistivity method for shallow rock fracture investigations - Detection of a solution cavity adjacent to a highway in southwest Jordan using electrical resistivity methods - Gravity field and crustal structure of the northwestern Arabian plate in Jordan - Published several scientific papers 	
Contact	<p>E-mail: awni @ksu.edu.sa Office Phone: Office Location : AB 62 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Tel. : 966 1 4676198 - 966 1 4676212 Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa</p>	

Name	Dr. Mohamed S. Fnais	
Qualification	Ph.D. Geophysics (Earthquake Seismology), Saint Louis University, Saint Louis , Missouri , USA , 2004 (1424 H)	
Academic rank	Associate Professor	
Administrative tasks	- Advisor to the Vice-Deanship for International Cooperation, KSU	
Memberships	<ul style="list-style-type: none"> - Seismological Society of America - American Geophysical Union - Saudi Society for Earth Sciences - Society of Geophysical Exploration 	
Research	<ul style="list-style-type: none"> - Study of subsurface geophysical properties of Wadi Hanifa area, Saudi Arabia - Study of the structure of the crust and upper mantle of the Arabian Shield and Red Sea - Modeling the change of shear velocity in the crust and upper mantle of the Arabian Shield and Arabian Plate - Supervised several M.Sc. theses - Published several scientific papers 	
Contact	E-mail: mfnais @ksu.edu.sa Office Phone: 4676205 Office Location : 2B 129 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Dr. Mohamed E. Al-Dabbagh	
Qualification	Ph.D. Geology (Sedimentology), University of Northern Carolina , USA , 1988 (1408 H)	
Academic rank	Assistant Professor	
Administrative tasks	<ul style="list-style-type: none"> - Ex. Chairman of Geology and Geophysics Department, KSU - Head of the Alumni Affairs and Employment Committee in the Department of Geology and Geophysics, KSU 	
Memberships	- Saudi Society for Earth Sciences	
Research	<ul style="list-style-type: none"> - Study of deposits and tectonics of the Red Sea - Supervised several M.Sc. theses 	

	- Published several scientific papers
Contact	E-mail: medabbagh@ksu.edu.sa Office Phone: 4676207 Office Location : 2B 121 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa

Name	Dr. Abdul Aziz A. Laboun	
Qualification	Ph.D. Geology (Petroleum Geology), King Abdul Aziz University, Saudi Arabia , 1982 (1402 H)	
Academic rank	Assistant Professor	
Administrative tasks	- Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences - Dhahran Society of Earth Sciences - American Association of Petroleum Geologists - Saudi Society for History - Saudi Society for Archeology 	
Research	<ul style="list-style-type: none"> - Study of Petroleum Geology of Saudi Arabia - Geoarcheological studies - Geomorphology of sand dunes - Supervised several M.Sc. theses - Published several scientific books in Arabic - Published several scientific papers 	
Contact	E-mail: laboun @ksu.edu.sa Office Phone: 4677055 Office Location : 2B 122 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Dr. Abdul Rahman M. Al-Dakheel	
Qualification	Ph.D. Geology (Hydrogeology - management and Planning the water resources), University of Colorado, USA , 1992 (1412 H)	
Academic rank	Assistant Professor	

		
Administrative tasks	<ul style="list-style-type: none"> - Ex. Chairman of Geophysics Department, King Abdul Aziz University, Saudi Arabia - Member of some committees in the Department of Geology and Geophysics, KSU 	
Memberships	- Saudi Society for Earth Sciences	
Research	<ul style="list-style-type: none"> - Management and Planning the water resources - Studies in Environment and pollution - Study of water composition and properties - Supervised several M.Sc. theses - Published several scientific papers 	
Contact	E-mail: aaldakheel @ksu.edu.sa Office Phone: 4677055 Office Location : 2B 122 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Dr. Osama M. Kaoud Kassem	
Qualification	Ph.D. Geology (Structural Geology), University of Miens , Germany , 2005 (1425 H)	
Academic rank	Assistant Professor	
Administrative tasks	<ul style="list-style-type: none"> - Coordinator of the Geology Program - Member of some committees in the Department of Geology and Geophysics, KSU 	
Memberships	<ul style="list-style-type: none"> - Saudi Society for Earth Sciences - Geological Society of Egypt - Egyptian Society of Applied Petrophysics 	
Research	<ul style="list-style-type: none"> - Study of history of microstructure deformation - Study of strain analysis in rocks - Study of plastic deformation 	

	- Published several scientific papers
Contact	E-mail: okassem @ksu.edu.sa Office Phone: Office Location : AB 64 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa

Name	Dr. Habis F. Ghrefat	
Qualification	Ph.D. Environmental Science and Engineering, University of Texas at El Paso, USA, 2004 (1324 H)	
Academic rank	Assistant Professor	
Administrative tasks	- Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	- Saudi Society for Earth Sciences - Geological Society of America (GSA) - American Geophysical Union (AGU)	
Research	- Mapping Playa Evaporite Minerals, White Sands, New Mexico Using Landsat ETM+ - Gypsum grain size determination in the Dune Area of White Sands, N.M using AVIRIS imagery - Spectral Dimensionality Comparison between Multispectral Landsat 7 ETM+, ASTER, and EO-1 ALI, and Hyperspectral AVIRIS and Hyperion - Published several scientific papers	
Contact	E-mail: habes @ksu.edu.sa Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Tel. : 966 1 4676198 - 966 1 4676212 Fax : 966 1 4673662 Department website: http://geo.ksu.edu.sa	

Name	Faisal Kamal Zaidi	
Qualification	2003-2006 -PhD in Hydrogeology (UGC / NGRI / Aligarh Muslim University)	

Academic rank	Assistant Professor	
Administrative tasks	- Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	- Saudi Society for Earth Sciences - International Society of Water Resources	
Research	<ul style="list-style-type: none"> - Hard rock hydrogeology - Groundwater resources assessment - Groundwater quality - Hydrological hazards - GIS 	
Contact	Geology Department, College of Science, P.O. Box 2455 - Riyadh 11451, Kingdom of Saudi Arabia Phone : +966 555829128, email : fzaidi@ksu.edu.sa Date of Birth: 28 th April, 1978; Nationality: Indian; Marital Status: Married Website: http://faculty.ksu.edu.sa/75264	

Name	Dr. Bassam A. Abu Amarah	
Qualification	Ph.D. Geology (Geochemistry and Petrology of igneous Rocks and its minerals), University of Manchester , United Kingdom , 1990 (1410 H)	
Academic rank	Assistant Professor	
Administrative tasks	- Member of some committees in the Department of Geology and Geophysics, KSU	
Memberships	<ul style="list-style-type: none"> - British Geological Society - Saudi Society for Earth Sciences - Saudi Chemical Society - American Society of Mineralogy 	
Research	<ul style="list-style-type: none"> - Study of geochemistry and petrology of Granitoid rocks and its associated ore deposits - Geochemical prospecting of mineral ores - Published several scientific papers - Study of geochemistry and petrology of Granitoid rocks and its associated ore deposits - Geochemical prospecting of mineral ores 	

	<ul style="list-style-type: none"> - Published and prepared several scientific researches in Granitoid rocks and its minerals geochemistry, and ground water hydrology in K.S.A.. - Prepared several scientific researches in drilling deep water wells, and interpreted ground water parameter; those well; in some province; have been the water supply for water treatment plants all over the Kingdom. - Supervised and managed several mining project such as Bauxite, Zinc, and Copper ores within the Arabian Shield.
Contact	E-mail: babuamarah @ksu.edu.sa Office Phone: 4697399 Office Location : 2B 111 Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia Fax : 966 1 4676214 Department website: http://geo.ksu.edu.sa

ASSISTANTS, TECHNICIANS AND EMPLOYEES

Name	Nationality	Occupation	Specialization	Contact
Saad M. Al-Homidan	Saudi	Research Assistant	Geophysics	Phone: 4674708 alhomidan@geologist.com
Said A. Al-Shaltoni	Jordanian	Lecturer	Geology	
Mansour H. Al-Hashem	Saudi	Demonstrator	Geology	
Awad S. Al-Shamarany	Saudi	Geophysicist	Microseismicity	Phone: 4675633
Hossam T. Tofaha	Jordanian	Research Assistant	Geology	
Hashem M. Babakr	Sudanese	Research Assistant	Geology	
Nife M. Al-Otaiby	Saudi	Lab Technician	Economic Geology	Phone: 4676245
Khaled M. Al-Qahtani	Saudi	Geologist	Paleontology	Phone: 4679829
Mohamed S. Al-Yousef	Saudi	Draftsman	Digital Photography	Phone: 4676242
Abdullah Al-Morshed	Saudi	Geological Museum Director	Administrator	Phone 4676212

Aftab A. Ahmed	Indian	Draftsman	Map draft	Phone: 4677053
Mohamed H. Effy	Yemeni	Research Assistant	Geology	
Hassan Al-Fifi	Saudi	Lab Technician	Geochemistry	Phone: 4676408
Abdullh Al-Aseery	Saudi	Secretary		Phone: 4676123

CONTACT US

DEPARTMENT OF GEOLOGY AND GEOPHYSICS, COLLEGE OF SCIENCE, KING SAUD UNIVERSITY

Address: P.O Box. 2455, Riyadh , 11451, Saudi Arabia

Tel. : +966 1 4676213 & + 966 1 4676212

Fax : + 966 1 4676214

Department web site: <http://geo.ksu.edu.sa>