

**KING SAUD UNIVERSITY**  
**College of Science**

Department of Geology and Geophysics



جامعة الملك سعود  
كلية العلوم  
قسم الجيولوجيا والجيوفيزياء

# **Handbook Courses Specification**

## **Geology Program**



**Department Obligatory Credit Courses requirements (69 credit hours)**

| Course Code | Course Title                        | Effective Credit Hours | Previous Requirements | Prerequisite Course(s)             |
|-------------|-------------------------------------|------------------------|-----------------------|------------------------------------|
| Geo 101     | Physical Geology                    | 4(3+1)                 | E                     |                                    |
| Geo 106     | Historical Geology                  | 3(2+1)                 | E                     | <b>Geo 101</b>                     |
| Geo 221     | Mineralogy                          | 3(2+1)                 | E                     | <b>Geo 101</b>                     |
| Geo 236     | Stratigraphy and Sedimentology      | 3(2+1)                 | E                     | <b>Geo 221</b>                     |
| Geo 243     | Invertebrate Paleontology           | 3(2+1)                 | E                     | <b>Geo 102</b>                     |
| Geo 262     | Environmental Geology               | 2(2+0)                 | E                     | <b>Geo 221</b>                     |
| Geo 323     | Igneous and Metamorphic Petrology   | 3(2+1)                 | E                     | <b>Geo 221</b>                     |
| Geo 334     | Sedimentary Petrology               | 3(2+1)                 | E                     | <b>Geo 236</b>                     |
| Geo 380     | Plate Tectonics                     | 2(2+0)                 | E                     | <b>Geo 236</b>                     |
| Geo 381     | Structural Geology                  | 3(2+1)                 | E                     | <b>Geo 236</b>                     |
| Geo 383     | Remote Sensing                      | 3(2+1)                 | E                     | <b>Geo 236</b>                     |
| Geo 386     | Geology of Arabian Shield           | 2(1+1)                 | E                     | <b>Geo 323</b>                     |
| Geo 392     | Geological Reports                  | 1((1+0)                | E                     | <b>Geo 236</b>                     |
| Geo 399     | Field Geology                       | 6(0+6)                 |                       | <b>Geo 323 , Geo 381 , Geo 392</b> |
| Geo 406     | Data Analysis in Geology            | 2(1+1)                 | E                     | <b>Geo 383 , Stat 101</b>          |
| Geo 452     | Petroleum Geology                   | 3(2+1)                 | E                     | <b>Geo 381, Geo 236</b>            |
| Geo 450     | Ores Geology                        | 3(2+1)                 | E                     | <b>Geo 323</b>                     |
| Geo 455     | Hydrogeology                        | 3(2+1)                 | E                     | <b>Geo 236, Geo 381</b>            |
| Geo 473     | Engineering Geology                 | 2(2+0)                 | E                     | <b>Geo 381</b>                     |
| Geo 478     | Spatial Information System          | 2(1+1)                 | E                     | <b>Geo 381</b>                     |
| Geo 482     | Sedimentary Geology of Saudi Arabia | 3(2+1)                 | E                     | <b>Geo 334</b>                     |
| Geo 498     | Geological Seminar                  | 1(1+0)                 | E                     | <b>Geo 393</b>                     |
| Geo 499     | Research Projects                   | 3(0+3)                 | E                     | <b>Geo 399</b>                     |
| Gph 201     | Principal of Geophysics             | 3(2+1)                 | E                     | <b>Phys 101</b>                    |
| Gph 301     | Geophysical Explorations            | 3(2+1)                 | E                     | <b>Phys 101</b>                    |



**Department optional credited hours requirements (15 C. hours)**

| Course Code | Course Title                        | Effective Credit Hours | Previous Requirements | Prerequisite Course(s)   |
|-------------|-------------------------------------|------------------------|-----------------------|--------------------------|
| Geo 242     | Micropaleontology                   | 3(2+1)                 | E                     | Geo 102                  |
| Geo 301     | Geomorphology                       | 3(2+1)                 | E                     | Geo 101                  |
| Geo 341     | Paleobotany                         | 3(2+1)                 | E                     | <b>Geo 102</b>           |
| Geo 342     | Paleoecology                        | 3(2+1)                 | E                     | <b>Geo 243, Geo 236</b>  |
| Geo 361     | Principles of Geochemistry          | 3(2+1)                 | E                     | <b>Chem 101, Geo 221</b> |
| Geo 421     | Volcanology                         | 3(2+1)                 | E                     | <b>Geo 323</b>           |
| Geo 431     | Carbonate Rocks                     | 3(2+1)                 | E                     | <b>Geo 334</b>           |
| Geo 432     | Quaternary Geology                  | 3(2+1)                 | E                     | <b>Geo 236</b>           |
| Geo 435     | Oceanography                        | 2(2+0)                 | E                     | <b>Geo 236</b>           |
| Geo 441     | Vertebrate Paleontology             | 3(2+1)                 | E                     | <b>Geo 243</b>           |
| Geo 445     | Sedimentary Basin Analysis          | 2(1+1)                 | E                     | <b>Geo 334</b>           |
| Geo 454     | Mining Geology                      | 2(1+1)                 | E                     | <b>Geo 450</b>           |
| Geo 456     | Application in Petroleum Geology    | 2(2+0)                 | E                     | <b>Geo 452</b>           |
| Geo 483     | Regional Geology of the Middle East | 2(2+0)                 | E                     | <b>Geo 482</b>           |
| Geo 495     | Historical Geology                  | 1(1+0)                 | E                     | <b>Geo 102</b>           |
| Geo 496     | Specialized Topics                  | 1(+0)                  | E                     | <b>Geo 392</b>           |

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## **GEO 101: Physical Geology**

## **Course Specification**

**Revised March 2007**



## Course Specification

|                    |   |
|--------------------|---|
| Institution        | King Saud University                    |
| College/Department | College of Science / Geology Department |

### A Course Identification and General Information

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|---|
| 1. Course title and code: <b>Physical Geology-Geo 101</b>   |
| 2. Credit hours <b>4.0</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>Geology</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Habes Ghrefat</b>  |
| 5. Level/year at which this course is offered<br><b>Third level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>None</b>   |
| 7. Co-requisites for this course (if any)<br><b>None</b>  |
| 8. Location if not on main campus   |

## B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

1. This course addresses the general education outcome relating to communications as follows:

a. Students develop their reading comprehension skills by reading the textbook, handout materials, and/or web materials.

b. Students develop their writing skills through a variety of homework assignments, tests, and quizzes.

c. Students develop their speaking/communications skills through class discussions, by asking questions in class verbally or through electronic media as well as interactions with their peers in and out of class.

2. This course addresses the general education outcomes of recognition and application of scientific inquiry as follows:

a. Students must apply the geological principles to explain various observed natural phenomena that occur on the Earth's surface as well as in the interior of the Earth.

b. Students will develop their observation skills to be able to recognize the various geological features and materials the Earth is constructed from.

c. Students will develop the skills of inquiry by use of the scientific method to experience, evaluate, and synthesize data as applied to various geological problems.

3. This course addresses the general education outcomes of developing effective individual, and at times, group problem-solving and critical thinking skills as applied to geology.

a. Students will develop their ability to solve problems and think critically by applying their acquired knowledge of geology to various problems that deal with geological issues as well as geological hazards.

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- **Electronic materials have been utilized to support the lecture course material.**
- **The course material was posted on the WebCT that could be accessed by**

**the students enrolled in the course only.**

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered     |             |               |
|----------------------------|-------------|---------------|
| Topic                      | No of Weeks | Contact hours |
| An Introduction to Geology | <b>1</b>    | <b>3</b>      |
| Matter and Minerals        | <b>1</b>    | <b>3</b>      |
| Igneous Rocks              | <b>1</b>    | <b>3</b>      |
| Sedimentary Rocks          | <b>1</b>    | <b>3</b>      |
| Metamorphic Rocks          | <b>1</b>    | <b>3</b>      |
| Weathering and Soil        | <b>1</b>    | <b>3</b>      |
| Volcanoes                  | <b>1</b>    | <b>3</b>      |
| Earthquakes                | <b>1</b>    | <b>3</b>      |
| Crustal Deformation        | <b>1</b>    | <b>3</b>      |
| Geologic time              | <b>1</b>    | <b>3</b>      |
| Plate tectonics            | <b>1</b>    | <b>3</b>      |

| 2 Course components (total contact hours per semester): |  |
|---|--|
| Lecture: <b>39 hrs/semester</b><br>3 hrs/week           | Laboratory : 26 hours /semester ( 2 hrs/week ) |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) |
| <b>4 hours weekly for the homework</b>   |

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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul>  |
| <p><b>a. Knowledge</b></p>   |
| <p>(i) Description of the knowledge to be acquired</p> <ol style="list-style-type: none"> <li>1. Demonstrate understanding of the tectonic origins for the Earth, the reasons behind the distribution of oceans and continents, and the location of volcanic, earthquake belts, and the internal structure of the Earth.</li> <li>2. Demonstrate understanding of how natural processes shape the land and how these natural processes affect society.</li> <li>3. Demonstrate understanding of how different types of rocks and minerals are formed and their significance to society.</li> <li>4. Recognize and apply scientific inquiry in a variety of geological settings.</li> </ol> |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>In-class lecturing where the previous knowledge is linked to the current and future topics</b></li> <li>• <b>Homework assignments</b></li> <li>• <b>Tutorial discussions</b></li> <li>• <b>Laboratory practice</b></li> </ul>   |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Homework and Quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Evaluation of lab reports</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>  |



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| <p>(i) Cognitive skills to be developed</p> <p>a. Students must apply the geological principles to explain various observed natural phenomena that occur on the Earth's surface as well as in the interior of the Earth.</p> <p>b. Students will develop their observation skills to be able to recognize the various geological features and materials the Earth is constructed from.</p> <p>c. Students will develop the skills of inquiry by use of the scientific method to experience, evaluate, and synthesize data as applied to various geological problems.</p> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Problem solving in the tutorial</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> <li>• <b>Communicate results of work to others</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Writing group reports</b></li> <li>• <b>Solving problems in groups during tutorial</b></li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Laboratory exams</b></li> <li>• <b>Assessment of the laboratory reports</b></li> <li>• <b>Grading homework assignments</b></li> </ul>   |

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| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>Scientific writing.</li> <li>Working in teams</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li><b>Writing laboratory reports</b></li> <li><b>Incorporating the use and utilization of computer in the course requirements</b></li> </ul> |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li><b>Evaluating the laboratory written reports</b></li> </ul>  |
| <b>e. Psychomotor Skills (if applicable)</b>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <ul style="list-style-type: none"> <li><b>Not applicable</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p><b>Not applicable</b></p>   |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p><b>Not applicable</b></p>  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Homework and assignments</b>                                    | <b>weekly</b> | <b>5%</b>                      |
| 2  | <b>Major exams I</b>   | <b>6</b>      | <b>15%</b>                     |
| 3  | <b>Lab activates</b>   | <b>weekly</b> | <b>30%</b>                     |
| 4  | <b>Final exam</b>  | As scheduled  | <b>50%</b>                     |

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|  |  | by the registrar |  |
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#### D. Student Support

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| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"> <li>Each faculty is required to be available in his office to devote at least 3 hrs/week for students' consultation and academic advice.</li> </ul> |
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#### E Learning Resources

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| <p>1. Required Text(s)</p> <ul style="list-style-type: none"> <li>Tarbuck, E.J. and Lutgens, F.K., 2002, <i>The Earth</i>, Ninth Edition, Prentice Hall, New Jersey, 670 p. with accompanying GEODE III CD-ROM bound into book inside back cover.</li> </ul> |
| <p>2. Essential References</p> <ul style="list-style-type: none"> <li>Selected handouts and reference materials on physical geology will be provided as part of course material.</li> </ul>  |
| <p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <ul style="list-style-type: none"> <li>Busch, R. M., <b>Study Guide for <i>The Earth</i></b>, 7th edition.</li> </ul>  |
| <p>4-.Electronic Materials, Web Sites etc</p> <ul style="list-style-type: none"> <li><b>Websites on the internet that are relevant to the topics of the course</b></li> </ul>  |
| <p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <ul style="list-style-type: none"> <li><b>Multi media associated with the text book and the relevant websites</b></li> </ul>                        |

#### F. Facilities Required

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| <p>Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)</p>   |
| <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>Lecture room equipped with a black board, overhead projector, computer and internet connection.</li> <li>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</li> </ul> |
| <p>2. Computing resources</p> <ul style="list-style-type: none"> <li>An easily accessible computer lab.</li> </ul>  |

3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

## G Course Evaluation and Improvement Processes

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|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  |
| <ul style="list-style-type: none"> <li>• <b>Course evaluation by student</b></li> <li>• <b>Students- faculty meetings</b></li> </ul>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |
| <ul style="list-style-type: none"> <li>• <b>Peer consultation on teaching</b></li> <li>• <b>Departmental council discussions</b></li> <li>• <b>Discussions within the group of faculty teaching the course</b></li> </ul>   |
| 3 Processes for Improvement of Teaching   |
| <p>-Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</p> <p>-Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</p> <p>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skills.</p> <p>-Teaching method will focus on students' learning and on course learning outcomes.</p> |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)   |
| <ul style="list-style-type: none"> <li>• Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements.</li> <li>• A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</li> </ul>  |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.  |
| <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>   |



**Geo 106: Historical Geology**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution:       | <b>King Saud University</b>                                   |
| College/Department | <b>College of Science / Geology and Geophysics Department</b> |

### A Course Identification and General Information

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| 1. Course title and code: <b>Historical Geology (Geo 106)</b>  |
| 2. Credit hours <b>3(2+1)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>B.Sc. program in Geology</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Mohamed Naguib El-Sabrouty</b>  |
| 5. Level/year at which this course is offered<br><b>Level four</b>   |
| 6. Pre-requisites for this course (if any)<br><b>Physical Geology(Geo 101)</b>   |
| 8. Co-requisites for this course (if any)  |
| 8. Location if not on main campus  |

## B Objectives

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|---|
| 1. Summary of the main learning outcomes for students enrolled in the course.   |
| <ul style="list-style-type: none"><li>• To familiarize students with basic knowledge of historical geology needed for higher level courses.</li><li>• To develop the students' understanding of the properties of substances in the light of trends in the historical geology across the columnar geology.</li><li>• To develop the students' appreciation of historical geology as an experimental science supported by theory as an interpretive and predictive tool.</li><li>• To develop in the students' an awareness of the application of historical geology to other areas.</li></ul>   |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)   |
| <ul style="list-style-type: none"><li>• Electronic materials and computer based programs have been utilized to support the lecture course material.</li><li>• The course is dynamic in nature especially as what concerns the use of computer soft ware in the practical exercises. Now the students are trained to apply surfer and finite extent programs.</li><li>• The course material was posted on the internet that could be accessed by the students enrolled in the course only.</li><li>• The experimental studies were reviewed. As a result of introducing new equipment and the intention to minimize the historical geology used.</li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>Principles of Historical Geology</b>                         | <b>2</b>    | <b>4</b>      |
| <b>Fossils - Index fossils</b>                                  | <b>1</b>    | <b>2</b>      |
| <b>Geochronology</b>  | <b>1</b>    | <b>2</b>      |
| <b>law of superposition of strata, law of faunal succession</b> | <b>2</b>    | <b>4</b>      |
| <b>law of crosscutting, law of inclusion</b>                    | <b>2</b>    | <b>4</b>      |
| <b>surfaces of unconformities</b>                               | <b>1</b>    | <b>2</b>      |
| <b>Lithostratigraphic units</b>                                 | <b>1</b>    | <b>2</b>      |
| <b>Bed, Member, Formation, Group</b>                            | <b>1</b>    | <b>2</b>      |

|  |          |          |
|--|----------|----------|
| <b>Geologic time rock units</b>          | <b>1</b> | <b>2</b> |
| <b>Salinity of Oceans</b>                | <b>1</b> | <b>2</b> |
| <b>Evidences and Causes of Evolution</b> | <b>2</b> | <b>4</b> |

|   |                     |   |        |
|---|---------------------|---|--------|
| 2 Course components (total contact hours per semester): |                     |   |        |
| Lecture: <b>30</b>                                      | Tutorial: <b>15</b> | Practical/Fieldwork/Internship: <b>48</b> | Other: |

|   |
|---|
| <p>3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)</p> <p><b>2-3 hours weekly for the homework and reports assignments.</b></p> |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• <b>A brief summary of the knowledge or skill the course is intended to develop;</b></li> <li>• <b>A description of the teaching strategies to be used in the course to develop that knowledge or skill;</b></li> <li>• <b>The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</b></li> </ul> |
| <b>a. Knowledge</b>  |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Historical geology using to determine the age.</b></li> <li>• <b>Explain the history of strata.</b></li> <li>• <b>Fixed the arrangements of strata.</b></li> <li>• <b>Identify the index fossils.</b></li> <li>• <b>Identify the surfaces of unconformities.</b></li> <li>• <b>Identify a evidences and causes of evolution.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>In-class lecturing where the previous knowledge is linked to the current and future topics</b></li> </ul>   |



|  |
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| <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Tutorial discussions</b></li> <li>• <b>Laboratory practice (systematic description and writing reports)</b></li> </ul>  |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Evaluation of laboratory reports</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <p><b>* Students will be able to understand the use and application of historical geology.</b></p> <p><b>* Students will be able to apply the knowledge have learnt concerning historical geology in field.</b></p> <p><b>* Students will be able to construct historical geology parameters.</b></p> <p><b>* Students will be able to identify the index fossils.</b></p> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Problem solving in the tutorial / recitation sessions</b></li> <li>• <b>Case studies related to the course topics and relevant field geology</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> <li>• <b>Manage resources, time and other members of the group</b></li> <li>• <b>Communicate results of work to others</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p><b>* Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</b></p>   |

|  |
|--|
| <p><b>* Practical work is planned around a number of historical geology problems..</b></p> <p><b>* Engage students in classroom and in practical session discussion with questions and answers.</b></p>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Laboratory exams</b></li> <li>• <b>Assessment of the laboratory reports</b></li> <li>• <b>Grading homework assignments</b></li> </ul> |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Use the computer for analysing and processing the data</b></li> <li>• <b>Use computational tools</b></li> <li>• <b>Report writing</b></li> </ul>                          |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Writing laboratory reports</b></li> <li>• <b>Incorporating the use and utilization of computer in the course requirements</b></li> </ul>                                    |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Evaluating the laboratory written reports</b></li> </ul>   |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><b>Not applicable</b></p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p style="text-align: center;"><b>Not applicable</b></p>  |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p style="text-align: center;"><b>Not applicable</b></p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Class activates ( in class quizzes, and homework)</b>           | <b>weekly</b> | <b>25%</b>                     |
| 2  | <b>Major exams I</b>   | <b>6</b>      | <b>15%</b>                     |
| 3  | <b>Major exams II</b>  | <b>12</b>     | <b>15%</b>                     |
| 4  | <b>Final exam</b>  | <b>16</b>     | <b>20%</b>                     |
| 5  | <b>Lab activates</b>   | <b>weekly</b> | <b>25%</b>                     |

#### D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Office hours 6 hr/ week**
- **help sessions 1hr/ week aided by two faculty members**

#### E Learning Resources

|  |
|--|
| 3. Required Text(s)  |
| <p><b>*Stanley, S. M, 2004, Earth System History. 2nd Edition, W H Freeman &amp; Co, 608 p.</b></p> <p><b>* Press,F., and R.Siever ( 1998): Understanding the Earth</b></p> <p><b>* Prothero, D.R., and R.H.Dott (2002): Evolution of the Earth</b></p>  |
| 2. Essential References  |
| <p><b>* Poort,J.M., and R.Carlson, (1992): Historical Geology</b></p> <p><b>* Mintz, L.W., (1981): Historical Geology</b></p>  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   |
| <p><b>* Abbott,P.,(1999): Natural disasters</b></p> <p><b>* Cooper,J.D.; R.H.Miller and J.Patterson (1990): Principles of historical geology</b></p> <p><b>* Eicher, D.L.,(1968): Geologic time</b></p> <p><b>* Margulis, L., and M.F.Dolan, (2002): Early Life: Evolution of the Precambrian Earth</b></p> <p><b>* Skinner, B.J., and S.C.Porter (1995): The Dynamic Earth</b></p> <p><b>* Stanley, S.M.,(1999): Earth System History</b></p> <p><b>* Stokes, W.L., (1973): Essentials of Earth History</b></p> <p><b>* Tarbuck, E.J., and F.K. Lutgens (1996): The Earth</b></p> |

|   |
|---|
| 4-.Electronic Materials, Web Sites etc  |
| <ul style="list-style-type: none"> <li>• <b>Websites on the internet that are relevant to the topics of the course</b></li> </ul> |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations                                 |
| <ul style="list-style-type: none"> <li>• <b>Multi media associated with the text book and the relevant websites</b></li> </ul>    |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.)   |
| <ul style="list-style-type: none"> <li>• <b>Lecture room with at least 25 seats</b></li> <li>• <b>Auditorium of a capacity of not less than 100 seats for large lecture format classes</b></li> <li>• <b>Geology laboratory with at least 30 places</b></li> </ul> |
| 4. Computing resources   |
| <ul style="list-style-type: none"> <li>• <b>Computer room containing at least 15 systems</b></li> </ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)  |
| <ul style="list-style-type: none"> <li>• <b>Availability of chemicals, glassware and equipment relevant to the course material</b></li> <li>• <b>Safety facilities</b></li> </ul>  |

## G Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  |
| <ul style="list-style-type: none"> <li>• <b>Course evaluation by student</b></li> <li>• <b>Students- faculty meetings</b></li> </ul>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |
| <ul style="list-style-type: none"> <li>• <b>Peer consultation on teaching</b></li> <li>• <b>Departmental council discussions</b></li> <li>• <b>Discussions within the group of faculty teaching the course</b></li> </ul> |
| 4 Processes for Improvement of Teaching   |
| <ul style="list-style-type: none"> <li>• <b>Conducting workshops given by experts on the teaching and learning methodologies</b></li> </ul>   |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Periodical departmental revisions of its methods of teaching</b></li> <li>• <b>Monitoring of teaching activates by senior faculty members</b></li> </ul>   |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Providing samples of all kind of assessment in the departmental course portfolio of each course</b></li> <li>• <b>Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy</b></li> <li>• <b>Conducting standard exams such as the other international universities exams.</b></li> </ul> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>  |



**GEO 221: Mineralogy**

**Course Specification**

**Revised March 2009**



## Course Specification

|  |
|--|
| Institution: king Saudi university   |
| College/Department : college of science – department of geology and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>mineralogy – GEO 221</b>   |
| 2. Credit hours : 3 credit hours ( 2 + 1)   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) |
| <b>B. sc. Program in Geology</b>  |
| 4. Name of faculty member responsible for the course<br><b>Prof : ahmed a. almohandis</b>   |
| 5. Level/year at which this course is offered : 4 th . level  |
| 6. Pre-requisites for this course (if any) : geo – 101  |
| 7. Co-requisites for this course (if any)   |
| 8. Location if not on main campus   |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <p>* The course intends to introduce the student to general crystallography and mineralogy.</p> <p>* This Course will develop student's knowledge of crystallography, silicate and non silicate mineralogy.</p>   |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <p>* The course content will be periodically reviewed by the instructors and the undergraduate committee as and when necessary.</p> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| Introduction : crystal growth, measurement of crystal angles  | 1           | 2+1           |
| Crystal systems and classes<br>Miller indices interfacial angles and axial ratios                               | 1           | 2+ 1          |
| Forms, crystal habits<br>Symmetry and unit cell   | 1           | 2+1           |
| Lattices and symmetry operations<br>Mineral chemistry : chemical composition. of the earth's crust              | 1           | 2+1           |
| Chemical analytical technique<br>Mineral Classification:<br>Native elements , sulphides and sulfosalts, halides | 1           | 2+1           |



|   |   |     |
|---|---|-----|
| Oxides, hydroxides, sulphides, carbonates, borates, phosphates and sulphates              | 1 | 2+1 |
| silicate minerals – structure and classification  | 1 | 2+1 |
| origin of minerals<br>introduction : nature of light, optical classification of crystals. | 1 | 2+1 |
| mineral preparation for microscopic study.  | 1 | 2+1 |
| - isotropic and anisotropic minerals, Polarized light                                     | 1 | 2+1 |
| The polarizing microscope , index of refraction   | 1 | 2+1 |
| interference colours and interference figures   | 1 | 2+1 |
| - uniaxial crystal optics, biaxial crystal optics<br>- the indicatrix                     | 1 | 2+1 |
| Application of the colour chart to the study of minerals                                  | 1 | 2+1 |
| - Mineral descriptions  | 1 | 2+1 |

|   |           |   |        |
|---|-----------|---|--------|
| 2 Course components (total contact hours per semester): |           |   |        |
| Lecture:<br>30 lectures                                 | Tutorial: | Practical/Fieldwork/Internship: 15 hours + 2 days fieldwork | Other: |

|   |
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| <p>3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) :</p> <p>Students are expected an average of 2 – 3 learning hours per week.</p> |
|---|

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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> </ul> <p>The course gives a basic knowledge on general mineralogy.</p> <ul style="list-style-type: none"> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> </ul> <p>- Teaching is conducted through lectures, practical sessions and fieldwork.</p> <ul style="list-style-type: none"> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> <p>- Methods include Quizzes, home works , tests , and examinations.</p> |
| <p><b>a. Knowledge</b></p>   |
| <p>(i) Description of the knowledge to be acquired</p> <p>- the student is expected to acquire basic knowledge in crystallography and mineralogy.</p> <p>- the student is expected to have some knowledge on the economic significance of mineral deposits.</p>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge :</p> <p>- Teaching will be conducted through lectures , practical sessions and fieldwork.</p>  |
| <p>(iii) Methods of assessment of knowledge acquired : Exams, quizzes, home-works and lab.</p> <p>Reports are used to asses the acquired knowledge on the subject.</p> <p>- oral and written exam in the Lab to lest the student's ability to Crystal systems and recognize minerals easily.</p>   |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed:</p> <p>Students will be able to apply their knowledge to identify minerals and crystal systems and classes .</p> <p>- Students will be able to understand the applications of chemistry and physics to differentiate between minerals and to imagine the crystals in 3 dimensions.</p>  |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills:- Assignments are given to students</p>   |

|  |
|--|
| <p>at regular intervals .</p> <ul style="list-style-type: none"> <li>- Participation of students in classroom discussions.</li> <li>- Late or no submission of assignments will be considered.</li> <li>- Practical assignments are to be written and should be submitted on time.</li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>- Class attendance of student at the beginning of the lecture is recorded.</li> <li>- Recording of submission of assignments and the grades.</li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>- Punctual attendance of classes and laboratory sessions is required of the students.</li> <li>- Students learn to manage their time in self study of the course material.</li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>- Teaching will be conducted through lectures , practical sessions and fieldwork.</li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>- Methods include quizzes , home works , tests and examinations.</li> <li>- Training to solve some crystallographic and mineralogical problems.</li> </ul>                           |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>- Use of computer to producing lab reports and assignments.</li> <li>- Ability to write Reports.</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>- Questions require student's knowledge in mineralogy and crystallography and to solve problems in symmetry and miller indices.</li> </ul>   |

|  |
|--|
| (iii) Methods of assessment of students numerical and communication skills<br>- Evaluation of written lab reports.<br>- Through students score in all tests and assignments. |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br>-----   |
| (ii) Teaching strategies to be used to develop these skills<br><br>- Not applicable.   |
| (iii) Methods of assessment of students psychomotor skills<br><br>-----  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |          |                                |
|--|--|----------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| 1  | Assignments and attendance   |          | 10%                            |
| 2  | Midterm examination  |          | 10%                            |
| 3  | Lab and field works  |          | 30%                            |
| 4  | Final examination  |          | 50%                            |
| 5  |  |          |                                |
| 6  |  |          |                                |
| 7  |  |          |                                |
| 8  |  |          |                                |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- Each faculty is required to be available in his office to devote at least 3 hours a week for students for consultation and academic advice.

## E Learning Resources

1. Required Text(s) :

Klein, C. & Dutrow, B, 2008, Manual of Mineralogy, 23rd edition, John Wiley & Sons, 704 p.

2. Essential References :

- Nesse, W.D., 2004, Introduction to Mineralogy. Oxford University Press, 464 p.
- Nesse, W.D., & Schulze, D. J., 2004, Introduction to optical mineralogy, 3rd ed., Oxford University press, 370p.
- MacKenzie, W.S. & Adams, A.E., 1994, A Color Atlas of Rocks and Minerals in Thin Section, John Wiley & Sons, Inc., 192 p.
- Phillips, F.C an introduction to crystallography , john wiley& sons.
- Lab manual prepared for this course.

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

- The instructor will provide a list of references for the students, as the course contains diverse topics.

4- Electronic Materials, Web Sites etc

- search through Google for related topics

5- Other learning material such as computer-based programs/CD, professional standards/regulations

- The instructor will provide some relevant materials and learning aids.

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>- Lecture Room equipped with a blackboard, overhead projector , and internet connection .</li> <li>- The lab have a blackboard, overhead projector and seating arrangement for students.</li> </ul> |
| <p>2. Computing resources</p> <ul style="list-style-type: none"> <li>- An easily accessible computer lab.</li> </ul>   |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p>   |

## G Course Evaluation and Improvement Processes

|   |
|---|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>- Student course evaluation at the conclusion of the course</li> </ul>   |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>- Faculty assessment of the course and effectiveness of teaching delivery.</li> <li>- Periodic self- assessment of the program.</li> </ul>   |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>-Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</li> <li>-Feedback from employers and and graduating students' input are used to identify any deficiencies in students' ability in applying mineralogical knowledge.</li> <li>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</li> <li>-Teaching method will focus on students' learning and on course learning outcomes</li> </ul>  |
| <p>4 Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>-Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements</li> <li>- A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities</li> </ul> |

and the adequacy of the equipment used in the lab.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.



**GEO 236: Stratigraphy and  
Sedimentology**

**Course Specification**

**Revised March 2009**





## Course Specification

|                    |  |                                      |
|--------------------|--|--------------------------------------|
| Institution        | King Saud University                                       | Department of Geology and Geophysics |
| College/Department | College of Sciences / Department of Geology and Geophysics |                                      |

### A. Course Identification and General Information

|   |
|---|
| 1. Course title and code: Stratigraphy and Sedimentology– <b>GEO 236</b>  |
| 2. Credit hours: 3 hrs. (2+1)   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br>Geology (offered in the Department of Geology).  |
| 4. Name of faculty member responsible for the course<br>Dr. Mohammad Eesa Al-Dabbagh  |
| 5. Level/year at which this course is offered<br>Level 3 – 2 <sup>nd</sup> year   |
| 6. Pre-requisites for this course (if any)<br><br>– <b>GEO 221</b>  |
| 7. Co-requisites for this course (if any)<br>None   |
| 8. Location if not on main campus <ul style="list-style-type: none"><li>• All courses and labs are given in the Geology Department.</li><li>• One three days field trip is required for this course. The field trip is out of Riyadh.</li></ul> |

## B. Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• Acquisition of knowledge by learning new concepts; explaining sedimentology and stratigraphy. The physical properties of grains ( such as grain size. Porosity, permeability etc.) are taught. Stratigraphy includes correlation, facies, geologic periods etc.</li> <li>• Cognitive skills through thinking and use of experimental work. Recognition of the different rocks in the field and see their physical properties in the lab; and how weathering affected them?</li> <li>• The students are encouraged to use computer soft ware and use the net for retrieving information.</li> <li>• Student becomes responsible for their own learning through the given assignments, laboratory exercises, report writing and presentation in front of the whole class.</li> </ul>                            |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• The course contents will be periodically reviewed by the instructors and new materials can be added when necessary.</li> <li>• Some assignments are given to the students to encourage them to search in the net. Among many sites are: Saudi Geological Survey, Saudi Armco, Ministry of Petroleum and Minerals, United States Geological Survey, Geo-Arabia, Saudi Geological Society. This in addition to the related journals and periodicals.</li> <li>• One individual presentation is required if the student numbers allow. If the number is high , one presentation for each group of four or five. Each one presents part of the presentation.</li> </ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| Introduction and fundamentals of sedimentology; Arab and Muslim contributors in sedimentology and stratigraphy. | 1           | (2+1)         |
| Physical properties(grain size,shape,fabric, porosity,and permeability).  | 2           | (3+2)         |
| Weathering; transportation.; deposition.  | 2           | (3+2)         |
| Sedimentary structures. - First mid-term exam   | 2           | (3+2)         |
| Introduction and fundamentals of stratigraphy. Main concepts.   | 1           | (2+1)         |
| Breaks in the record; principle of superposition.   | 1           | (2+1)         |
| Facies and facies changes.  | 1           | (2+1)         |
| Correlation.  | 1           | (2+1)         |
| Relative and radiometric dating.  | 1           | (2+1)         |
| Stratigraphic code. - First mid-term exam   | 2           | (3+2)         |
| Geologic column.  | 1           | (2+1)         |

2 Course components (total contact hours per semester):

Lectures: 30 hours /semesters; ( 3hrs/ week);      Laboratory : 45 hours /semester ( 3hrs/week )

Three days field trip.

3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week)

- Students are expected to accomplish an average of 3 learning hours per week.

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop.
- A description of the teaching strategies to be used in the course to develop that knowledge or skill.
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- Knowledge of the physical properties of grains. Statistical application in the lab.
- The students are required to examine and study the thin sections representing the different rocks under the microscope and observe the different forms of porosities.
- Teaching this course is conducted through lectures, practical sessions and fieldwork.

(ii) Teaching strategies to be used to develop that knowledge

- Course materials are delivered through a sequential delivery of lectures.
- Interactive learning process through questions and answers in class and lab.
- Laboratory work, engaging students to plan and coordinate tests.
- Field trip is required to give the student a direct look and contact with the different rocks. The student can see the weathered rocks.

|   |
|---|
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>Exams, homework and lab reports are used to assess the acquired knowledge on the subject.</li> <li>Oral presentation is given to examine the students' ability to perform and to show their knowledge of the subject.</li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>Students will be able to apply the knowledge of the rocks and realize what affected and shape them.</li> <li>They apply their knowledge in relation to properties especially different porosities and permeability. They are very important in oil and water resources.</li> <li>They should be able to assess the importance of each property of each rock type.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>Lectures are supported by illustration, hand outs and sometimes with presentation. Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</li> <li>Laboratory work is planned to teach the student how to recognize easily and to distinguish between the different rocks, in the field, in hand specimen and under the microscope as well.</li> <li>Engage students in classroom and laboratory discussion with questions and answers.</li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>Exams and homework will be emphasized on the rocks which contain important resources. .</li> <li>Laboratory reports prepare the student to deal with different methods, data analysis and interpretation .</li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>Punctual attendance of classes and laboratory session is required of the students..</li> <li>Students will take the responsibility to accomplish any given assignment or home work on their own and submit them on time.</li> <li>Students learn to manage their time in self study of the coarse material.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p>  |

|   |
|---|
| <ul style="list-style-type: none"> <li>• Assignments are given to the students at regular intervals to give them time to accomplish and submit on time. Late or no submission of assignments carries penalties or loss of part of the grade points.</li> <li>• Laboratory reports are to be written in the prescribed format and are to be submitted on time.</li> <li>• Field trip attendance is required for the course. Some questions about the field are given at least in one of the exams..</li> <li>• Participation of students in classroom discussion is encouraged.</li> </ul> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• Class attendance of students at the beginning of the lecture is recorded.</li> <li>• Lab, and field trip attendance is imperative and it is recorded.</li> <li>• Submission of assignment and home work is also recorded.</li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• Ability of students to apply basic knowledge of computer and GIS.</li> <li>• Use of computer in search for additional knowledge and in producing lab reports and assignments. Computer is used for statistical parameters.</li> <li>• Ability to write some reports using important terms in English</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• Questions of tests and assignments require students' knowledge of important subjects.</li> <li>• Questions include important English terms to familiarize the students to the foreign language.</li> <li>• Some assignments include some computer search.</li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• Assigned grades for each assignment, report ,exams are recorded.</li> <li>• Lab assignments are graded and recorded.</li> <li>• Extra grades might be added for good participation in class and in the field.</li> <li>• All grades are added and the total is given after the finals.</li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>   |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>Not applicable.</p>   |

| (ii) Teaching strategies to be used to develop these skills      |  |                                  |                                |
|--|--|----------------------------------|--------------------------------|
| (iii) Methods of assessment of students psychomotor skills       |  |                                  |                                |
| 5. Schedule of Assessment Tasks for Students During the Semester |  |                                  |                                |
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                         | Proportion of Final Assessment |
| 1  | Homework , (and one field trip report , this only once).           | Every three weeks                | 5%                             |
| 2  | 13 lab reports, each for a new test                                | Weekly                           | 25%                            |
| 3  | First mid-term exam  | Within the sixth week            | 10%                            |
| 4  | Second mid-term exam   | Within the 13 <sup>th</sup> week | 10%                            |
| 5  | Final Exam   | As scheduled by the registrar    | 50%                            |

## D. Support

|  |
|--|
| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"> <li>I am available in the office to devote as much as it takes to answer any question related to the course. I am also available for any academic advice and consultation.</li> <li>Office hours are posted, but I am available almost the entire working day.</li> </ul> |
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## E. Learning Resources

|  |
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| <p>1. Required Text(s):</p> <ul style="list-style-type: none"> <li>"Principles of Sedimentology" by Mohammad A. Moshrif; King Saud University Publication.</li> <li>"Sedimentary Geology" by: Donald R. Prothero and Fred Schwab; W.H. Freeman and Co.</li> </ul>  |
| <p>2. Essential References</p> <ul style="list-style-type: none"> <li>"Sedimentary Petrology" by: Robert Folk; Translated by: Ahmad A. Al-Aswad; King Saud University Publications.</li> <li>"Sedimentary Petrology" by: Maurice Tucker; Blackwell Scientific Publications.</li> <li>"Field Description of Sedimentary Rocks" by: Maurice Tucker; Translated by: Mohammad H. Basyoni and Ahmad M. Mursi; King Abdulaziz University Publications.</li> <li>Selly, R. C., 1996, An Introduction to Sedimentology: New York, Academic Press, 408p.</li> <li>Boggs, S., 2006, Principles of Sedimentology and Stratigraphy, 4th ed., Pearson-Prentice Hall,</li> </ul> |

|  |
|--|
| 688 p.<br><ul style="list-style-type: none"> <li>Selected handouts and reference materials on sedimentary rocks and sedimentary petrology.</li> <li>Lab handouts are prepared for this course.</li> </ul>  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br>Journal of King Saud University( Science); Journal of Sedimentary Geology; Geological Society of America; American Association of Petroleum Geologists; Journal of Micropaleontology; Geo-Arabia; Journal of Petroleum Geology; Arabian Journal of Geosciences.<br>The instructor will provide a list of references for the students, as the course contains diverse topics. |
| 4-.Electronic Materials, Web Sites etc.<br><br><ul style="list-style-type: none"> <li>Among many recommended sites are: Saudi Geological Survey, Saudi Armco, Ministry of Petroleum and Minerals, United States Geological Survey, Maaden, Geo-Arabia, Saudi Geological Society and all related journals and periodicals.</li> <li>Search through Google for related topics.</li> </ul>  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations<br><br><ul style="list-style-type: none"> <li>The instructor may provide some relevant materials and learning aids.</li> </ul>   |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br><br><ul style="list-style-type: none"> <li>Lecture room is equipped with a black board, overhead projector, data show, and computer.</li> <li>Fully equipped laboratories with binoculars, polarizing microscopes and other needed equipments.</li> </ul> All field equipments are required for the three day field trip.   |
| 2. Computing resources<br>An easily accessible computer lab in the department and in the college. <ul style="list-style-type: none"> <li>GIS lab is available in the department.</li> </ul>   |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br><ul style="list-style-type: none"> <li>The laboratory is equipped with binoculars, polarizing microscopes and other needed equipments. Some labs are equipped with data show and computer.</li> </ul> Brunton compass, hand level, lens, hammer, chisel, acid and sample bags are required for the field trip. <ul style="list-style-type: none"> <li>Samples of different rocks and minerals are available in the lab.</li> </ul> |

## G. Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  |
| <ul style="list-style-type: none"><li>• Student course evaluation at the conclusion of the course.</li></ul>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |
| <ul style="list-style-type: none"><li>• Faculty assessment of the course and effectiveness of teaching delivery.</li><li>• Periodic self- assessment of the program.</li></ul>  |
| 3 Processes for Improvement of Teaching   |
| <ul style="list-style-type: none"><li>• A committee assigned by the department will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</li><li>• Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge.</li><li>• Workshops are organized on effective teaching methods to enable instructors to improve their teaching skill.</li><li>• Teaching method will focus on students' learning and on course learning outcomes.</li></ul> |
| 4. Processes for verifying standards of student achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)   |
| <ul style="list-style-type: none"><li>• A committee assigned by the department will review samples of student work in this course to check on the standard of grades and achievements.</li><li>• A committee of faculty members can evaluate the course material and the students' work to compare the standard of grades and achievements compared to other known universities. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</li></ul>   |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.  |
| <ul style="list-style-type: none"><li>• The department intend to apply periodical self- assessment and might rely on external assessment by an invited faculty member or consultant.</li><li>• The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</li></ul>   |





**GEO 242**

**Micropaleontology**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution:       | <b>King Saud University</b>                    |
| College/Department | <b>College of Science / Geology Department</b> |

### A Course Identification and General Information

|   |   |
|---|---|
| 1. Course title and code:   | <b>Principles of Micro Fossils (Geo 242)</b>                      |
| 2. Credit hours   | <b>3(2+1)</b>   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>B.Sc. program in Geology</b>                                   |
| 4. Name of faculty member responsible for the course  | <b>Prof. Ali A.F. AL-FURAIH</b>                                   |
| 5. Level/year at which this course is offered   | <b>Level five</b>   |
| 6. Pre-requisites for this course (if any)  | <b>Physical geology (Geo 101) and Historical Geology(Geo 102)</b> |
| 9. Co-requisites for this course (if any)   |   |
| 8. Location if not on main campus   |   |

## B Objectives

|   |
|---|
| 1. Summary of the main learning outcomes for students enrolled in the course.   |
| <ul style="list-style-type: none"><li>• To familiarize students with basic knowledge of Micro Fossils needed for higher level courses.</li><li>• To develop the students' understanding of the properties of substances in the light of trends in the invertebrate fossils across the Micro Fossils.</li><li>• To develop the students' appreciation of Micro Fossils as an experimental science supported by theory as an interpretive and predictive tool.</li><li>• To develop in the students' an awareness of the application of Micro Fossils to other areas.</li></ul>   |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)   |
| <ul style="list-style-type: none"><li>• Electronic materials and computer based programs have been utilized to support the lecture course material.</li><li>• The course is dynamic in nature especially as what concerns the use of computer soft ware in the practical exercises. Now the students are trained to apply surfer and finite extent programs.</li><li>• The course material was posted on the internet that could be accessed by the students enrolled in the course only.</li><li>• The experimental studies were reviewed. As a result of introducing new equipment and the intention to minimize the invertebrate fossils used.</li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                       |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Introduction in Micropaleontology</b>     | <b>1</b>    | <b>3</b>      |
| <b>Fossilization</b>                         | <b>1</b>    | <b>3</b>      |
| <b>Marine sedimentation environments</b>     | <b>1</b>    | <b>3</b>      |
| <b>Classification of marine zones</b>        | <b>1</b>    | <b>3</b>      |
| <b>Classification of marine organisms</b>    | <b>1</b>    | <b>3</b>      |
| <b>Importance of microfossils</b>            | <b>1</b>    | <b>3</b>      |
| <b>Geological history of microfossils</b>    | <b>1</b>    | <b>3</b>      |
| <b>Collection and preparation of samples</b> | <b>1</b>    | <b>3</b>      |

|   |          |          |
|---|----------|----------|
| <b>Study the important micro faunas in the record</b> | <b>1</b> | <b>3</b> |
| <b>Foraminifera</b>                                   | <b>1</b> | <b>3</b> |
| <b>Radiolaria</b>                                     | <b>1</b> | <b>3</b> |
| <b>Ostracoda</b>                                      | <b>1</b> | <b>3</b> |
| <b>Conodonts</b>                                      | <b>1</b> | <b>3</b> |
| <b>Algae, Diatoms</b>                                 | <b>1</b> | <b>3</b> |
| <b>Pollen grains, Spores</b>                          | <b>1</b> | <b>3</b> |

|   |                     |   |        |
|---|---------------------|---|--------|
| 2 Course components (total contact hours per semester): |                     |   |        |
| Lecture: <b>30</b>                                      | Tutorial: <b>15</b> | Practical/Fieldwork/Internship: <b>48</b> | Other: |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
| <b>2 hours weekly for the homework and reports assignments.</b>   |

|   |
|---|
| 4. Development of Learning Outcomes in Domains of Learning  |
| For each of the domains of learning shown below indicate:   |
| <ul style="list-style-type: none"> <li>• <b>A brief summary of the knowledge or skill the course is intended to develop;</b></li> <li>• <b>A description of the teaching strategies to be used in the course to develop that knowledge or skill;</b></li> <li>• <b>The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</b></li> </ul> |
| <b>a. Knowledge</b>   |
| (i) Description of the knowledge to be acquired <ul style="list-style-type: none"> <li>• <b>Micro fossils using to determine the age.</b></li> <li>• <b>Explain the history of strata.</b></li> </ul>   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Fixed the arrangements of strata.</b></li> <li>• <b>Identify the index fossils.</b></li> <li>• <b>Identify the surfaces of unconformities.</b></li> <li>• <b>Identify a evidences and causes of evolution.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>In-class lecturing where the previous knowledge is linked to the current and future topics</b></li> <li>• <b>Homework assignments</b></li> <li>• <b>Tutorial discussions</b></li> <li>• <b>Laboratory practice (systematic description and writing reports)</b></li> </ul>             |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Evaluation of laboratory reports</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p> <p><b>* Students will be able to understand the use and application of Micro fossils.</b></p> <p><b>* Students will be able to apply the knowledge have learnt concerning Micro fossils in field.</b></p> <p><b>* Students will be able to construct Micro fossils parameters.</b></p> <p><b>* Students will be able to identify the index fossils.</b></p> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Problem solving in the tutorial / recitation sessions</b></li> <li>• <b>Case studies related to the course topics and relevant field geology</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> </ul>  |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Manage resources, time and other members of the group</b></li> <li>• <b>Communicate results of work to others</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p><b>* Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</b></p> <p><b>* Practical work is planned around a number of invertebrate fossils problems..</b></p> <p><b>* Engage students in classroom and in practical session discussion with questions and answers.</b></p> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Laboratory exams</b></li> <li>• <b>Assessment of the laboratory reports</b></li> <li>• <b>Grading homework assignments</b></li> </ul>   |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Use the computer for analysing and processing the data</b></li> <li>• <b>Use computational tools</b></li> <li>• <b>Report writing</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Writing laboratory reports</b></li> <li>• <b>Incorporating the use and utilization of computer in the course requirements</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Evaluating the laboratory written reports</b></li> </ul>   |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><b>Not applicable</b></p>  |

|   |
|---|
| (ii) Teaching strategies to be used to develop these skills |
| <b>Not applicable</b>                                       |
| (iii) Methods of assessment of students psychomotor skills  |
| <b>Not applicable</b>                                       |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Class activates ( in class quizzes, and homework)</b>           | <b>weekly</b> | <b>25%</b>                     |
| 2  | <b>Major exams I</b>   | <b>6</b>      | <b>15%</b>                     |
| 3  | <b>Major exams II</b>  | <b>12</b>     | <b>15%</b>                     |
| 4  | <b>Final exam</b>  | <b>16</b>     | <b>20%</b>                     |
| 5  | <b>Lab activates</b>   | <b>weekly</b> | <b>25%</b>                     |

#### D. Student Support

|   |
|---|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) |
| <ul style="list-style-type: none"> <li>• <b>Office hours 6 hr/ week</b></li> <li>• <b>help sessions 1hr/ week aided by two faculty members</b></li> </ul>         |

#### E Learning Resources

|   |
|---|
| 5. Required Text(s)   |
| <ul style="list-style-type: none"> <li>* <b>Bignot,G.,(1985): Elements of Micropaleontology</b></li> <li>* <b>Brasier,R.F., (1980): Microfossils</b></li> </ul>   |
| 2. Essential References   |
| <ul style="list-style-type: none"> <li>* <b>AL-FURAIH, A.A.,(2000): Principles of micro fossils</b></li> </ul>  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)  |
| <ul style="list-style-type: none"> <li>* <b>Flugel, E.,(1977): Fossil Algae Recent Results and Developments</b></li> <li>* <b>Haq, B.U., and A.Boersma, (1980): Introduction to Marine Micropaleontology</b></li> </ul> |

|  |
|--|
| <ul style="list-style-type: none"> <li>* <b>Haynes, J.R., (1981): Foraminifera</b></li> <li>* <b>Lindstrom, M.,(1964): Conodonts</b></li> <li>* <b>Pokorny, V. (1980): Introduction to Marine Micropaleontology</b></li> <li>* <b>Traverse, A., (1988): Paleopalynology</b></li> </ul> |
| <p>4-.Electronic Materials, Web Sites etc</p> <ul style="list-style-type: none"> <li>• <b>Websites on the internet that are relevant to the topics of the course</b></li> </ul>  |
| <p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <ul style="list-style-type: none"> <li>• <b>Multi media associated with the text book and the relevant websites</b></li> </ul>  |

## F. Facilities Required

|  |
|--|
| <p>Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)</p>  |
| <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>• <b>Lecture room with at least 25 seats</b></li> <li>• <b>Auditorium of a capacity of not less than 100 seats for large lecture format classes</b></li> <li>• <b>Geology laboratory with at least 30 places</b></li> </ul> |
| <p>6. Computing resources</p> <ul style="list-style-type: none"> <li>• <b>Computer room containing at least 15 systems</b></li> </ul>  |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> <li>• <b>Availability of chemicals, glassware and equipment relevant to the course material</b></li> <li>• <b>Safety facilities</b></li> </ul>                     |

## G Course Evaluation and Improvement Processes

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Course evaluation by student</b></li> <li>• <b>Students- faculty meetings</b></li> </ul> |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Peer consultation on teaching</b></li> </ul>                                 |



|    |   |
|----|---|
|    | <ul style="list-style-type: none"> <li>• <b>Departmental council discussions</b></li> <li>• <b>Discussions within the group of faculty teaching the course</b></li> </ul>   |
| 5  | <p>Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Conducting workshops given by experts on the teaching and learning methodologies</b></li> <li>• <b>Periodical departmental revisions of its methods of teaching</b></li> <li>• <b>Monitoring of teaching activates by senior faculty members</b></li> </ul>  |
| 4. | <p>Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Providing samples of all kind of assessment in the departmental course portfolio of each course</b></li> <li>• <b>Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy</b></li> <li>• <b>Conducting standard exams such as the other international universities exams.</b></li> </ul> |
| 5  | <p>Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>   |



**GEO 243**

**Principles of Invertebrate  
Palaeontology**

**Course Specification**

**Revised November 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution:       | <b>King Saud University</b>                                   |
| College/Department | <b>College of Science / Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |   |
|---|---|
| 1. Course title and code:   | <b>Principles of Invertebrate palaeontology (GEO 243)</b> |
| 2. Credit hours   | <b>3(2+1)</b>   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>B.Sc. program in Geology</b>                           |
| 4. Name of faculty member responsible for the course  | <b>Prof. Ali A.F. AL-FURAIH</b>                           |
| 5. Level/year at which this course is offered   | <b>Level five</b>   |
| 6. Pre-requisites for this course (if any)  | <b>Historical Geology (Geo 102)</b>                       |
| 10.Co-requisites for this course (if any)   |   |
| 8. Location if not on main campus   |   |

## B Objectives

|   |
|---|
| 1. Summary of the main learning outcomes for students enrolled in the course.   |
| <ul style="list-style-type: none"><li>• To familiarize students with basic knowledge of invertebrate fossils needed for higher level courses.</li><li>• To develop the students' understanding of the properties of substances in the light of trends in the invertebrate fossils across the historical geology.</li><li>• To develop the students' appreciation of invertebrate fossils as an experimental science supported by theory as an interpretive and predictive tool.</li><li>• To develop in the students' an awareness of the application of invertebrate fossils to other areas.</li></ul>   |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)   |
| <ul style="list-style-type: none"><li>• Electronic materials and computer based programs have been utilized to support the lecture course material.</li><li>• The course is dynamic in nature especially as what concerns the use of computer soft ware in the practical exercises. Now the students are trained to apply surfer and finite extent programs.</li><li>• The course material was posted on the internet that could be accessed by the students enrolled in the course only.</li><li>• The experimental studies were reviewed. As a result of introducing new equipment and the intention to minimize the invertebrate fossils used.</li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Introduction in Invertebrate fossils comprise: Conditions of fossilization</b>              | <b>1</b>    | <b>3</b>      |
| <b>Processes of fossilization - Modes of preservation</b>                                      | <b>1</b>    | <b>3</b>      |
| <b>Fossil record – Index fossil – Importance of fossil studies – Taxonomy and nomenclature</b> | <b>1</b>    | <b>3</b>      |
| <b>Study the important invertebrate fossils in the record like: Phylum Sponges</b>             | <b>1</b>    | <b>3</b>      |
| <b>Phylum Cindaria (Corals)</b>  | <b>1</b>    | <b>3</b>      |

|   |          |          |
|---|----------|----------|
| <b>Phylum Bryozoa</b>   | <b>1</b> | <b>3</b> |
| <b>Phylum Mollusca (Amphineura, Scaphopoda, Pelecypoda, Gastropoda, Cephalopoda)</b>            | <b>1</b> | <b>3</b> |
| <b>Phylum Echinodermata (Echinoidea, Crinozoa)</b>  | <b>1</b> | <b>3</b> |
| <b>Phylum Brachiopoda (Articulata, Inarticulata)</b>  | <b>1</b> | <b>3</b> |
| <b>Phylum Annelida (Oligochaeta, Hirudinea)</b>   | <b>1</b> | <b>3</b> |
| <b>Phylum Arthropoda (Trilobita)</b>  | <b>1</b> | <b>3</b> |
| <b>Phylum Hemichordata (Graptolithina)</b>  | <b>1</b> | <b>3</b> |
| <b>Ichnology: trace fossil classifications</b>  | <b>1</b> | <b>3</b> |
| <b>Taxonomy classification, Depositional classification, Behavioral classification</b>          | <b>1</b> | <b>3</b> |
| <b>the study comprise: Morphology, Classification, Index genus, Historical geology, Ecology</b> | <b>1</b> | <b>3</b> |

|   |                     |   |        |
|---|---------------------|---|--------|
| 2 Course components (total contact hours per semester): |                     |   |        |
| Lecture: <b>30</b>                                      | Tutorial: <b>15</b> | Practical/Fieldwork/Internship: <b>48</b> | Other: |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
| <b>2-3 hours weekly for the homework and reports assignments.</b>   |

|   |
|---|
| 4. Development of Learning Outcomes in Domains of Learning  |
| For each of the domains of learning shown below indicate:   |
| <ul style="list-style-type: none"> <li>• <b>A brief summary of the knowledge or skill the course is intended to develop;</b></li> <li>• <b>A description of the teaching strategies to be used in the course to develop that knowledge or skill;</b></li> <li>• <b>The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</b></li> </ul> |
| <b>a. Knowledge</b>   |
| (i) Description of the knowledge to be acquired   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Invertebrate fossils using to determine the age.</b></li> <li>• <b>Explain the history of strata.</b></li> <li>• <b>Fixed the arrangements of strata.</b></li> <li>• <b>Identify the index fossils.</b></li> <li>• <b>Identify the surfaces of unconformities.</b></li> <li>• <b>Identify a evidences and causes of evolution.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>In-class lecturing where the previous knowledge is linked to the current and future topics</b></li> <li>• <b>Homework assignments</b></li> <li>• <b>Tutorial discussions</b></li> <li>• <b>Laboratory practice (systematic description and writing reports)</b></li> </ul>   |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Evaluation of laboratory reports</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>* <b>Students will be able to understand the use and application of invertebrate fossils.</b></li> <li>* <b>Students will be able to apply the knowledge have learnt concerning invertebrate fossils in field.</b></li> <li>* <b>Students will be able to construct invertebrate fossils parameters.</b></li> <li>* <b>Students will be able to identify the index fossils.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Problem solving in the tutorial / recitation sessions</b></li> <li>• <b>Case studies related to the course topics and relevant field geology</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |

|  |
|--|
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> <li>• <b>Manage resources, time and other members of the group</b></li> <li>• <b>Communicate results of work to others</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p><b>* Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</b></p> <p><b>* Practical work is planned around a number of invertebrate fossils problems..</b></p> <p><b>* Engage students in classroom and in practical session discussion with questions and answers.</b></p> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Laboratory exams</b></li> <li>• <b>Assessment of the laboratory reports</b></li> <li>• <b>Grading homework assignments</b></li> </ul>   |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Use the computer for analysing and processing the data</b></li> <li>• <b>Use computational tools</b></li> <li>• <b>Report writing</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Writing laboratory reports</b></li> <li>• <b>Incorporating the use and utilization of computer in the course requirements</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Evaluating the laboratory written reports</b></li> </ul>   |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |

|   |
|---|
| (i) Description of the psychomotor skills to be developed and the level of performance required |
| <b>Not applicable</b>   |
| (ii) Teaching strategies to be used to develop these skills                                     |
| <b>Not applicable</b>   |
| (iii) Methods of assessment of students psychomotor skills                                      |
| <b>Not applicable</b>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Class activates ( in class quizzes, and homework)</b>           | <b>weekly</b> | <b>25%</b>                     |
| 2  | <b>Major exams I</b>   | <b>6</b>      | <b>15%</b>                     |
| 3  | <b>Major exams II</b>  | <b>12</b>     | <b>15%</b>                     |
| 4  | <b>Final exam</b>  | <b>16</b>     | <b>20%</b>                     |
| 5  | <b>Lab activates</b>   | <b>weekly</b> | <b>25%</b>                     |

#### D. Student Support

|   |
|---|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) |
| <ul style="list-style-type: none"> <li>• <b>Office hours 6 hr/ week</b></li> <li>• <b>help sessions 1hr/ week aided by two faculty members</b></li> </ul>         |

#### E Learning Resources

|   |
|---|
| 7. Required Text(s)   |
| <b>* Wells, J.W., (1973): Treaties on Invertebrate Paleontology</b>       |
| 2. Essential References   |
| <b>* Clarkson, E.N.K.,(1994): Invertebrate Paleontology and Evolution</b> |



|  |
|--|
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   |
| <p>* <b>Babin,C.,(1981): Elements of Paleontology</b></p> <p>* <b>Boardman,R.S.; A.H.Cheetham and A.J.Rowell (1987): Fossil Invertebrates</b></p> <p>* <b>Dodd, J.R., and R.J.Stanton, (1990): Paleoecology</b></p> <p>*<b>Prothero, D.R. 2003. Bringing Fossils to Life: An Introduction to Paleobiology (2nd ed). McGraw- Hill, New York, 503 p.</b></p> |
| 4-.Electronic Materials, Web Sites etc   |
| <ul style="list-style-type: none"> <li>• <b>Websites on the internet that are relevant to the topics of the course</b></li> </ul>  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations  |
| <ul style="list-style-type: none"> <li>• <b>Multi media associated with the text book and the relevant websites</b></li> </ul>   |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.)   |
| <ul style="list-style-type: none"> <li>• <b>Lecture room with at least 25 seats</b></li> <li>• <b>Auditorium of a capacity of not less than 100 seats for large lecture format classes</b></li> <li>• <b>Geology laboratory with at least 30 places</b></li> </ul> |
| 8. Computing resources   |
| <ul style="list-style-type: none"> <li>• <b>Computer room containing at least 15 systems</b></li> </ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)  |
| <ul style="list-style-type: none"> <li>• <b>Availability of chemicals, glassware and equipment relevant to the course material</b></li> <li>• <b>Safety facilities</b></li> </ul>  |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching   |
| <ul style="list-style-type: none"> <li>• <b>Course evaluation by student</b></li> <li>• <b>Students- faculty meetings</b></li> </ul> |

|    |   |
|----|---|
| 2  | <p>Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Peer consultation on teaching</b></li> <li>• <b>Departmental council discussions</b></li> <li>• <b>Discussions within the group of faculty teaching the course</b></li> </ul>   |
| 6  | <p>Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Conducting workshops given by experts on the teaching and learning methodologies</b></li> <li>• <b>Periodical departmental revisions of its methods of teaching</b></li> <li>• <b>Monitoring of teaching activates by senior faculty members</b></li> </ul>  |
| 4. | <p>Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Providing samples of all kind of assessment in the departmental course portfolio of each course</b></li> <li>• <b>Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy</b></li> <li>• <b>Conducting standard exams such as the other international universities exams.</b></li> </ul> |
| 5  | <p>Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>   |



**GEO 262**

**Environmental Geology**

**Course Specification**

**Revised November 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution:       | <b>King Saud University</b>                                   |
| College/Department | <b>College of Science / Geology Department and Geophysics</b> |

### A Course Identification and General Information

|  |
|--|
| 1. Course title and code: <b>Environmental Geology (GEO 262)</b>   |
| 2. Credit hours <b>2 (2+0)</b>   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>B.Sc. program in Geology</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Mohamed Naguib EL-SABROUTY</b>  |
| 5. Level/year at which this course is offered<br><b>5<sup>th</sup> level</b>   |
| 6. Pre-requisites for this course (if any)<br><br><b>GEO 221</b>   |
| 11. Co-requisites for this course (if any)   |
| 8. Location if not on main campus  |

## B Objectives

|  |
|--|
| 1. Summary of the main learning outcomes for students enrolled in the course.  |
| <ul style="list-style-type: none"><li>• To familiarize students with basic knowledge of environmental geology needed for higher level courses.</li><li>• To develop the students' understanding of the properties of substances in the light of trends in the environment across the geology.</li><li>• To develop the students' appreciation of environmental as an experimental science supported by theory as an interpretive and predictive tool.</li><li>• To develop in the students' an awareness of the application of environmental geology to other areas.</li></ul> |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)  |
| <ul style="list-style-type: none"><li>• Electronic materials and computer based programs have been utilized to support the lecture course material.</li><li>• The course is dynamic in nature especially as what concerns the use of computer soft ware in the practical exercises. Now the students are trained to apply surfer and finite extent programs.</li><li>• The course material was posted on the internet that could be accessed by the students enrolled in the course only.</li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                             |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Fundamental concepts of environment</b>         | <b>1</b>    | <b>2</b>      |
| <b>Environment problems</b>                        | <b>1</b>    | <b>2</b>      |
| <b>Direct reasons for environmental failure</b>    | <b>1</b>    | <b>2</b>      |
| <b>Natural resources</b>                           | <b>1</b>    | <b>2</b>      |
| <b>Land system</b>                                 | <b>1</b>    | <b>2</b>      |
| <b>Natural processes (Endogenetic, Exogenetic)</b> | <b>1</b>    | <b>2</b>      |
| <b>Uniformitarianism</b>                           | <b>1</b>    | <b>2</b>      |
| <b>Principle of environmental unity</b>            | <b>1</b>    | <b>2</b>      |
| <b>Equifinality - Variables law</b>                | <b>1</b>    | <b>2</b>      |

|   |          |          |
|---|----------|----------|
| <b>Earth materials and processes</b>  | <b>1</b> | <b>2</b> |
| <b>Atmosphere constituents (Troposphere, Stratosphere, Mesosphere, Thermosphere, Exosphere)</b> | <b>1</b> | <b>2</b> |
| <b>Global climate change</b>  | <b>1</b> | <b>2</b> |
| <b>Soil erosion - Desertification</b>   | <b>1</b> | <b>2</b> |
| <b>Geological hazards: Earthquakes, Volcanic activity, Floods, Torrents, Land sliding</b>       | <b>1</b> | <b>2</b> |
| <b>Pollution of water, atmosphere and soil</b>  | <b>1</b> | <b>2</b> |

|   |           |   |             |
|---|-----------|---|-------------|
| 2 Course components (total contact hours per semester): |           |   |             |
| Lecture: <b>30</b>                                      | Tutorial: | Practical/Fieldwork/Internship: <b>48</b> | Other:<br>- |

|  |
|--|
| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) |
| <b>2 hours weekly for the homework and reports assignments.</b>  |

|   |
|---|
| 4. Development of Learning Outcomes in Domains of Learning  |
| For each of the domains of learning shown below indicate: <ul style="list-style-type: none"> <li>• <b>A brief summary of the knowledge or skill the course is intended to develop;</b></li> <li>• <b>A description of the teaching strategies to be used in the course to develop that knowledge or skill;</b></li> <li>• <b>The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</b></li> </ul> |
| <b>a. Knowledge</b>   |
| (i) Description of the knowledge to be acquired <ul style="list-style-type: none"> <li>• <b>Environmental studies.</b></li> <li>• <b>Explain the environmental geology.</b></li> <li>• <b>Determine the geological hazards.</b></li> <li>• <b>Identify the pollutants.</b></li> </ul>   |

|  |
|--|
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>In-class lecturing where the previous knowledge is linked to the current and future topics</b></li> <li>• <b>Homework assignments</b></li> <li>• <b>Tutorial discussions</b></li> <li>• <b>Field application</b></li> </ul>   |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Evaluation of reports</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>* <b>Students will be able to understand the mean of the environment.</b></li> <li>* <b>Students will be able to apply the knowledge have learnt concerning environmental geology in field.</b></li> <li>* <b>Students will be able to construct environmental geology parameters.</b></li> <li>* <b>Students will be able to identify the pollutants.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Problem solving in the tutorial / recitation sessions</b></li> <li>• <b>Case studies related to the course topics and relevant field geology</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> <li>• <b>Manage resources, time and other members of the group</b></li> <li>• <b>Communicate results of work to others</b></li> </ul>   |

|   |
|---|
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p><b>* Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</b></p> <p><b>* Practical work is planned around a number of environmental geology problems..</b></p> <p><b>* Engage students in classroom and in practical session discussion with questions and answers.</b></p> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Assessment of the reports</b></li> <li>• <b>Grading homework assignments</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Use the computer for analysing and processing the data</b></li> <li>• <b>Use computational tools</b></li> <li>• <b>Report writing</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Writing reports</b></li> <li>• <b>Incorporating the use and utilization of computer in the course requirements</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Evaluating the written reports</b></li> </ul>   |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>   |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><b>Not applicable</b></p>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p style="text-align: center;"><b>Not applicable</b></p>   |



(iii) Methods of assessment of students psychomotor skills

**Not applicable**

#### 5. Schedule of Assessment Tasks for Students During the Semester

| Assessment | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
|------------|--|---------------|--------------------------------|
| 1          | <b>Class activates ( in class quizzes, and homework)</b>           | <b>weekly</b> | <b>25%</b>                     |
| 2          | <b>Major exams I</b>   | <b>6</b>      | <b>15%</b>                     |
| 3          | <b>Major exams II</b>  | <b>12</b>     | <b>15%</b>                     |
| 4          | <b>Final exam</b>  | <b>16</b>     | <b>20%</b>                     |
| 5          | <b>Lab activates</b>   | <b>weekly</b> | <b>25%</b>                     |

#### D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Office hours 6 hr/ week**
- **help sessions 1hr/ week aided by two faculty members**

#### E Learning Resources

|  |
|--|
| 9. Required Text(s)  |
| <b>* Arms,K.,(1994): Environmental Science</b><br><b>* Boktin, D., and E.Keller (2000): Environmental Science</b>  |
| 2. Essential References  |
| <b>* Keller, E., (1999): Environmental geology</b><br><b>* Bell,F. (1998): Environmental geology</b>   |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   |
| <b>* Hill.,M.K., (1997): Understanding environmental pollution</b><br><b>* Montgomery,C., (1999): Environmental geology</b><br><b>* Nebel,B., and R.Wright (2000): Environmental Science</b> |
| 4-.Electronic Materials, Web Sites etc   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Websites on the internet that are relevant to the topics of the course</b></li> </ul> |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations                                 |
| <ul style="list-style-type: none"> <li>• <b>Multi media associated with the text book and the relevant websites</b></li> </ul>    |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"> <li>• <b>Lecture room with at least 35 seats</b></li> <li>• <b>Auditorium of a capacity of not less than 100 seats for large lecture format classes</b></li> </ul>  |
| 10. Computing resources <ul style="list-style-type: none"> <li>• <b>Computer room containing at least 15 systems</b></li> </ul>   |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <ul style="list-style-type: none"> <li>• <b>Availability of chemicals, glassware and equipment relevant to the course material</b></li> <li>• <b>Safety facilities</b></li> </ul> |

## G Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>• <b>Course evaluation by student</b></li> <li>• <b>Students- faculty meetings</b></li> </ul>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> <li>• <b>Peer consultation on teaching</b></li> <li>• <b>Departmental council discussions</b></li> <li>• <b>Discussions within the group of faculty teaching the course</b></li> </ul>                                  |
| 7 Processes for Improvement of Teaching <ul style="list-style-type: none"> <li>• <b>Conducting workshops given by experts on the teaching and learning methodologies</b></li> <li>• <b>Periodical departmental revisions of its methods of teaching</b></li> <li>• <b>Monitoring of teaching activates by senior faculty members</b></li> </ul> |

|  |
|--|
|  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Providing samples of all kind of assessment in the departmental course portfolio of each course</b></li> <li>• <b>Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy</b></li> <li>• <b>Conducting standard exams such as the other international universities exams.</b></li> </ul> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>  |

**KING SAUD UNIVERSITY**  
**College of Science**

Department of Geology and Geophysics



جامعة الملك سعود  
كلية العلوم  
قسم الجيولوجيا والجيوفيزياء

**GEO 301:**  
**Geomorphology**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                      |
| College/Department | <b>Faculty of Science / Department of Geology and Geophysics</b> |

### A Course Identification and General Information

|   |                                |
|---|--------------------------------|
| 1. Course title and code:   | <b>Geomorphology (GEO 301)</b> |
| 2. Credit hours   | <b>3 (2+1)</b>                 |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) |                                |
|   | <b>Geology</b>                 |
| 4. Name of faculty member responsible for the course  |                                |
| 5. Level/year at which this course is offered   |                                |
| 6. Pre-requisites for this course (if any)  | <b>GEO 101</b>                 |
| 7. Co-requisites for this course (if any)   | <b>Field geology</b>           |
| 8. Location if not on main campus   |                                |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize the geology students with the basic principles of geomorphology.</b></li><li>• <b>To enable the student to distinguish the most common rock features and landforms in the field.</b></li><li>• <b>The student should eventually be capable of linking the topography with their geological expressions.</b></li></ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to topographic studies.</b></li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>Introduction</b>   | <b>1</b>    | <b>3</b>      |
| <b>Natural processes that create landforms and landscapes</b> | <b>2</b>    | <b>6</b>      |
| <b>Physics and chemistry of weathering and soil formation</b> | <b>2</b>    | <b>6</b>      |
| <b>Dynamics of mass wasting</b>                               | <b>1</b>    | <b>3</b>      |
| <b>Streams and glaciers</b>                                   | <b>2</b>    | <b>6</b>      |

|   |          |          |
|---|----------|----------|
| <b>Karst processes</b>  | <b>1</b> | <b>3</b> |
| <b>Topographic response to tectonic and climatic forces</b>   | <b>1</b> | <b>3</b> |
| <b>Terrain analysis utilizing geomorphic field data, remote sensing imagery, and numerical models</b> | <b>2</b> | <b>6</b> |
| <b>Natural hazards</b>  | <b>2</b> | <b>6</b> |
| <b>One day field trip</b>   |          |          |

|   |           |   |        |
|---|-----------|---|--------|
| 2 Course components (total contact hours per semester): |           |   |        |
| Lecture: <b>42 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: <b>14/16/</b> | Other: |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

|   |
|---|
| <b>4. Development of Learning Outcomes in Domains of Learning</b><br><br>For each of the domains of learning shown below indicate: <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| (i) Description of the knowledge to be acquired   |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Gain the skills needed to identify landforms and topographic features.</b></li> <li>• <b>Apply the concepts of plate tectonics and sedimentary process to the study of geomorphology.</b></li> </ul>                         |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>3 weekly lectures</b></li> <li>• <b>Assignments related to subjects being discussed</b></li> <li>• <b>A weekly 2-hour Laboratory session</b></li> </ul> |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assignments and lab reports</b></li> <li>• <b>Practical exams</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>• <b>Identify the main landforms and topographic features.</b></li> <li>• <b>Draw the different type of maps.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of geomorphological suites from different parts of the Arabian Shield</b></li> </ul>        |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments and lab reports</b></li> </ul>               |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p>  |



|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Personal initiative is encouraged through independent work on assignments and lab reports</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to encourage independent efforts</b></li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments to ensure independent effort</b></li> <li>• <b>Questions related to the assignments are frequently included in mid-term and final exams.</b></li> </ul>                         |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> </ul>   |
| <p><b>e. Psychomotor Skills (if applicable) N/A</b></p>   |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;">N/A</p>   |

|   |
|---|
| (ii) Teaching strategies to be used to develop these skills |
| N/A   |
| (iii) Methods of assessment of students psychomotor skills  |
| N/A   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

|   |
|---|
| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"> <li><b>Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams</b></li> </ul> |
|---|

## E Learning Resources

|  |
|--|
| <p>1. Required Text(s)</p> <p><b>- Summerfield M.A., 1991, Global Geomorphology. John Wiley and Sons, New York, NY, 536 p.</b></p> |
| <p>2. Essential References</p> <p><b>- Burbank, D.W., and R.S. Anderson, 2001, Tectonic Geomorphology, Blackwell</b></p>           |

|   |
|---|
| <b>Scientific, Oxford, 274p.</b>  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)                |
| 4-.Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"> <li><b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> <li><b>Laboratory seating at least 25 students, and equipped with petrological microscopes.</b></li> </ul> |
| 2. Computing resources <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <p><b>Printer – Scanner – data show</b></p>   |

## G Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <p><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment</b></p> |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>   |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>                    |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <p><b>- Exam results are made available upon request to relevant committees.</b></p> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p><b>- An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></p>  |



**GEO 320:**  
**Petrology**

**Course Specification**

**Revised November 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution        | <b>King Saud University</b>                                   |
| College/Department | <b>College of Science / Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Petrology (GEO 320)</b>  |
| 2. Credit hours <b>3.0</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>Geology program</b> |
| 4. Name of faculty member responsible for the course  |
| 5. Level/year at which this course is offered <b>5<sup>th</sup> level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>GEO 221</b>  |
| 7. Co-requisites for this course (if any)<br><b>none</b>  |
| 8. Location if not on main campus   |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• <b>To provide the geophysics student with an overall knowledge of the different rock types and their mineralogies.</b></li> <li>• <b>To enable the student to distinguish different lithologies and features in under the polarizing microscope.</b></li> </ul>             |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• <b>visual displays using PowerPoint</b></li> <li>• <b>Course contents will be posted on the instructor's web page.</b></li> </ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |              |               |
|--|--------------|---------------|
| Topic  | No. of Weeks | Contact hours |
| <b>Extrusive and intrusive igneous rocks</b>   | <b>2</b>     | <b>4</b>      |
| <b>classification and field relations of igneous rocks</b>                             | <b>2</b>     | <b>4</b>      |
| <b>weathering</b>  | <b>1</b>     | <b>2</b>      |
| <b>clastic sedimentary rocks</b>   | <b>2</b>     | <b>4</b>      |
| <b>carbonates and evaporites</b>   | <b>2</b>     | <b>4</b>      |
| <b>metamorphism and metamorphic rocks</b>  | <b>2</b>     | <b>4</b>      |
| <b>metamorphic zones and facies</b>  | <b>2</b>     | <b>4</b>      |
| <b>a brief summary on the Arabian Shield and the sedimentary cover in Saudi Arabia</b> | <b>2</b>     | <b>4</b>      |

|   |                                    |   |        |
|---|------------------------------------|---|--------|
| 2 Course components (total contact hours per semester): |                                    |   |        |
| Lecture: <b>30</b>                                      | Tutorial:<br><b>Not applicable</b> | Practical/Fieldwork/Internship: <b>48 (practical) + 30 (fieldwork) = 78</b> | Other: |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

**2 hours weekly for assignments and lab reports.**

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- **identify igneous and metamorphic rocks, their textures and constituent minerals in the field and under the polarizing microscope.**
- **Identify various sedimentary rocks in hand specimens and under the microscope.**

(ii) Teaching strategies to be used to develop that knowledge

- **2 weekly lectures**
- **Assignments related to subjects being discussed**
- **A weekly 2-hour Laboratory session**
- **A 2-day Field trip to the eastern Arabian Shield**

(iii) Methods of assessment of knowledge acquired

- **Mid-term and final exams**
- **Assignments and field reports**
- **Practical exams**



|  |
|--|
|  |
| <b>b. Cognitive Skills</b>   |
| <ul style="list-style-type: none"> <li>• Cognitive skills to be developed</li> <li>• <b>Identify the main rock-forming minerals in thin sections using the petrological microscope</b></li> <li>• <b>General field techniques with special emphasis on Precambrian terrains</b></li> </ul>   |
| <ul style="list-style-type: none"> <li>• (ii) Teaching strategies to be used to develop these cognitive skills</li> <li>• <b>Homework assignments</b></li> <li>• <b>Field trip to relevant areas</b></li> </ul>  |
| (iii) Methods of assessment of students cognitive skills <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments as well as lab and field reports</b></li> </ul>   |
| <b>c. Interpersonal Skills and Responsibility</b>  |
| (i) Description of the interpersonal skills and capacity to carry responsibility to be developed <ul style="list-style-type: none"> <li>• <b>The student should learn how to conduct a proper field excursion and rely on himself in such situations.</b></li> <li>• <b>Personal initiative is encouraged through independent work on assignments and field reports</b></li> </ul> |
| (ii) Teaching strategies to be used to develop these skills and abilities <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments</b></li> <li>• <b>Field areas are divided into sectors each of which is the responsibility of a small group of students</b></li> </ul>  |
| (iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments and field reports</b></li> <li>• <b>Questions related to the field trip and assignments are frequently included in mid-term and final exams.</b></li> </ul>                         |
| <b>d. Communication, Information Technology and Numerical Skills</b>   |

|  |  |  |  |
|--|--|--|--|
| (i) Description of the skills to be developed in this domain.  |  |  |  |
| <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Ability to use global position systems (GPS) in field surveys</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |  |  |  |
| (ii) Teaching strategies to be used to develop these skills  |  |  |  |
| <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Student are required to show proficiency in the use of portable GPS during field trips</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>   |  |  |  |
| (iii) Methods of assessment of students numerical and communication skills   |  |  |  |
| <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> <li>• <b>Students are required to demonstrate their ability to use GPS in the field</b></li> </ul>   |  |  |  |
| <b>e. Psychomotor Skills (if applicable)      N/A</b>  |  |  |  |
| (i) Description of the psychomotor skills to be developed and the level of performance required  |  |  |  |
| <b>N/A</b>   |  |  |  |
| (ii) Teaching strategies to be used to develop these skills  |  |  |  |
| <b>N/A</b>   |  |  |  |
| (iii) Methods of assessment of students psychomotor skills   |  |  |  |
| <b>N/A</b>   |  |  |  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |          |                                |
|--|--|----------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |

|   |                                |                                 |     |
|---|--------------------------------|---------------------------------|-----|
| 1 | <b>6 main Assignments</b>      | Bi-weekly                       | 10% |
| 2 | <b>12 lab reports</b>          | Weekly                          | 6%  |
| 3 | <b>Mid-term exam</b>           | After the 10 <sup>th</sup> week | 10% |
| 4 | <b>1<sup>st</sup> lab exam</b> | After the 6 <sup>th</sup> week  | 12% |
| 5 | <b>2<sup>nd</sup> lab exam</b> | Last week                       | 12% |
| 6 | <b>Final exam</b>              | As per university schedule      | 50% |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

## E Learning Resources

### 1. Required Text(s)

- **Raymond, L. A., 2002, Petrology: The Study of Igneous, Sedimentary, & Metamorphic Rocks, McGraw Hill, 742 p.**
- **Blatt, H. & Tracy, R.J., 2005, Petrology: Igneous, sedimentary, and metamorphic, 2nd edition. W.H. Freeman & Co, 530 p.**

### 2. Essential References

- **Winter, J.D., 2002, An Introduction to Igneous and Metamorphic Petrology, Prentice Hall, 697 p.**
- **MacKenzie W.S. & Adams A.E., 1994, A Color Atlas of Rocks and Minerals in Thin Section, John Wiley & Sons, 192 p.**
- **Best, M.G., 2003, Igneous and Metamorphic Petrology, 2nd ed, Blackwell Science, 729 p.**
- **Hall A. 1996. *Igneous petrology*, 2nd ed. Harlow, UK, Longman.**
- **Shelley D. (1993). *Igneous and metamorphic rocks under the microscope*. Chapman & Hall, London.**
- **Yardley B.W.D., McKenzie W.S. & Guilford C. (1990). *Atlas of metamorphic rocks and their textures*. Longman, Harlow.**

|  |
|--|
| <p>3. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <ul style="list-style-type: none"> <li>• <b>Wilson M. <i>Igneous petrogenesis</i>: 1989. A global tectonic approach. Boston, Unwin Hyman.</b></li> <li>• <b>Mason R. (1990). <i>Petrology of the Metamorphic Rocks</i>, 2nd ed. Unwin Hyman, London.</b></li> <li>• <b>Barker A.J. (1998). <i>Introduction to Metamorphic Textures and Microstructures</i>. 2nd ed., Stanley Thornes, Cheltenham.</b></li> <li>• <b>Kornprobst, J. (2002). <i>Metamorphic Rocks and Their Geodynamic Significance: A Petrological Handbook</i>. Petrology and Structural Geology Series Vol. 12. Kluwer , Dordrecht.</b></li> <li>• <b>Yardley, B. W. D. (1989) <i>An Introduction to Metamorphic Petrology</i>, Longman, Harlow.</b></li> </ul> |
| <p>4-.Electronic Materials, Web Sites etc</p> <ul style="list-style-type: none"> <li>• <a href="#"><u>Atlas of Igneous and metamorphic rocks, minerals, and textures</u></a></li> <li>• <a href="#"><u>John Winter home page</u></a>. To accompany textbook.</li> <li>• <a href="#"><u>Society for Sedimentary Geology</u></a></li> <li>• <a href="#"><u>Metamorphic Rocks</u></a>. A comprehensive review of the subject.</li> <li>• <a href="#"><u>Introduction to Metamorphic Rocks</u></a> Dave Waters, Department of Earth Sciences, University of Oxford.</li> </ul>   |
| <p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <p><b>To be provided by instructor.</b></p>   |

## F. Facilities Required

|   |
|---|
| <p>Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)</p> <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>• <b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> </ul> |
|---|

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Laboratory seating at least 25 students, and equipped with petrological microscopes.</b></li> </ul>   |
| <p>2. Computing resources</p> <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>   |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> <li>1) <b>At least 25 petrological microscopes</b></li> <li>2) <b>A complete set of rock thin sections</b></li> </ul> |

## G. Course Evaluation and Improvement Processes

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment.</b></p>  |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>                  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Recommendations are reported to the department on the basis of feedback questionnaires to take the necessary steps.</b></li> <li>• <b>Lecture notes are reviewed regularly and kept up-to-date.</b></li> </ul>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Exam results are made available upon request to relevant committees.</b></li> </ul> |
| <p>5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></li> </ul>   |



**GEO 323: Igneous and  
Metamorphic Petrology**

**Course Specification**

**Revised November 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution        | <b>King Saud University</b>                                   |
| College/Department | <b>College of Science / Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Igneous and Metamorphic Petrology (GEO 323)</b>  |
| 2. Credit hours <b>3.0</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology program</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Ahmad Al-Saleh</b>   |
| 5. Level/year at which this course is offered <b>5<sup>th</sup> level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>GEO 221</b>  |
| 7. Co-requisites for this course (if any)<br><b>none</b>  |
| 8. Location if not on main campus   |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To provide the student with an overall knowledge of the processes of magmatism and metamorphism and their products.</b></li><li>• <b>To enable the student to distinguish igneous and metamorphic lithologies and features in the field and under the polarizing microscope.</b></li><li>• <b>The student should eventually be capable of mapping igneous/metamorphic terrains and deciphering their tectonic milieu.</b></li></ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to the applications of the EPMA on mineral chemistry and thermobarometry as soon as this device becomes available in the university.</b></li></ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |              |               |
|--|--------------|---------------|
| Topic  | No. of Weeks | Contact hours |
| <b>Mineral composition of magmatic rocks</b>   | <b>1</b>     | <b>2</b>      |
| <b>Classification of magmatic rocks</b>  | <b>1</b>     | <b>2</b>      |
| <b>Origin and composition of magma</b>   | <b>1</b>     | <b>2</b>      |
| <b>magmatic differentiation</b>  | <b>1</b>     | <b>2</b>      |
| <b>volcanism and its products</b>  | <b>1</b>     | <b>2</b>      |
| <b>emplacement mechanisms of plutonic rocks</b>                                      | <b>1</b>     | <b>2</b>      |
| <b>geochemistry of igneous rocks and its relationship to their tectonic settings</b> | <b>1</b>     | <b>2</b>      |
| <b>Isotopes and radiometric dating</b>   | <b>1</b>     | <b>2</b>      |



|  |          |          |
|--|----------|----------|
| <b>Introduction to metamorphism: its processes and categories</b>  | <b>1</b> | <b>2</b> |
| <b>The phase rule and composition-assemblage diagrams</b>          | <b>1</b> | <b>2</b> |
| <b>Metamorphic facies / Thermobarometry and P-T-t paths</b>        | <b>1</b> | <b>2</b> |
| <b>Contact metamorphism / Dynamic metamorphism</b>                 | <b>1</b> | <b>2</b> |
| <b>Metamorphism in subduction zones / Ocean-floor metamorphism</b> | <b>1</b> | <b>2</b> |
| <b>Metamorphism in collision zones</b>                             | <b>1</b> | <b>2</b> |
| <b>Metamorphic and tectonic evolution of the Arabian Shield</b>    | <b>1</b> | <b>2</b> |

|   |  |   |        |
|---|--|---|--------|
| 2 Course components (total contact hours per semester): |  |   |        |
| Lecture: <b>30</b>                                      | Tutorial:<br><br><b>Not applicable</b> | Practical/Fieldwork/Internship: <b>48 (practical) + 30 (fieldwork) = 78</b> | Other: |

|  |
|--|
| <p>3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)</p> <p><b>2 hours weekly for assignments and field and lab reports.</b></p> |
|--|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Gain the skills needed to identify igneous and metamorphic rocks, their textures and constituent minerals in the field and under the polarizing microscope.</b></li> </ul>   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Develop the ability to make detailed maps in areas of igneous/metamorphic terrains.</b></li> <li>• <b>Apply the concepts of plate tectonics and allochthonous terranes to the study of regional metamorphic belts.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>2 weekly lectures</b></li> <li>• <b>Assignments related to subjects being discussed</b></li> <li>• <b>A weekly 2-hour Laboratory session</b></li> <li>• <b>A 3-day Field trip to the eastern Arabian Shield</b></li> </ul>   |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assignments and field reports</b></li> <li>• <b>Practical exams</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <ul style="list-style-type: none"> <li>• Cognitive skills to be developed</li> <li>• <b>Identify the main rock-forming minerals in thin sections using the petrological microscope</b></li> <li>• <b>Calculate the radiometric ages of rock and minerals using isotopic data</b></li> <li>• <b>Estimate the P-T condition of metamorphism on the basis of mineral chemistry</b></li> <li>• <b>General field techniques with special emphasis on Precambrian terrains</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of petrological suites from different parts of the Arabian Shield</b></li> <li>• <b>Field trip to relevant areas</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments as well as lab and field reports</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p>   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>The student should learn how to conduct a proper field excursion and rely on himself in such situations.</b></li> <li>• <b>Team work is promoted by allocating the mapping of certain field areas to 3-4 student groups</b></li> <li>• <b>Personal initiative is encouraged through independent work on assignments and field reports</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to ensure independent effort</b></li> <li>• <b>Field areas are divided into sectors each of which is the responsibility of a small group of students</b></li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments and field reports to ensure independent effort</b></li> <li>• <b>Questions related to the field trip and assignments are frequently included in mid-term and final exams.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Ability to use global position systems (GPS) in field surveys</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Student are required to show proficiency in the use of portable GPS during field trips</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>   |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> <li>• <b>Students are required to demonstrate their ability to use GPS in the field</b></li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)      N/A</b></p>  |

|   |
|---|
| (i) Description of the psychomotor skills to be developed and the level of performance required |
| N/A   |
| (ii) Teaching strategies to be used to develop these skills                                     |
| N/A   |
| (iii) Methods of assessment of students psychomotor skills                                      |
| N/A   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                                 |                                |
|--|--|---------------------------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                        | Proportion of Final Assessment |
| 1  | <b>6 main Assignments</b>  | Bi-weekly                       | 10%                            |
| 2  | <b>12 lab reports</b>  | Weekly                          | 6%                             |
| 3  | <b>Mid-term exam</b>   | After the 10 <sup>th</sup> week | 10%                            |
| 4  | <b>1<sup>st</sup> lab exam</b>                                     | After the 6 <sup>th</sup> week  | 12%                            |
| 5  | <b>2<sup>nd</sup> lab exam</b>                                     | Last week                       | 12%                            |
| 6  | <b>Final exam</b>  | As per university schedule      | 50%                            |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

## E Learning Resources

4. Required Text(s)

- **Winter, J.D., 2002, An Introduction to Igneous and Metamorphic Petrology, Prentice Hall, 697 p.**
- **MacKenzie W.S. & Adams A.E., 1994, A Color Atlas of Rocks and**

**Minerals in Thin Section, John Wiley & Sons, 192 p.**

- **Best, M.G., 2003, *Igneous and Metamorphic Petrology*, 2nd ed, Blackwell Science, 729 p.**

5. Essential References

- **Hall A. 1996. *Igneous petrology*, 2nd ed. Harlow, UK, Longman.**
- **Wilson M. *Igneous petrogenesis*: 1989. A global tectonic approach. Boston, Unwin Hyman.**
- **Mason R. (1990). *Petrology of the Metamorphic Rocks*, 2nd ed. Unwin Hyman, London.**
- **Barker A.J. (1998). *Introduction to Metamorphic Textures and Microstructures*. 2nd ed., Stanley Thornes, Cheltenham.**
- **Kornprobst, J. (2002). *Metamorphic Rocks and Their Geodynamic Significance: A Petrological Handbook*. Petrology and Structural Geology Series Vol. 12. Kluwer , Dordrecht.**
- **Yardley, B. W. D. (1989) *An Introduction to Metamorphic Petrology*, Longman, Harlow.**
- **Shelley D. (1993). *Igneous and metamorphic rocks under the microscope*. Chapman & Hall, London.**
- **Yardley B.W.D., McKenzie W.S. & Guilford C. (1990). *Atlas of metamorphic rocks and their textures*. Longman, Harlow.**

6. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

- **Philpotts A.R. (1990). *Principles of Igneous and Metamorphic Petrology*. Prentice Hall.**
- **Le Maitre, R.W. (2002). *Igneous Rocks - A Classification and Glossary of Terms*. Cambridge University Press**
- **Kusky, Timothy. (2008) *Volcanoes: eruptions and other volcanic hazards*.**
- **Bucher K. & Frey M. (1994) *Petrogenesis of Metamorphic Rocks*.**
- **Kerrick D.M. (ed.) (1991) *Contact Metamorphism*. Reviews in Mineralogy, vol. 26. Mineralogical Society of America.**
- **Kretz R. (1994). *Metamorphic Crystallisation*. John Wiley and Sons, Chichester.**
- **Miyashiro A. (1994). *Metamorphism and Metamorphic Belts*. Unwin Hyman, London.**
- **Desmons J. & Smulikowski W. (2007). *A systematic nomenclature for metamorphic rocks. 4. High P/T metamorphic rocks. Recommendations by the IUGS Subcommittee on the systematics of metamorphic rocks*.**
- **Spear, F.S. (1993). *Metamorphic Phase Equilibria and Pressure-Temperature Time Paths*. Mineralogical Society of America, Washington, D.C.**

4-.Electronic Materials, Web Sites etc

- [Geochemistry of igneous rocks](#)
- [Teaching Phase Equilibria](#)
- [John Winter home page](#)
- [Atlas of Igneous and metamorphic rocks, minerals, and textures](#)
- [Journal of Metamorphic Geology](#)
- [THERMOCALC](#) program and data set.
- [MetPetDB](#): A database for metamorphic petrology.
- [Metamorphic Rocks](#). A comprehensive review of the subject.
- [Introduction to Metamorphic Rocks](#) Dave **Waters**, Department of Earth Sciences, University of Oxford.
- [Phase Equilibria in Metamorphic Rocks](#): Thermodynamic Background and Petrological Applications.

5- Other learning material such as computer-based programs/CD, professional standards/regulations

**Earth Science Courseware CD's that include the following subjects:**

Basic Geochemistry: Origin and Distribution of the Elements  
Basic Petrography  
Crystallography  
Ocean Crust and Ophiolites  
Arc Magmatism  
Phase Diagrams in Igneous Systems  
Petrogenesis of Granitic Rocks  
Radiogenic Isotopes in Geological Sciences

**F. Facilities Required**

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- **Lecture room equipped with a projector connected to DVD and video**

|   |
|---|
| <p><b>players and a computer with a broadband internet connection.</b></p> <ul style="list-style-type: none"> <li>• <b>Laboratory seating at least 25 students, and equipped with petrological microscopes.</b></li> </ul>  |
| <p>2. Computing resources</p> <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>   |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> <li>3) <b>At least 25 petrological microscopes</b></li> <li>4) <b>A complete set of igneous and metamorphic rock thin sections</b></li> </ul> |

## G. Course Evaluation and Improvement Processes

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment.</b></p>  |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>                  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Recommendations are reported to the department on the basis of feedback questionnaires to take the necessary steps.</b></li> <li>• <b>Lecture notes are reviewed regularly and kept up-to-date.</b></li> </ul>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Exam results are made available upon request to relevant committees.</b></li> </ul> |
| <p>5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></li> </ul>   |



**GEO 334**

**Sedimentary Petrology**

**Course Specification**

**Revised November 2009**





### Course Specification

|                    |  |
|--------------------|--|
| Institution        | King Saud University                                       |
| College/Department | College of Sciences / Department of Geology and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: Sedimentary Petrology ( 334 GEO)  |
| 2. Credit hours: 3 hrs. (2+1)   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br>Geology (offered in the Department of Geology).  |
| 4. Name of faculty member responsible for the course<br>Dr. Mohammad Eesa Al-Dabbagh  |
| 5. Level/year at which this course is offered<br>Level 6 – 3 <sup>rd</sup> year   |
| 6. Pre-requisites for this course (if any)<br><br>Introduction to Sedimentology and Stratigraphy – <b>GEO 236</b>   |
| 7. Co-requisites for this course (if any)<br>None   |
| 8. Location if not on main campus <ul style="list-style-type: none"><li>All courses and labs are given in the Geology Department.</li><li>One three days field trip is required for this course. The field trip is out of Riyadh.</li></ul> |

### B. Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• Acquisition of knowledge by learning new concepts; explaining the various sedimentary rocks ; the description of different rocks; and presenting the corresponding environments where these rocks were formed.</li> <li>• Cognitive skills through thinking and use of experimental work. Recognition of the different rocks in the field.</li> <li>• The students are encouraged to use computer soft ware and use the net for retrieving information.</li> <li>• Student becomes responsible for their own learning through the given assignments, laboratory exercises, report writing and presentation in front of the whole class.</li> </ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• The course contents will be periodically reviewed by the instructors and new materials can be added when necessary.</li> <li>• Some assignments are given to the students to encourage them to search in the net. Among many sites are: Saudi Geological Survey, Saudi Armco, Ministry of Petroleum and Minerals, United States Geological Survey, Geo-Arabia, Saudi Geological Society. This in addition to the related journals and periodicals.</li> <li>• One individual presentation is required if the student numbers allow. If the number is high , one presentation for each group of four or five. Each one presents part of the presentation.</li> </ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| Introduction and fundamentals of sedimentary rocks.   | 1           | (2+1)         |
| Siliciclastic rocks: ( conglomerates, breccia, sandstones, siltstones and claystones). Provenance of sandstones. Importance of sandstones containing water aquifers in the Kingdom of Saudi Arabia. | 2           | (4+2)         |
| Carbonate rocks: (limestones and dolomite); their importance in oil reservoirs in the Kingdom of Saudi Arabia.  | 2           | (4+2)         |
| Evaporites: (rock salts, gypsum and anhydrite); and their importance as cap rocks.  | 1           | (2+1)         |
| Siliceous rocks; silicification. -- First mid-term exam   | 1           | (2+1)         |
| Phosphate rocks ( phosphorates). Their economic importance in the kingdom.  | 1           | (2+1)         |
| Ironstones; stromatolites.  | 1           | (2+1)         |
| Coal; oil shale; manganese nodules.   | 1           | (2+1)         |
| Sedimentary environments: continental environments.   | 2           | (4+2)         |
| Sedimentary environments: transitional environments. - Second mid-term exam.  | 1           | (2+1)         |
| Sedimentary environments: marine environments.  | 2           | (4+2)         |

2 Course components (total contact hours per semester):

Lectures: 30 hours /semesters; ( 2 hrs/ week);      Laboratory : 45 hours /semester ( 3hrs/week )

2 days field trip.

3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week)

- Students are expected to accomplish an average of 3 learning hours per week.

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop.
- A description of the teaching strategies to be used in the course to develop that knowledge or skill.
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- Knowledge and recognition of the different sedimentary rocks in the field, describe the hand samples and study them in the lab. The students are also required to examine and study the thin sections representing the different rocks under the microscope.
- The students also examine and collect the fossils if they find any.
- Teaching this course is conducted through lectures, practical sessions and fieldwork.

(ii) Teaching strategies to be used to develop that knowledge

- Course materials are delivered through a sequential delivery of lectures.
- Interactive learning process through questions and answers in class and lab.
- Laboratory work, engaging students to plan and coordinate tests.
- Field trip is required to give the student a direct look and contact with the different rocks.  
During the field trip the student has to collect samples for the class and for his own collection.

|  |
|--|
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>Exams, homework and lab reports are used to assess the acquired knowledge on the subject.</li> <li>Oral presentation is given to examine the students' ability to perform and to show their knowledge of the subject.</li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>Students will be able to apply the knowledge of the different sedimentary rocks and realize what they contain in their bodies.</li> <li>They apply their knowledge in relation to the economy of the country, especially for searching water, minerals and oil embedded in these rocks. This is imperative for job hunting after graduation.</li> <li>They should be able to assess the importance of each rock type in other domains, such as building, dam construction. The engineer should consult the geologist for the soil and the bed rock under any building or any other construction.</li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>Lectures are supported by illustration, hand outs and sometimes with presentation. Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</li> <li>Laboratory work is planned to teach the student how to recognize easily and to distinguish between the different rocks, in the field, in hand specimen and under the microscope as well.</li> <li>Engage students in classroom and laboratory discussion with questions and answers.</li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>Exams and homework will be emphasized on the rocks which contain important resources. .</li> <li>Laboratory reports prepare the student to deal with different methods, data analysis and interpretation .</li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>Punctual attendance of classes and laboratory session is required of the students..</li> <li>Students will take the responsibility to accomplish any given assignment or home work on their own and submit them on time.</li> <li>Students learn to manage their time in self study of the coarse material.</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p>   |

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| <ul style="list-style-type: none"> <li>• Assignments are given to the students at regular intervals to give them time to accomplish and submit on time. Late or no submission of assignments carries penalties or loss of part of the grade points.</li> <li>• Laboratory reports are to be written in the prescribed format and are to be submitted on time.</li> <li>• Field trip attendance is required for the course. Some questions about the field are given at least in one of the exams..</li> <li>• Participation of students in classroom discussion is encouraged.</li> </ul> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• Class attendance of students at the beginning of the lecture is recorded.</li> <li>• Lab, and field trip attendance is imperative and it is recorded.</li> <li>• Submission of assignment and home work is also recorded.</li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• Ability of students to apply basic knowledge of computer and GIS.</li> <li>• Use of computer in search for additional knowledge and in producing lab reports and assignments.</li> <li>• Ability to write some reports using important terms in English</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• Questions of tests and assignments require students' knowledge of important subjects.</li> <li>• Questions include important English terms to familiarize the students to the foreign language.</li> <li>• Some assignments include some computer search.</li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• Assigned grades for each assignment, report ,exams are recorded.</li> <li>• Lab assignments are graded and recorded.</li> <li>• Extra grades might be added for good participation in class and in the field.</li> <li>• All grades are added and the total is given after the finals.</li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>   |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>Not applicable.</p>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p>  |

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|  |
| (iii) Methods of assessment of students psychomotor skills |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                                  |                                |
|--|--|----------------------------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                         | Proportion of Final Assessment |
| 1  | Homework , (and one field trip report – only once)..               | Every three weeks                | 5%                             |
| 2  | 13 lab reports, each for a new test                                | Weekly                           | 25%                            |
| 3  | First mid-term exam  | Within the sixth week            | 10%                            |
| 4  | Second mid-term exam   | Within the 13 <sup>th</sup> week | 10%                            |
| 5  | Final Exam   | As scheduled by the registrar    | 50%                            |

## D. Support

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| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"> <li>I am available in the office to devote as much as it takes to answer any question related to the course. I am also available for any academic advice and consultation.</li> <li>Office hours are posted, but I am available almost the entire working day.</li> </ul> |
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## E. Learning Resources

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| <p>2. Required Text(s):</p> <ul style="list-style-type: none"> <li>"Sedimentary Petrology" by: Robert Folk; Translated by: Ahmad A. Al-Aswad; King Saud University Publications.</li> <li>"Sedimentary Petrology" by: Maurice Tucker; Blackwell Scientific Publications.</li> </ul>  |
| <p>2. Essential References</p> <ul style="list-style-type: none"> <li>"Sedimentary Geology" by: Donald R. Prothero and Fred Schwab; W.H. Freeman and Co.</li> <li>"Principles of Sedimentology" by Mohammad A. Moshrif; King Saud University Publications.</li> <li>"Field Description of Sedimentary Rocks" by: Maurice Tucker; Translated by: Mohammad H. Basyoni and Ahmad M. Mursi; King Abdulaziz University Publications.</li> </ul> |

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| <ul style="list-style-type: none"> <li>Selected handouts and reference materials on sedimentary rocks and sedimentary petrology.</li> <li>Lab handouts are prepared for this course.</li> </ul>  |
| <p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <ul style="list-style-type: none"> <li>Journal of King Saud University( Science); Journal of Sedimentary Geology; Geological Society of America; American Association of Petroleum Geologists; Journal of Micropaleontology; Geo-Arabia; Journal of Petroleum Geology; Arabian Journal of Geosciences.</li> <li>The instructor will provide a list of references for the students, as the course contains diverse topics.</li> </ul> |
| <p>4-.Electronic Materials, Web Sites etc.</p> <ul style="list-style-type: none"> <li>Among many recommended sites are: Saudi Geological Survey, Saudi Armco, Ministry of Petroleum and Minerals, United States Geological Survey, Maaden, Geo-Arabia, Saudi Geological Society and all related journals and periodicals.</li> <li>Search through Google for related topics.</li> </ul>  |
| <p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <ul style="list-style-type: none"> <li>The instructor may provide some relevant materials and learning aids.</li> </ul>   |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>Lecture room is equipped with a black board, overhead projector, data show, and computer.</li> <li>Fully equipped laboratories with binoculars, polarizing microscopes and other needed equipments.<br/>All field equipments are required for the three day field trip.</li> </ul>   |
| <p>2. Computing resources</p> <ul style="list-style-type: none"> <li>An easily accessible computer lab in the department and in the college.</li> <li>GIS lab is available in the department.</li> </ul>  |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> <li>The laboratory is equipped with binoculars, polarizing microscopes and other needed equipments. Some labs are equipped with data show and computer.<br/>Brunton compass, hand level, lens, hammer , chisel, and sample bags are required for the field trip.</li> </ul> |

- Samples of different rocks and minerals are available in the lab.

## G. Course Evaluation and Improvement Processes

### 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Student course evaluation at the conclusion of the course.

### 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Faculty assessment of the course and effectiveness of teaching delivery.
- Periodic self- assessment of the program.

### 3 Processes for Improvement of Teaching

- A committee assigned by the department will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.
- Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge.
- Workshops are organized on effective teaching methods to enable instructors to improve their teaching skill.
- Teaching method will focus on students' learning and on course learning outcomes.

### 4. Processes for verifying standards of student achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- A committee assigned by the department will review samples of student work in this course to check on the standard of grades and achievements.
- A committee of faculty members can evaluate the course material and the students' work to compare the standard of grades and achievements compared to other known universities. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.

### 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- The department intend to apply periodical self- assessment and might rely on external assessment by an invited faculty member or consultant.
- The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.





**GEO 341: Paleobotany**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                      |
| College/Department | <b>Faculty of Science / Department of Geology and Geophysics</b> |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Paleobotany (GEO 341)</b>  |
| 2. Credit hours <b>2 (1+1)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology</b> |
| 4. Name of faculty member responsible for the course  |
| 5. Level/year at which this course is offered   |
| 6. Pre-requisites for this course (if any) <b>GEO 102</b>   |
| 7. Co-requisites for this course (if any)   |
| 8. Location if not on main campus   |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize the geology students with the basic principles of paleobotany.</b></li><li>• <b>To enable the student to distinguish the most common plant kingdom and ancient environments.</b></li><li>• <b>The student should eventually be capable of linking the ancient geologic process with the recent geologic environments.</b></li></ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to ancient plant kingdom and plant diversity through the geologic record.</b></li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>Introduction</b>   | <b>1</b>    | <b>2</b>      |
| <b>Fossil record of the plant kingdom</b>                                   | <b>2</b>    | <b>4</b>      |
| <b>Ancient environments and plant diversity through the geologic record</b> | <b>2</b>    | <b>4</b>      |
| <b>Origin of life in the Archean</b>  | <b>1</b>    | <b>2</b>      |
| <b>Cyanobacteria</b>  | <b>1</b>    | <b>2</b>      |

|   |          |          |
|---|----------|----------|
| <b>Emergence and diversity of fungi</b>                       | <b>1</b> | <b>2</b> |
| <b>Appearance of ferns and mosses</b>                         | <b>1</b> | <b>2</b> |
| <b>Vascular plants</b>  | <b>2</b> | <b>4</b> |
| <b>Dominance of angiosperms in the Mesozoic and Cenozoic.</b> | <b>1</b> | <b>2</b> |

|   |           |                                 |        |
|---|-----------|---------------------------------|--------|
| 2 Course components (total contact hours per semester): |           |                                 |        |
| Lecture: <b>24 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: | Other: |

|   |
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| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

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|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Gain the skills needed to identify ancient plant kingdom.</b></li> <li>• <b>Apply the concepts of ancient environments and plant diversity through the geologic record.</b></li> </ul>   |

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| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>3 weekly lectures</b></li> <li>• <b>Assignments related to subjects being discussed</b></li> <li>• <b>A weekly 2-hour Laboratory session</b></li> </ul> |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assignments and lab reports</b></li> <li>• <b>Practical exams</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>• <b>Identify the main ancient plants.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of ancient plants suites from different parts of the Saudi Arabia.</b></li> </ul>           |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments and lab reports</b></li> </ul>               |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Personal initiative is encouraged through independent work on assignments and lab reports</b></li> </ul>             |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to encourage independent efforts</b></li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p>   |

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| <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments to ensure independent effort</b></li> <li>• <b>Questions related to the assignments are frequently included in mid-term and final exams.</b></li> </ul>   |
| <b>d. Communication, Information Technology and Numerical Skills</b>   |
| (i) Description of the skills to be developed in this domain. <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |
| (ii) Teaching strategies to be used to develop these skills <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>  |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> </ul>   |
| <b>e. Psychomotor Skills (if applicable)      N/A</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br><b>N/A</b>  |
| (ii) Teaching strategies to be used to develop these skills<br><br><b>N/A</b>  |
| (iii) Methods of assessment of students psychomotor skills<br><br><b>N/A</b>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |              |                                |
|--|--|--------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due     | Proportion of Final Assessment |
| 1  | <b>Write Report</b>  | <b>3-6-8</b> | <b>10%</b>                     |
| 2  | <b>First test</b>  | <b>7</b>     | <b>10%</b>                     |
| 3  | <b>Practical test</b>  | <b>10</b>    | <b>20%</b>                     |

|   |                    |           |            |
|---|--------------------|-----------|------------|
|   |                    |           |            |
| 4 | <b>Second test</b> | <b>12</b> | <b>10%</b> |
| 5 | <b>Final Exam</b>  | <b>15</b> | <b>50%</b> |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

## E Learning Resources

1. Required Text(s)

**- Stewart, W.N. & Rothwell, G.W. 1993. Paleobotany and the evolution of plants, Second edition. Cambridge University Press, Cambridge, 535 p.**

2. Essential References

**- Taylor, T. N, Taylor, E. L. & Krings, M., 2008, Paleobotany: the biology and evolution of fossil plants, 2nd edition, Academic Press, 1088 p.**

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

4-.Electronic Materials, Web Sites etc

5- Other learning material such as computer-based programs/CD, professional standards/regulations

## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- **Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.**
- **Laboratory seating at least 25 students, and equipped with petrological**

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| <b>microscopes.</b>  |
| 2. Computing resources<br><b>A computer lab with an internet connection is needed for some lectures.</b>   |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br><b>5) At least 25 petrological microscopes</b><br><b>6) A complete set of ancient plants in thin sections and hand specimens.</b> |

## **G Course Evaluation and Improvement Processes**

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching<br><br><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment</b>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department<br><br><ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul> |
| 3 Processes for Improvement of Teaching<br><br><ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>  |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)<br><br><b>- Exam results are made available upon request to relevant committees.</b>                                  |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.<br><br><b>- An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b>   |





**Geo 342: Paleoecology**

**Course Specification**

**Revised March 2007**



## Course Specification

|                    |  |
|--------------------|--|
| Institution:       | <b>King Saud University</b>                    |
| College/Department | <b>College of Science / Geology Department</b> |

### A Course Identification and General Information

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|--|
| 1. Course title and code: <b>Paleoecology (Geo 342)</b>  |
| 2. Credit hours <b>3(2+1)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>B.Sc. program in Geology</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Mohamed Naguib EL-SABROUTY</b>  |
| 5. Level/year at which this course is offered<br><b>Level six</b>  |
| 6. Pre-requisites for this course (if any)<br><b>Sedimentary and stratigraphy(Geo 234) – Invertebrate fossils (Geo 241)</b>  |
| 12.Co-requisites for this course (if any)  |
| 8. Location if not on main campus  |

## B Objectives

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|---|
| 1. Summary of the main learning outcomes for students enrolled in the course. <ul style="list-style-type: none"><li>• To familiarize students with basic knowledge of paleoecology needed for higher level courses.</li><li>• To develop the students' understanding of the properties of substances in the light of trends in the paleoecology across the fossils.</li><li>• To develop the students' appreciation of paleoecology as an experimental science supported by theory as an interpretive and predictive tool.</li><li>• To develop in the students' an awareness of the application of paleoecology to other strata.</li></ul>   |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) <ul style="list-style-type: none"><li>• Electronic materials and computer based programs have been utilized to support the lecture course material.</li><li>• The course is dynamic in nature especially as what concerns the use of computer soft ware in the practical exercises. Now the students are trained to apply surfer and finite extent programs.</li><li>• The course material was posted on the internet that could be accessed by the students enrolled in the course only.</li><li>• The experimental studies were reviewed. As a result of introducing new equipment and the intention to minimize the paleoecology applications.</li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Paleoclimatology, Paleoenvironment, Paleogeography</b>  | <b>1</b>    | <b>3</b>      |
| <b>Sedimentary environments: Physical parameters, Chemical parameters, Biological parameters</b> | <b>1</b>    | <b>3</b>      |
| <b>Facies, Sedimentary facies parameters</b>   | <b>1</b>    | <b>3</b>      |
| <b>Mode of life (Locomotion, Nutrition, Reproduction, Growth, Behavior)</b>                      | <b>1</b>    | <b>3</b>      |
| <b>Abiotic factors: Configuration of the earth's surface, Light, Temperature</b>                 | <b>1</b>    | <b>3</b>      |

|  |          |          |
|--|----------|----------|
| <b>Salinity, Oxygenation of water, Currents (Global currents, Local currents) Depth &amp; Bathymetry</b>                   | <b>1</b> | <b>3</b> |
| <b>Nutrient elements, Substrate, Water currents (Global currents, Local currents), Water turbidity</b>                     | <b>1</b> | <b>3</b> |
| <b>Biotic factors: Competition, Symbiosis, Parasitism, Predator prey - Paleotemperature measurement</b>                    | <b>1</b> | <b>3</b> |
| <b>Seasonal cyclicity – Fossiliferous Horizons</b>   | <b>1</b> | <b>3</b> |
| <b>Association of organisms: Palaeobiocoenosis, Thanatocoenosis – Environment Mode of life of fossils - Facies fossils</b> | <b>1</b> | <b>3</b> |
| <b>General characteristics of Continental environments</b>   | <b>1</b> | <b>3</b> |
| <b>Marine environments</b>   | <b>1</b> | <b>3</b> |
| <b>Classification of Sedimentary environments</b>  | <b>1</b> | <b>3</b> |
| <b>Paleoenvironments of bygone association</b>   | <b>1</b> | <b>3</b> |
| <b>Paleoenvironments identification</b>  | <b>1</b> | <b>3</b> |

|   |                     |   |             |
|---|---------------------|---|-------------|
| 2 Course components (total contact hours per semester): |                     |   |             |
| Lecture: <b>30</b>                                      | Tutorial: <b>15</b> | Practical/Fieldwork/Internship: <b>48</b> | Other:<br>- |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
| <b>2 hours weekly for the homework and reports assignments.</b>   |

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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• <b>A brief summary of the knowledge or skill the course is intended to develop;</b></li> <li>• <b>A description of the teaching strategies to be used in the course to develop that knowledge or skill;</b></li> <li>• <b>The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</b></li> </ul> |
| <p><b>a. Knowledge</b></p>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Paleoecology using to determine the age.</b></li> <li>• <b>Explain the paleoecology of strata.</b></li> <li>• <b>Fixed the paleoecology of strata.</b></li> <li>• <b>Identify the paleoecology.</b></li> <li>• <b>Identify the change of paleoecology.</b></li> <li>• <b>Identify a evidences of paleoecology.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>In-class lecturing where the previous knowledge is linked to the current and future topics</b></li> <li>• <b>Homework assignments</b></li> <li>• <b>Tutorial discussions</b></li> <li>• <b>Laboratory practice (systematic description and writing reports)</b></li> </ul>  |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Evaluation of laboratory reports</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>* <b>Students will be able to understand the use and application of paleoecology</b></li> <li>* <b>Students will be able to apply the knowledge have learnt concerning</b></li> </ul>   |

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| <p><b>paleoecology in field.</b></p> <p><b>* Students will be able to construct paleoecology parameters.</b></p> <p><b>* Students will be able to identify the facies fossils.</b></p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Problem solving in the tutorial / recitation sessions</b></li> <li>• <b>Case studies related to the course topics and relevant field geology</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>In class short quizzes</b></li> <li>• <b>Major and final exams</b></li> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> <li>• <b>Manage resources, time and other members of the group</b></li> <li>• <b>Communicate results of work to others</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <p><b>* Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</b></p> <p><b>* Practical work is planned around a number of paleoecology problems..</b></p> <p><b>* Engage students in classroom and in practical session discussion with questions and answers.</b></p> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Laboratory exams</b></li> <li>• <b>Assessment of the laboratory reports</b></li> <li>• <b>Grading homework assignments</b></li> </ul>   |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Use the computer for analysing and processing the data</b></li> </ul>   |

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| <ul style="list-style-type: none"> <li>• <b>Use computational tools</b></li> <li>• Report writing</li> </ul>   |
| (ii) Teaching strategies to be used to develop these skills <ul style="list-style-type: none"> <li>• <b>Writing laboratory reports</b></li> <li>• <b>Incorporating the use and utilization of computer in the course requirements</b></li> </ul> |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li>• <b>Evaluating the laboratory written reports</b></li> </ul>  |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br><p style="text-align: center;"><b>Not applicable</b></p>  |
| (ii) Teaching strategies to be used to develop these skills<br><br><p style="text-align: center;"><b>Not applicable</b></p>  |
| (iii) Methods of assessment of students psychomotor skills<br><br><p style="text-align: center;"><b>Not applicable</b></p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Class activates ( in class quizzes, and homework)</b>           | <b>weekly</b> | <b>25%</b>                     |
| 2  | <b>Major exams I</b>   | <b>6</b>      | <b>15%</b>                     |
| 3  | <b>Major exams II</b>  | <b>12</b>     | <b>15%</b>                     |
| 4  | <b>Final exam</b>  | <b>16</b>     | <b>20%</b>                     |
| 5  | <b>Lab activates</b>   | <b>weekly</b> | <b>25%</b>                     |

#### D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Office hours 6 hr/ week**
- **help sessions 1hr/ week aided by two faculty members**

#### E Learning Resources

|  |
|--|
| 11. Required Text(s)   |
| <b>* Hecker,R.F., (1965): Introduction to Paleoecology</b>   |
| 2. Essential References  |
| <b>* Dodd,J.R.,(1981): Paleoecology Concepts and applications</b><br><b>* Ager, D.V., (1963): Principale of paleoecology</b>                 |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   |
| <b>* Reyment, R.A.,(1971): Introduction to quantitative paleoecology</b><br><b>* Kreps, J.R., and N.B.Davies, (1978): Behavioral ecology</b> |
| 4-.Electronic Materials, Web Sites etc   |
| <b>• Websites on the internet that are relevant to the topics of the course</b>  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations  |
| <b>• Multi media associated with the text book and the relevant websites</b>   |

#### F. Facilities Required

|  |
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| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)                               |
| 1. Accommodation (Lecture rooms, laboratories, etc.)   |
| <b>• Lecture room with at least 25 seats</b><br><b>• Auditorium of a capacity of not less than 100 seats for large lecture format classes</b><br><b>• Geology laboratory with at least 30 places</b> |
| 12. Computing resources  |
| <b>• Computer room containing at least 15 systems</b>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)  |
| <b>• Availability of chemicals, glassware and equipment relevant to the course material</b>  |



- **Safety facilities**

## **G Course Evaluation and Improvement Processes**

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  |
| <ul style="list-style-type: none"> <li>• <b>Course evaluation by student</b></li> <li>• <b>Students- faculty meetings</b></li> </ul>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |
| <ul style="list-style-type: none"> <li>• <b>Peer consultation on teaching</b></li> <li>• <b>Departmental council discussions</b></li> <li>• <b>Discussions within the group of faculty teaching the course</b></li> </ul>   |
| 8 Processes for Improvement of Teaching   |
| <ul style="list-style-type: none"> <li>• <b>Conducting workshops given by experts on the teaching and learning methodologies</b></li> <li>• <b>Periodical departmental revisions of its methods of teaching</b></li> <li>• <b>Monitoring of teaching activates by senior faculty members</b></li> </ul>   |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)   |
| <ul style="list-style-type: none"> <li>• <b>Providing samples of all kind of assessment in the departmental course portfolio of each course</b></li> <li>• <b>Assigning group of faculty members teaching the same course to grade same questions for various students. Faculty from other institutions are invited to review the accuracy of the grading policy</b></li> <li>• <b>Conducting standard exams such as the other international universities exams.</b></li> </ul> |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.  |
| <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>   |



**Geo 361: Principle of Geochemistry**

**Course Specification**

**Revised March 2007**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | King Saud University                                     |
| College/Department | College of Science, Department of Geology and Geophysics |

### A Course Identification and General Information

|   |   |
|---|---|
| 1. Course title and code:   | <b>Principle of Geochemistry, 361 Geo</b>     |
| 2. Credit hours   | 3 credit hours                                |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>General Geology</b>                        |
| 4. Name of faculty member responsible for the course  | Prof. Hassan Othman M. Sindi                  |
| 5. Level/year at which this course is offered:  | 5 <sup>th</sup> semester                      |
| 6. Pre-requisites for this course (if any) :  | 321 Geo, 101 Chem.                            |
| 7. Co-requisites for this course (if any)   | -   |
| 8. Location if not on main campus   | Main building, Building 4, Geology Department |

### B Objectives

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|---|
| 1. Summary of the main learning outcomes for students enrolled in the course.<br>Students will practice on the usages of the geochemical analysis for the different rock types and minerals. Their relation to the universe and the formation of the Earth. Geochemistry of magmas. Geochemical relations with the tectonics (earthquakes and volcanoes). Geochemistry of organic materials (coal, petroleum and organic rocks) Hydro-geochemistry. Absolute age. Correlation of geochemical studies. |
|---|

- Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

Usages of various Arabic and English references, Internet articles, Term papers and connection of the studied subjects to the new geochemical problems world-wide.  
Group work and solely projects.

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| <b>1 Topics to be Covered</b>   |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| Introduction  | 1           | 1             |
| Cosmo-chemistry and their geochemical composition   | 1           | 1             |
| Geochemistry of the Earth, its development and relation to the outer-space. Natural pollution, biological and industrial pollution.   | 2           | 1             |
| Principals of geochemistry for minerals and rocks. Field relations. Bown's Reaction Series.   | 2           | 1             |
| Chemistry of crystallisation and Crystallisation of the magma. Group of minerals. Replacement. Geochemistry of the magmas   | 3           | 1             |
| Geochemical classifications and the distribution of the elements in the rocks and in the universe   | 3           | 1             |
| Relation between magma and the heat, viscosity and replacement. Geochemical cycle. Stable and unstable isotopes.  | 4           | 1             |
| Early and post crystallisation of the magma and the geochemistry of the igneous rocks   | 4           | 1             |
| Petrological coherences, changing in the geochemistry of the rocks, magma's equilibrium. Type of magmas, relation of solid and wet solutions to magmas and differences in geochemistry and their relations to pressure and temperature.   | 5           | 2             |
| Phase rule and its applications on rocks. Equations of Calluses and Boltzmann. .  | 6           | 2             |
| Nuclear geochemistry, Isotope geochemistry and their cycles. Splitting the isotopes and Radioactive minerals, Trans-Uranium Elements (Actinoides)   | 7           | 1             |
| Absolute age and age determinations   | 7           | 1             |
| Geochemistry of Metamorphic rocks and its relation to the tectonics. Effect of pressure and temperature on the changes in the geochemistry of the rocks   | 8           | 1             |
| Geochemistry of sediments, soil and sedimentary rocks. Aqueous solutions at different temperatures. Change of equilibrium according to temperature. Hybridization   | 8           | 1             |
| Geochemistry of Metamorphism, erosions. Oxidations and reduction process. Carbonisation, ionization, replacement, hydrolization and aqueous alterations. Water and gaseous and their effect on the rocks and the atmosphere               | 9           | 1             |
| Organic Geochemistry and geochemistry of organic sedimentary rocks, coal and petrol and their relations to the environment. Suspensions and electrochemical polarizesm.   | 9           |               |
| Geochemical Exploration   | 10          | 1             |
| <b>Mid-Term Exam</b>  | 10          | 1             |
| Applied geochemistry to the thermodynamics. Gibbs Rules and its applications  | 11          | 1             |
| Rate of geochemical reactions and equilibrium. Applied of geochemical studies to the Kinetic theory   | 11          | 1             |
| Statistical geochemistry and geochemical ratios.  | 12          | 1             |
| Parson and Cohen. Correlation matrix, vector analyses, Student T.   | 12          | 1             |
| Applied geochemistry in Economic rocks and minerals, military, structure industrial and construction sectors. Relation of geochemistry to the evolution of the Earth Atmosphere, hydrosphere and the tectonic (earthquakes and volcanos). | 13          | 1             |

|   |        |        |
|---|--------|--------|
| Methods of studying the different types of the rocks, liquids and gases. Field work and methods of collecting the samples. Methods of mineral separations, working with the analyses, working with the machines and equipments. C.I.P.W. Norms and Niggles values and their applications. | 13     | 1      |
| The Arabian Shield, the occurrences of the main igneous rocks and their geochemistry  | 14     | 1      |
| Applied Geochemistry and exercises  | 14     | 1      |
| Field trips for full three days at weekends =30 hours (10 hours /day) at selected weekends  | 3 Days | 3 Days |
| Exercises and presentations   |        |        |
| Labs and practical work   |        |        |
| Questions and review  |        |        |

|   |                     |  |  |
|---|---------------------|--|--|
| 2 Course components (total contact hours per semester): |                     |  |  |
| Lecture:<br><br>28                                      | Tutorial:<br><br>28 | Practical/Fieldwork/Internship:<br><br>3 full days at the weekends | Other:<br><br>Presentations, Exercises, questions and Review |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)<br><br>150 actual hours per semester. |
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| 4. Development of Learning Outcomes in Domains of Learning :<br><br>For each of the domains of learning shown below indicate:<br><br><ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul>   |
| <b>a. Knowledge</b>   |
| (i) Description of the knowledge to be acquired :<br><br>The knowledge of the geochemical analysis for the different rock types and minerals and their relation to the universe and the formation of the Earth. Geochemistry of magmas and deformation, erosion and alteration of rocks. Geochemical relations with the tectonics (earthquakes and volcanoes). Geochemistry of organic materials (coal, petroleum and organic rocks). Hydro-geochemistry. Absolute age. Correlation of geochemical studies. Relation of the geochemical studies to the economic, military, pollution and Constructions rocks and areas. Statistical analysis and methods of forming |

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| the geochemical reports.  |
| <p>(ii) Teaching strategies to be used to develop that knowledge :<br/> Usages of different Arabic and English references, Internet articles, Term papers and connection of the studied subjects to the new geochemical problems world-wide. Group work and solely projects. Digital maps, Usages of the geochemical equipments and their errors. Geochemical correlations and usages of the IT. Writing the geochemical reports and articles.</p>  |
| <p>(iii) Methods of assessment of knowledge acquired :<br/> Quizzes, Mid-term exams, Term papers, assignments, group projects, field work reports, and final exams.</p>   |
| <b>b. Cognitive Skills</b>  |
| <p>(i) Cognitive skills to be developed :<br/> The usages of the IGS. Digital maps. IT, field work and its application for the geochemical studies. Collecting the different samples for the geochemical analysis from the different rock types, minerals and fluids. The usages of the field and geochemical equipments and analytical methods. Methods of studying the geochemistry of organic materials (coal, petroleum and organic rocks) and Hydro-geochemistry. Determination and understanding the absolute age. Relation of the geochemical studies to the economic, military, pollution and Constructions. Statistical analysis and methods of forming the geochemical reports.</p> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills :<br/> The usages of the IGS. Digital maps. IT, field work and its application for the geochemical studies. Statistical analysis and methods of forming the geochemical reports. Geochemical correlations and usages of the IT. Writing the geochemical reports and articles.</p>  |
| <p>(iii) Methods of assessment of students cognitive skills :<br/> Quizzes,<br/> Mid-term exams,<br/> Term papers,<br/> Assignments,<br/> Group projects,<br/> Field work reports,<br/> Final exams.</p>  |
| <b>c. Interpersonal Skills and Responsibility</b>   |

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| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed:<br/>Doing field work and group and solely projects.</p>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities :<br/>Doing field work and group and solely projects.<br/>Connection with the related companies and corporations.<br/>Training and gaining experience for the related corporations and companies.</p>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility:<br/>Making presentations, collecting reports from the related companies and corporations, discussing these reports and the group work. Discussing the projects in a presentation with members of staff in the department .</p> |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain :<br/>Geological programs by using the IT.<br/>Application of the field work,<br/>Usages of the geological and geochemical equipments<br/>Digital maps.</p>  |
| <p>(ii) Teaching strategies to be used to develop these skills<br/>Connection with the companies and corporations that wok in the same field.</p>  |
| <p>(iii) Methods of assessment of students numerical and communication skills :</p>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required<br/>Field work,<br/>Group work,<br/>Cooperation with others,<br/>Training projects.</p>   |
| <p>(ii) Teaching strategies to be used to develop these skills<br/>Field work,<br/>Group work,<br/>Cooperation with others,</p>  |

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| Training projects.  |
| (iii) Methods of assessment of students psychomotor skills  |
| Result of the term papers,<br>Submitting and presenting the work and research and focusing on the difficulties that may face them and trying to find the solutions. |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |          |                                |
|--|--|----------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| 1  | Quizzes  | 3, 6, 9  | 10                             |
| 2  | Term papers  | 7        | 5                              |
| 3  | Group projects   | 10       | 5                              |
| 4  | Practical Mid-term test  | 5, 8     | 20                             |
| 5  | Theoretical mid-term test  | 11       | 20                             |
| 6  | Field work   | 4        | 5                              |
| 7  | Discussions, presentation, attendance, etc.                        | -        | 5                              |
| 8  | Final Theoretical Exam   | 14       | 30                             |

#### D. Student Support

Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week) :

One hour per week and giving the official office hours.

#### E Learning Resources

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|---|
| 1- Required Text(s) :   |
| - حسن عثمان سندي ، 1910. مبادئ وأسس الجيوكيمياء . الطبعة الأولى . تحت الطبع 470 صفحة  |
| - محمد عمر نصيف و محمد عمر نصيف و محمد رشاد حسن مفتي ، 1994. الجيوكيمياء (مترجم بالعربية عن كتاب Fyfe, W.S.. (Geochemistry الشركة العربية للنشر |



والتوزيع ، القاهرة ، مصر . 180 صفحة.

- سالم محمود عبد الله الدباغ ، 1988 . مبادئ وطرق الإستكشاف الجيوكيميائي للرواسب الخام . دار الكتب للطباعة والنشر ، جامعة الموصل . العراق ، 242 صفحة .

- أحمد محمد يشادي و ابراهيم العوضي عبد العزيز ، 1978 . أسس علم الجيوكيمياء ، دار القلم ، الكويت ، 352 صفحة .

## 2. Essential References :

- Compton R.R. Geology in the field. John wiley and Sons, Inc., New York. 398 p.

- Henderson P., 1982. Inorganic Geochemistry . 1<sup>st</sup> Edition Pergamon Press, Oxford, U.K. 354 p.

- Jeffery, P.G., and Hutchison, D., 1981. Chemical methods of rock analysis. 3<sup>rd</sup> Edition, Pergamon Press, Oxford, U.K. 380 p.

- Krauskopf, K.B. 1967. Introduction to Geochemistry. McGraw-Hill Kogakusha, Ltd., London. 617 p.

- Mason, B., 1966. Principles of Geochemistry. 3<sup>rd</sup> Edition. Wiley International, John Wiley and Sons, Inc., London 329 p.

## 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

Journal of Petrology

Chemistry of Minerals

Geochemica et Cosmoemica

## 4. Electronic Materials, Web Sites etc

Space Geology and geochemistry,

Volcanoes, earthquakes and tectonics,

Environmental and global weather changing,

Igneous, sedimentary and metamorphic rocks, and their geochemistry,

Organic materials and their geochemistry ,

Coal and petroleum geochemistry,

Exploration, mining and mineral geochemistry, Hydro-geochemistry

## 5- Other learning material such as computer-based programs/CD, professional standards/regulations

## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in

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| classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br>50 seats and 100 seats for the practical and IT computers are needed at least. Projects and photo analyses.  |
| 2. Computing resources<br>We need a room for 50 students at least that can be extended to 100 or 200 students. We also need labs for 100-200 students with 100 microscopes and screen with projects and microscope for photographing and swift point counter. We need 50-100 PC connected to the Internet with petrological programmes.  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) :<br>We need 50-100 PC connected to the Internet with petrological programmes (e.g. igpet) plus AutoCAD, MS.Office, Windows etc. Also we need microscopes, compasses, hammers, hand lenses, maps, Photographic microscopes, swift point counters, equipments for the analyses (e.g. x-Rays, Atomic absorption, Neutron Activation, Plasma, centrifuges, desiccators, magnetic and electrical mineral separation, ovens, high pressure equipments, press equipments, IR photo cells, etc... |

## **G Course Evaluation and Improvement Processes**

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching<br>Quizzes,<br>Mid-term exams,<br>Term papers,<br>Assignments,<br>Group projects,<br>Field work reports,<br>Final exams.   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department<br><br>Reports of the practical sessions,<br>Presentation of the term papers and the joint and group projects.   |
| 3 Processes for Improvement of Teaching<br><br>Field work and routine visits to the related companies and corporation establishments.   |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)<br><br>Field work and routine visits to the related companies and corporation establishments. |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.<br><br>Reports from the companies where the students are working.<br>The feedback from the alumina students after their graduation. To see their points of   |

view according to the marketing situation

Training the students during the summer holidays or during the placement year in one of the well known companies or establishment corporation that deals with the same field.

Encouraging the students to attend the conferences, and seminars and the workshop that deals with the same subjects.



## **GEO 380: Plate Tectonics**

### **Course Specification**

**Revised March 2009**



## Course Specification

|                                  |  |
|----------------------------------|--|
| Institution                      | <b>King Saud University</b>                                |
| College/Department<br>Geophysics | <b>Science Faculty – Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |  |
|---|--|
| 1. Course title and code:   | <b>Plate Tectonics - GEO 380</b>       |
| 2. Credit hours   | <b>2(2+0)</b>                          |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b> |
| 4. Name of faculty member responsible for the course  |  |
| 5. Level/year at which this course is offered   |  |
| 6. Pre-requisites for this course (if any)  | <b>GEO 236</b>                         |
| 7. Co-requisites for this course (if any)   |  |
| 8. Location if not on main campus   |  |

## B Objectives

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|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field on using some survey and field tools.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>1- Geophysical and geological observations related to plate tectonic theory</b> | <b>1</b>    | <b>2</b>      |
| <b>2- Marine magnetic.</b>   | <b>1</b>    | <b>2</b>      |
| <b>3- Paleomagnetic measurements.</b>  | <b>1</b>    | <b>2</b>      |
| <b>4- Seismicity and volcanism of plate boundaries.</b>                            | <b>1</b>    | <b>2</b>      |
| <b>5- Reference frames and absolute plate motions</b>                              | <b>2</b>    | <b>4</b>      |

|   |          |          |
|---|----------|----------|
| <b>6- Interpretations of geologic phenomena in the context of plate tectonics</b> | <b>2</b> | <b>4</b> |
| <b>7- Ocean trenches.</b>   | <b>1</b> | <b>2</b> |
| <b>8- Island arcs.</b>  | <b>1</b> | <b>2</b> |
| <b>9- Plate tectonic evolution of the ocean basins.</b>                           | <b>2</b> | <b>4</b> |
| <b>10- plate tectonic evolution of the continents.</b>                            | <b>2</b> | <b>4</b> |

|   |           |   |              |
|---|-----------|---|--------------|
| 2 Course components (total contact hours per semester): |           |   |              |
| Lecture: <b>28 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) |
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| 4. Development of Learning Outcomes in Domains of Learning   |
| For each of the domains of learning shown below indicate:  |
| <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>  |
| (i) Description of the knowledge to be acquired  |

|   |
|---|
| <ul style="list-style-type: none"> <li>- <b>Knowledge and understanding of behavior and properties of different type of rocks.</b></li> <li>- <b>Know the different techniques.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                                 |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul> |



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| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>                                |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>                     |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>   |

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|--|
| (ii) Teaching strategies to be used to develop these skills  |
| <b>Use computer software to present and analyse structural geology and structural deformation data.</b>  |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required  |
| (ii) Teaching strategies to be used to develop these skills  |
| (iii) Methods of assessment of students psychomotor skills   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |

|   |                    |           |            |
|---|--------------------|-----------|------------|
| 5 | <b>Second test</b> | <b>14</b> | <b>10%</b> |
| 6 | <b>Final Exam</b>  | <b>15</b> | <b>50%</b> |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E Learning Resources

|   |
|---|
| 1. Required Text(s)   |
| <p>2. Essential References</p> <p><b>Moore, E.M., and Twiss, R.J., 1995, Tectonics: W. H. Freeman &amp; Company, New York, 415 p.</b></p> <p><b>Kearey, P and. Vine, F. J, 1996, Global Tectonics, 2nd Edition, Blackwell Scientific Publications, Oxford, 302 p.</b></p> |
| <p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <p><b>Cox, A. and Hart, R.B., 1991, Plate Tectonics: How it Works. Blackwell Scientific Publications, 416 p.</b></p>  |
| 4-.Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations   |

## F. Facilities Required

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|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Lecture rooms, laboratories, etc.)   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li> <li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li> </ul> |
| 2. Computing resources <ul style="list-style-type: none"> <li>• <b>An easily accessible computer lab.</b></li> </ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <p><b>Printer – Scanner – data show</b></p>   |

## **G Course Evaluation and Improvement Processes**

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li> <li>• <b>Meeting and discussion between faculty and students</b></li> </ul>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> <li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li> <li>• <b>Periodic self- assessment of the program.</b></li> </ul>  |
| 3 Processes for Improvement of Teaching <ul style="list-style-type: none"> <li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li> <li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li> <li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul> |

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- **Not activated yet**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.**



## **GEO 381: Structural Geology**

## **Course Specification**

**Revised March 2009**



## Course Specification

|                     |   |
|---------------------|---|
| Institution:        | <b>King Saud University</b>                 |
| College/Department: | <b>Science Faculty – Geology Department</b> |

### A Course Identification and General Information

|   |   |
|---|---|
| 1. Course title and code:   | <b>Structural Geology – Geo 381</b>             |
| 2. Credit hours:  | <b>3(2+1)</b>                                   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b>          |
| 4. Name of faculty member responsible for the course:   | <b>Dr. Osama Mohamed Kaoud Kassem</b>           |
| 5. Level/year at which this course is offered:  | <b>5<sup>th</sup> level/3<sup>rd</sup> year</b> |
| 6. Pre-requisites for this course (if any):   | <b>Geo 101</b>                                  |
| 7. Co-requisites for this course (if any):  | <b>Field Geology</b>                            |
| 8. Location if not on main campus:  |   |





## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field on using some survey and field tools.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                    |             |               |
|---|-------------|---------------|
| Topic                                     | No of Weeks | Contact hours |
| <b>Introduction of Structural Geology</b> | <b>1</b>    | <b>3</b>      |
| <b>Review of structures</b>               | <b>1</b>    | <b>3</b>      |
| <b>Classification</b>                     | <b>1</b>    | <b>3</b>      |
| <b>Non tectonic structures</b>            | <b>1</b>    | <b>3</b>      |
| <b>Tectonic structures</b>                | <b>1</b>    | <b>3</b>      |
| <b>Strain Analysis</b>                    | <b>1</b>    | <b>3</b>      |

|  |          |          |
|--|----------|----------|
| <b>Stress Analysis</b>                   | <b>1</b> | <b>3</b> |
| <b>Deformation (Ductile and Brittle)</b> | <b>1</b> | <b>3</b> |
| <b>Folds</b>                             | <b>1</b> | <b>3</b> |
| <b>Foliation - Lineation</b>             | <b>1</b> | <b>3</b> |
| <b>Joint – Fracture</b>                  | <b>1</b> | <b>3</b> |
| <b>Faults</b>                            | <b>1</b> | <b>3</b> |
| <b>Shear Zone</b>                        | <b>1</b> | <b>3</b> |
| <b>GPS – Compass – Structural Tools</b>  | <b>1</b> | <b>3</b> |

|   |                 |   |              |
|---|-----------------|---|--------------|
| 2 Course components (total contact hours per semester): |                 |   |              |
| Lecture: <b>42 hours</b>                                | Tutorial: ----- | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

|  |
|--|
| <p>3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week)</p> <p>-----</p> |
|--|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop.</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill.</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul>                                     |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Knowledge and understanding of behavior and properties of different type of rocks to understand of the principles of structural geology.</b></li> <li>• <b>Know the different field work techniques.</b></li> <li>• <b>Knowledge of the different methods and techniques used in collecting field samples, analysis and interpretation of structural data.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> <li>• <b>Field trips and field discussions</b></li> </ul> |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <b>b. Cognitive Skills</b>  |
| <p>(i) Cognitive skills to be developed</p>   |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Students will be able to apply the knowledge of behaviour and properties of structural geology that they have learnt in this course in practical and field work.</b></li> <li>• <b>To be able to plan and conduct experiments and determine tectonic movement in different localities.</b></li> <li>• <b>To be able to differentiate between the different tectonic deformations associated to the different types of rocks.</b></li> <li>• <b>Students will be able to use and apply the gain knowledge to differentiate and nominate the different structural movement such as folds, Faults, shear zone, lineation and foliation in the field and lab.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>   |

|  |
|--|
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Use computer software to present and analyse structural geology and structural deformation data.</b></li> </ul>   |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>-----</p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p>-----</p>  |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p>-----</p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E. Learning Resources

|   |
|---|
| 1. Required Text(s): <b>Park, R.G. 1983: Foundation of structural Geology, pp135.</b>   |
| 2. Essential References <ul style="list-style-type: none"> <li>• <b>Ramsay, J. G. &amp; Huber, M. I. 1983: The Techniques of Modern Structural Geology, volume 1: Strain Analysis, Academic press, New York.</b></li> </ul> |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) <p><b>The instructor will provide a list of references for the students, as the course contains diverse topics.</b></p>                  |
| 4-.Electronic Materials, Web Sites etc <p><b>Search through Google for related topics.</b></p>  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations <p><b>The instructor may provide some relevant materials and learning aids.</b></p>                                       |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"><li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li><li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li></ul> |
| 2. Computing resources <ul style="list-style-type: none"><li>• <b>An easily accessible computer lab.</b></li></ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br><b>Printer – Scanner – data show</b>   |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li><li>• <b>Meeting and discussion between faculty and students</b></li></ul>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"><li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li><li>• <b>Periodic self- assessment of the program.</b></li></ul>  |
| 3 Processes for Improvement of Teaching <ul style="list-style-type: none"><li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li><li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li><li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li><li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li></ul> |

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- **Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements.**
- **A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.**





## **GEO 383: Remote Sensing**

## **Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                |
| College/Department | <b>Science Faculty – Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |  |
|---|--|
| 1. Course title and code:   | <b>Remote Sensing -GEO 383</b>         |
| 2. Credit hours   | <b>3(2+1)</b>                          |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b> |
| 4. Name of faculty member responsible for the course  |  |
| 5. Level/year at which this course is offered   |  |
| 6. Pre-requisites for this course (if any)  | <b>GEO 236</b>                         |
| 7. Co-requisites for this course (if any)   |  |
| 8. Location if not on main campus   |  |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field on using some survey and field tools.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                          |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>1- Basics of remote sensing</b>              | <b>1</b>    | <b>3</b>      |
| <b>2- Electromagnetic spectrum</b>              | <b>1</b>    | <b>3</b>      |
| <b>3- Types of sensors and platforms</b>        | <b>1</b>    | <b>3</b>      |
| <b>4- Acquiring and processing primary data</b> | <b>1</b>    | <b>3</b>      |
| <b>5- Spatial corrections</b>                   | <b>2</b>    | <b>6</b>      |

|  |          |          |
|--|----------|----------|
| <b>6- Types of filters</b>             | <b>1</b> | <b>3</b> |
| <b>7- Image enhancement</b>            | <b>1</b> | <b>3</b> |
| <b>8- Classification methods</b>       | <b>1</b> | <b>3</b> |
| <b>9- Principal component analysis</b> | <b>1</b> | <b>3</b> |
| <b>10- Thermal and radar imaging</b>   | <b>1</b> | <b>3</b> |
| <b>11- Geologic applications</b>       | <b>2</b> | <b>6</b> |
| <b>12- Interpretation</b>              | <b>1</b> | <b>3</b> |

|   |           |   |              |
|---|-----------|---|--------------|
| 2 Course components (total contact hours per semester): |           |   |              |
| Lecture: <b>42 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
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|--|
| <b>a. Knowledge</b>  |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>- <b>Knowledge and understanding of behavior and properties of different type of rocks.</b></li> <li>- <b>Know the different techniques.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                    |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <b>b. Cognitive Skills</b>   |
| <p>(i) Cognitive skills to be developed</p>  |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions</b></li> </ul> |

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| <b>and answers.</b>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>                                |
| <b>c. Interpersonal Skills and Responsibility</b>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>                     |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <b>d. Communication, Information Technology and Numerical Skills</b>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>   |

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|  |
| (ii) Teaching strategies to be used to develop these skills<br><br><b>Use computer software to present and analyse structural geology and structural deformation data.</b>   |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required  |
| (ii) Teaching strategies to be used to develop these skills  |
| (iii) Methods of assessment of students psychomotor skills   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

|   |
|---|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) |
| <ul style="list-style-type: none"> <li>• <b>Working hours 7hrs/day.</b></li> </ul>  |

- **Office hours 3hrs/day**

## E Learning Resources

|  |
|--|
| 1. Required Text(s)  |
| <p>2. Essential References</p> <p><b>Lillesand, T.M. &amp; R.W. Kiefer, 2004, Remote Sensing and Image Interpretation, 5th Edition, John Wiley &amp; Sons, 768 p.</b></p> <p><b>Sabins, F. F., 1997, Remote Sensing: Principles and Interpretation, W.H. Freeman and Company, 494 p.</b></p> |
| <p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <p><b>Avery, T. E. and Berlin, G. L, 1992, Fundamentals of Remote Sensing and Airphoto Interpretation, 5th Edition, Macmillan Publishing Company, 472 p.</b></p>                                   |
| 4-.Electronic Materials, Web Sites etc   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations  |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li> <li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li> </ul> |
| <p>2. Computing resources</p> <ul style="list-style-type: none"> <li>• <b>An easily accessible computer lab.</b></li> </ul>   |



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| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <p><b>Printer – Scanner – data show</b></p> |
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## **G Course Evaluation and Improvement Processes**

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li> <li>• <b>Meeting and discussion between faculty and students</b></li> </ul>   |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li> <li>• <b>Periodic self- assessment of the program.</b></li> </ul>  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li> <li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li> <li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul> |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Not activated yet</b></li> </ul>  |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li> </ul>   |



**GEO 386**

**Geology of the Arabian Shield**

**Course Specification**

**Revised November 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | King Saud University                                   |
| College/Department | College of Science / Geology Department and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Geology of the Arabian Shield (GEO 386)</b>  |
| 2. Credit hours <b>2</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>Geology program</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Ahmad Al-Saleh</b>   |
| 5. Level/year at which this course is offered <b>6<sup>th</sup> level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>GEO 323</b>  |
| 7. Co-requisites for this course (if any)<br><b>none</b>  |
| 8. Location if not on main campus   |

### B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• <b>To provide the student with an overall knowledge of the geology and tectonic development of the Arabian Shield.</b></li> <li>• <b>To enable the student to distinguish igneous and metamorphic lithologies and features in the field and under the polarizing microscope.</b></li> <li>• <b>The student should eventually be capable of mapping igneous/metamorphic terrains and deciphering their tectonic milieu.</b></li> </ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li> <li>• <b>Course contents, handouts and assignments will be posted on the instructor's web page.</b></li> </ul>  |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                        |              |               |
|---|--------------|---------------|
| Topic   | No. of Weeks | Contact hours |
| <b>Origin of the Arabian Shield</b>           | <b>2</b>     | <b>2</b>      |
| <b>stratigraphic schemes</b>                  | <b>2</b>     | <b>2</b>      |
| <b>igneous and tectonic activity</b>          | <b>2</b>     | <b>2</b>      |
| <b>island arc and microcontinents</b>         | <b>1</b>     | <b>1</b>      |
| <b>allochthonous terranes</b>                 | <b>1</b>     | <b>1</b>      |
| <b>ophiolites and sutures</b>                 | <b>2</b>     | <b>2</b>      |
| <b>correlation with the Nubian Shield</b>     | <b>1</b>     | <b>1</b>      |
| <b>the Pan-African episode</b>                | <b>1</b>     | <b>1</b>      |
| <b>Archean terranes in the Arabian Shield</b> | <b>1</b>     | <b>1</b>      |
| <b>ore deposits in the Arabian Shield</b>     | <b>2</b>     | <b>2</b>      |

|   |  |   |        |
|---|--|---|--------|
| 2 Course components (total contact hours per semester): |  |   |        |
| Lecture: <b>15</b>                                      | Tutorial:<br><br><b>Not applicable</b> | Practical/Fieldwork/Internship: <b>48 (practical) + 30 (fieldwork) = 78</b> | Other: |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

**2 hours weekly for assignments and field and lab reports.**

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- **Gain the skills needed to identify igneous and metamorphic rocks, their textures and constituent minerals in the field and under the polarizing microscope.**
- **Apply the concepts of plate tectonics and allochthonous terranes to the study of selected areas of the Arabian Shield.**

(ii) Teaching strategies to be used to develop that knowledge

- **1 weekly lectures**
- **Assignments related to subjects being discussed**
- **A weekly 2-hour Laboratory session**
- **A 3-day Field trip to the eastern Arabian Shield**

(iii) Methods of assessment of knowledge acquired

- **Mid-term and final exams**
- **Assignments and field reports**
- **Practical exams**

|  |
|--|
| <b>b. Cognitive Skills</b>   |
| <ul style="list-style-type: none"> <li>• Cognitive skills to be developed</li> <li>• <b>Identify the main rock-forming minerals in thin sections using the petrological microscope</b></li> <li>• <b>General field techniques with special emphasis on Precambrian terrains</b></li> </ul>   |
| <ul style="list-style-type: none"> <li>• (ii) Teaching strategies to be used to develop these cognitive skills</li> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of petrological suites from different parts of the Arabian Shield</b></li> <li>• <b>Field trip to relevant areas</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments as well as lab and field reports</b></li> </ul>  |
| <b>c. Interpersonal Skills and Responsibility</b>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>The student should learn how to conduct a proper field excursion and rely on himself in such situations.</b></li> <li>• <b>Team work is promoted by allocating the mapping of certain field areas to 3-4 student groups</b></li> <li>• <b>Personal initiative is encouraged through independent work on assignments and field reports</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to ensure independent effort</b></li> <li>• <b>Field areas are divided into sectors each of which is the responsibility of a small group of students</b></li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments and field reports to ensure independent effort</b></li> <li>• <b>Questions related to the field trip and assignments are frequently included in mid-term and final exams.</b></li> </ul>   |

|   |   |
|---|---|
| <b>d. Communication, Information Technology and Numerical Skills</b>                            |   |
| (i) Description of the skills to be developed in this domain.                                   | <ul style="list-style-type: none"> <li>• <b>Ability to use global position systems (GPS) in field surveys</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul>                                     |
| (ii) Teaching strategies to be used to develop these skills                                     | <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Students are required to show proficiency in the use of portable GPS during field trips</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul> |
| (iii) Methods of assessment of students numerical and communication skills                      | <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> <li>• <b>Students are required to demonstrate their ability to use GPS in the field</b></li> </ul>  |
| <b>e. Psychomotor Skills (if applicable)      N/A</b>   |   |
| (i) Description of the psychomotor skills to be developed and the level of performance required | <b>N/A</b>  |
| (ii) Teaching strategies to be used to develop these skills                                     | <b>N/A</b>  |
| (iii) Methods of assessment of students psychomotor skills                                      | <b>N/A</b>  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                                 |                                |
|--|--|---------------------------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                        | Proportion of Final Assessment |
| 1  | <b>6 main Assignments</b>  | Bi-weekly                       | 10%                            |
| 2  | <b>12 lab reports</b>  | Weekly                          | 6%                             |
| 3  | <b>Mid-term exam</b>   | After the 10 <sup>th</sup> week | 10%                            |
| 4  | <b>1<sup>st</sup> lab exam</b>                                     | After the 6 <sup>th</sup> week  | 12%                            |
| 5  | <b>2<sup>nd</sup> lab exam</b>                                     | Last week                       | 12%                            |
| 6  | <b>Final exam</b>  | As per university schedule      | 50%                            |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

## E Learning Resources

|                         |   |
|-------------------------|---|
| 7. Required Text(s)     | <ul style="list-style-type: none"> <li>• <b>Brown, G.F., Schmidt, D.L., and Huffman, A.C. Jr., 1989, Geology of the Arabian Peninsula—Shield area of Western Saudi Arabia: U.S. Geological Survey Professional Paper 560-A, 188 p.</b></li> <li>• <b>Grainger, D. J, 2007, The geologic evolution of Saudi Arabia: a voyage through space and time, Jeddah: Saudi Geological Survey.</b></li> </ul> |
| 8. Essential References | <ul style="list-style-type: none"> <li>• <b>Masaru Yoshida, Brian F. Windley, Somnath Dasgupta, 2002, Proterozoic East Gondwana: supercontinent assembly and breakup.</b></li> <li>• <b>Maps and reports of various parts of the Arabian shield prepared by the SGS.</b></li> </ul>   |



|  |
|--|
| <p>9. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <ul style="list-style-type: none"> <li>• <b>Vaughan, A.P.M., Leat, P.T. &amp; Pankhurst, R.J. (eds), 2005, <i>Terrane Processes at the Margins of Gondwana</i>, Geological Society, London, Special Publications, 246.</b></li> <li>• <b>Eriksson, P.G. Altermann, W. Nelson, D.R. Mueller W.U. and Catuneanu, O:Editors, (2004), <i>The Precambrian Earth: Tempos and Events</i>, Elsevier, Amsterdam.</b></li> </ul> |
| <p>4-.Electronic Materials, Web Sites etc</p> <ul style="list-style-type: none"> <li>• <a href="#">Journal of African Earth Sciences</a></li> <li>• <a href="#">Arabian Journal of Geosciences</a></li> <li>• <a href="#">Saudi Geological Survey</a></li> </ul>   |
| <p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <p><b>Proterozoic geology of western Saudi Arabia, a CD prepared by Peter Johnson (2007).</b></p>   |

## F. Facilities Required

|  |
|--|
| <p>Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)</p> <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>• <b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> <li>• <b>Laboratory seating at least 25 students, and equipped with petrological microscopes.</b></li> </ul> |
| <p>2. Computing resources</p> <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>  |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <p><b>7) At least 25 petrological microscopes.</b></p>  |

- 8) A complete set of Arabia Shield rock suites in hand specimen and thin sections.**

## **G. Course Evaluation and Improvement Processes**

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  |
| <b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment.</b>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |
| <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul> |
| 3 Processes for Improvement of Teaching   |
| <ul style="list-style-type: none"> <li>• <b>Recommendations are reported to the department on the basis of feedback questionnaires to take the necessary steps.</b></li> <li>• <b>Lecture notes are reviewed regularly and kept up-to-date.</b></li> </ul>                      |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)                           |
| <ul style="list-style-type: none"> <li>• <b>Exam results are made available upon request to relevant committees.</b></li> </ul>   |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   |
| <ul style="list-style-type: none"> <li>• <b>An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></li> </ul>   |



## **GEO 392: Geologic Reports**

### **Course Specification**

**Revised March 2009**

# Course Specification

*For Guidance on the completion of this template, please refer to of Handbook 2  
Internal Quality Assurance Arrangements*

|                    |   |
|--------------------|---|
| Institution        | King Saud University                    |
| College/Department | College of Science / Geology Department |

## A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Geologic Reports-Geo 385</b>   |
| 2. Credit hours <b>1</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Habes Ghrefat</b>  |
| 5. Level/year at which this course is offered<br><b>Sixth level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>Geo 234</b>  |
| 13.Co-requisites for this course (if any)<br><b>None</b>  |
| 8. Location if not on main campus   |

## B Objectives

|   |
|---|
| 1. Summary of the main learning outcomes for students enrolled in the course.   |
| Professional development of the skills of technical editing and writing for geologists.   |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) |
| <ul style="list-style-type: none"><li>• <b>Electronic materials will be utilized to support the lecture course material.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered            |             |               |
|-----------------------------------|-------------|---------------|
| Topic                             | No of Weeks | Contact hours |
| <b>Basic report elements</b>      | <b>1</b>    | <b>1</b>      |
| <b>Abstract</b>                   | <b>1</b>    | <b>1</b>      |
| <b>Introduction</b>               | <b>2</b>    | <b>2</b>      |
| <b>Methods</b>                    | <b>2</b>    | <b>2</b>      |
| <b>Results and discussion</b>     | <b>2</b>    | <b>2</b>      |
| <b>Conclusions</b>                | <b>1</b>    | <b>1</b>      |
| <b>Appendices</b>                 | <b>1</b>    | <b>1</b>      |
| <b>References</b>                 | <b>2</b>    | <b>2</b>      |
| <b>Capitalization</b>             | <b>1</b>    | <b>1</b>      |
| <b>Abbreviations and symbols</b>  | <b>1</b>    | <b>1</b>      |
| <b>Elements of graphic design</b> | <b>1</b>    | <b>1</b>      |

|   |  |
|---|--|
| 2 Course components (total contact hours per semester): |  |
| Lecture: <b>13 hrs/semester</b><br>1 hr/week            |  |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

###### (i) Description of the knowledge to be acquired

This course provides training in the preparation of professional and technical written reports. Attention is paid to the development of the student's ability to design a coherent report, to organize ideas, and to understand and use specific form.

###### (ii) Teaching strategies to be used to develop that knowledge

- In-class lecturing

###### (iii) Methods of assessment of knowledge acquired

- **Presentations**
- **Report writing**
- **Assignments and homework**

##### **b. Cognitive Skills**

|   |
|---|
| (i) Cognitive skills to be developed  |
| (ii) Teaching strategies to be used to develop these cognitive skills <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> </ul>   |
| (iii) Methods of assessment of students cognitive skills <ul style="list-style-type: none"> <li>• <b>Checking the problems solved in the homework assignments</b></li> </ul>  |
| <b>c. Interpersonal Skills and Responsibility</b>   |
| (i) Description of the interpersonal skills and capacity to carry responsibility to be developed <ul style="list-style-type: none"> <li>• <b>Work independently and as part of a team.</b></li> <li>• <b>Communicate results of work to others</b></li> </ul> |
| (ii) Teaching strategies to be used to develop these skills and abilities <ul style="list-style-type: none"> <li>• <b>Writing group reports</b></li> <li>• <b>Presentation</b></li> </ul>   |
| (iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility <ul style="list-style-type: none"> <li>• <b>Reports assessment</b></li> <li>• <b>Grading homework assignments</b></li> </ul>                                |
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| (i) Description of the skills to be developed in this domain. <ul style="list-style-type: none"> <li>• <b>Scientific writing.</b></li> <li>• <b>Working in teams</b></li> </ul>   |
| (ii) Teaching strategies to be used to develop these skills <ul style="list-style-type: none"> <li>• <b>Writing reports</b></li> <li>• <b>Incorporating the use and utilization of computer in the course</b></li> </ul>                                      |

|   |
|---|
| <b>requirements</b>   |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li>• <b>Evaluating the written reports</b></li> </ul>      |
| <b>e. Psychomotor Skills (if applicable)</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required <ul style="list-style-type: none"> <li>• <b>Not applicable</b></li> </ul> |
| (ii) Teaching strategies to be used to develop these skills<br><b>Not applicable</b>  |
| (iii) Methods of assessment of students psychomotor skills<br><b>Not applicable</b>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Homework and assignments</b>                                    | <b>weekly</b> | <b>50%</b>                     |
| 3  | <b>Report writing</b>  |               | <b>50%</b>                     |

#### D. Student Support

|  |
|--|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) <ul style="list-style-type: none"> <li>• Each faculty is required to be available in his office to devote at least 3 hrs/week for students' consultation and academic advice.</li> </ul> |
|--|

#### E Learning Resources

|  |
|--|
| 13. Required Text(s) <ul style="list-style-type: none"> <li>• The art and science of writing geoscience reports by Brian Grant, P.Geo</li> </ul> |
|--|



|  |
|--|
| 2. Essential References  |
| <ul style="list-style-type: none"> <li>Selected handouts and reference materials will be provided as part of course material.</li> </ul> |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   |
| <ul style="list-style-type: none"> <li></li> </ul>   |
| 4-.Electronic Materials, Web Sites etc   |
| <ul style="list-style-type: none"> <li><b>Websites on the internet that are relevant to the topics of the course</b></li> </ul>          |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations  |
| <ul style="list-style-type: none"> <li></li> </ul>   |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Lecture rooms, laboratories, etc.)   |
| <ul style="list-style-type: none"> <li>Lecture room equipped with a black board, overhead projector, computer and internet connection.</li> </ul>                      |
| 14. Computing resources<br>Computer Lab  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)  |

## G Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  |
| <ul style="list-style-type: none"> <li><b>Course evaluation by student</b></li> <li><b>Students- faculty meetings</b></li> </ul>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  |
| <ul style="list-style-type: none"> <li><b>Peer consultation on teaching</b></li> <li><b>Departmental council discussions</b></li> <li><b>Discussions within the group of faculty teaching the course</b></li> </ul> |
| 9 Processes for Improvement of Teaching   |
| -Undergraduate Committee will review deficiencies based on the student evaluation, faculty input,   |

|   |
|---|
| <p>course file, and program assessment.</p> <p>-Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</p> <p>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</p> <p>-Teaching method will focus on students' learning and on course learning outcomes.</p>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements.</li> <li>• A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</li> </ul> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</b></li> <li>• <b>The head of department and faculty take the responsibility of implementing the proposed changes.</b></li> </ul>   |



## **GEO 399: Field Geology**

### **Course Specification**

**Revised March 2009**



## Field Experience Specification

Institution : *King Saud University*

College/Department : *College of Science/Department of Geology & Geophysics*

### A Field Experience Course Identification and General Information

**1. Field experience course title and code :** *Field Geology – GEO 391*

**2. Credit hours :** *(4 + 0) credit hrs*

**3. Program in which this field experience activity is offered**  
*BSc degree, Department of Geology & Geophysics*

**4. Name of faculty member responsible for administration of the field experience**  
*No assigned faculty or staff members – used to be changed from semester to another due to decisions of Department council*

**5. Duration and time allocation of the field experience activity**  
*5 weeks full time (Saturday to Thursday) , a summer course*

**6. Level/year at which the field experience is offered**  
*Level 7- 4<sup>th</sup> year*

## B Objectives

### 1. Summary of the main learning outcomes for students participating in the field experience activity.

- To learn basic field skills and techniques
- To learn the skills of reading maps, mapping ,columns and sections drawings
- To learn how to interpret the structure and geologic history of an area based on field observations and geologic maps.
- To become responsible for their own field works in exploration geology.
- To develop the skills and expertise needed to make the transition from student to professional geologist
- To learn the importance of accuracy in data acquisition and placement on a geologic map.
- To integrate aspects of prior coursework into a comprehensive package in which the student becomes aware of the interdependence of all parts of the science of geology, and
- To develop senses of self-confidence and professional competence

### 2. Briefly describe any plans for developing and improving the field experience activity that are being implemented.

- a clear syllabus for the whole field trip
- geological softwares ( e.g. : rock classifications, cross sections, stereo projections (rose diagrams) , correlations, geologic columns, surface contouring etc )

### 3. Learning Outcomes in Domains of Learning

- a- skills in the field experience intended to develop
  - skills of sample collections (rocks, minerals, fossils, water , etc.)
  - skills using the Brunton and Silva compasses ( geographic directions, strikes, dip amounts and directions, etc.)
  - skills of measuring geologic sections and stratigraphic columns
  - skills of rock identification and description (sedimentary, igneous and metamorphic rocks)
  - field notes and sketches
  - safety procedures
  - skills of locations on geologic and topographic maps and air photos
  - skills to construct geologic cross-sections from field and geologic maps
  - skills to interpret the geologic structures and geologic history
  - hydrogeologic measurements and mapping,
  - safety procedures

#### b- teaching strategies to be used in the course to develop that knowledge or skill.

- Lecturing students before any practicing
- choose the appropriate geological sites to be investigated
- follow up with students to choose appropriate samples, traverses , geologic sections ,layers , borders between map units ....etc

#### c- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

- assignments and grading : a variety of assignments will be given and graded, including, mapping projects , cross-section constructions, interpretations of field features, rock and section descriptions and measurements, and a field exam on local geologic features.
- field notebooks and written assignments
- pre/post tests for instruments under practicing (oral tests)
- group interviews,
- grading performance and activities

|   |  |
|---|--|
| (Note that the objectives of the field experience may not include all of the domains and the items should be completed only for kinds of learning the field experience activity is intended to develop) |  |
| <b>a. Knowledge</b>   |  |
| (i) <b>Description of the knowledge to be acquired</b>  | <ul style="list-style-type: none"> <li>- <i>collecting field data</i></li> <li>- <i>knowledge of basic principles of field geological methods</i></li> <li>- <i>data acquisition and methods of interpretations</i></li> <li>- <i>web networks information</i></li> </ul>  |
| (ii) What will be done to develop that knowledge  | <ul style="list-style-type: none"> <li>- <i>class lecturing before going to field</i></li> <li>- <i>follow up students works and duties step by step</i></li> <li>- <i>assignments and reports</i></li> </ul>  |
| (iii) Methods of assessment of knowledge acquired   | <ul style="list-style-type: none"> <li>- <i>student quiz at end of each field experience.</i></li> <li>- <i>evaluation of field reports.</i></li> <li>- <i>personal and group discussions</i></li> <li>- <i>oral tests after instrumental practicing</i></li> <li>- <i>final personal project report</i></li> <li>- <i>final team project report</i></li> <li>- <i>final exam</i></li> </ul>               |
| <b>b. Cognitive Skills</b>  |  |
| (i) Description of cognitive skills to be developed   | <ul style="list-style-type: none"> <li>- <i>students will be able to make all measurements (data collecting) and field notes</i></li> <li>- <i>students should be able to do their own reports and maps</i></li> <li>- <i>students should be able to do analysis and interpretation</i></li> <li>- <i>students should be able to cooperate with each other</i></li> <li>- <i>report writing</i></li> </ul> |
| (ii) What will be done to develop these cognitive skills  | <ul style="list-style-type: none"> <li>- <i>practicing collecting data using; hammer, compass, lenses, hand level and paces,</i></li> <li>- <i>practicing drawing sections and stratigraphic columns</i></li> <li>- <i>practicing some geophysical and hydrological instruments</i></li> <li>- <i>practicing geological works in teams</i></li> </ul>  |
| (iii) Methods of assessment of skills developed   | <ul style="list-style-type: none"> <li>- <i>evaluation of field data and collected samples</i></li> <li>- <i>evaluation of field reports.</i></li> <li>- <i>evaluation of field maps , sections and geologic columns</i></li> <li>- <i>team and personal discussions</i></li> <li>- <i>oral tests</i></li> <li>- <i>evaluation of final report</i></li> <li>- <i>a final exam</i></li> </ul>               |
| <b>c. Interpersonal Skills and Responsibility</b>   |  |
| (i) <b>Description of the interpersonal skills and capacity to carry responsibility to be developed</b>   | <ul style="list-style-type: none"> <li>- <i>work independently and as a group</i></li> <li>- <i>manage resources</i></li> <li>- <i>communicate results and professional discussion of observations and interpretations</i></li> </ul>  |

|   |
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| <p><i>Notice: it is fully expected that each student will acquire his own field data, take his own notes and produce his own map and cross-sections. It is not acceptable for partners to each do a part of the work and to then exchange information to complete the project.</i></p>  |
| <p><b>(ii) What will be done to develop these skills and abilities</b></p> <ul style="list-style-type: none"> <li>- field assignments will be given to the students at each practice</li> <li>- 50% of the final grade allocated to the assignments and reports</li> <li>- reports are to be submitted in the same day of the field practice or at the end of its duration time limits</li> </ul>                               |
| <p><b>(iii) Methods of assessment of skills and abilities developed</b></p> <ul style="list-style-type: none"> <li>- Attendance , readiness, activity, attitudes</li> <li>- assessment of field reports.</li> <li>- a common discussion</li> <li>- a final team project</li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p><b>(i) Description of the numerical and communication skills to be developed</b></p> <ul style="list-style-type: none"> <li>- Use of compasses, GPS, and geophysical instruments in acquisitioning data at the field.</li> <li>- pc computer for producing field reports and assignments</li> <li>- pc computer for producing diagrams , geological analyses and contouring</li> <li>- Report writing in English.</li> </ul> |
| <p><b>(ii) What will be done to develop these skills</b></p> <ul style="list-style-type: none"> <li>- field works</li> <li>- practicing available instruments or equipments</li> <li>- practicing geologic softwares</li> </ul>   |
| <p><b>(iii) Methods of assessment of skills developed</b></p> <ul style="list-style-type: none"> <li>- evaluating the quality of field data.</li> <li>- data processing using softwares.</li> <li>- report writing.</li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>   |
| <p><b>(i) Description of the psychomotor skills to be developed and the level of performance required</b></p> <ul style="list-style-type: none"> <li>- Not applicable</li> </ul>  |
| <p><b>(ii) What will be done to develop these skills</b></p> <ul style="list-style-type: none"> <li>- Not applicable</li> </ul>   |
| <p><b>(iii) Methods of assessment of psychomotor skills</b></p> <ul style="list-style-type: none"> <li>- Not applicable</li> </ul>  |

**C Description of Field Experience Activity** (General description in the form to be used for the Bulletin or Handbook should be attached)

|   |
|---|
| <p><b>1. At what stage or stages during the program does the field experience occur?</b></p> <ul style="list-style-type: none"> <li>- It occurs from the beginning till the end of field trip</li> </ul>  |
| <p><b>2. Organizational structure (eg. single time block, distributed time blocks, recurrent schedule of XXX days per week)</b></p> <ul style="list-style-type: none"> <li>- one week (six days) for geologic and hydrogeologic field skills , contouring and traversing</li> </ul> |

|  |   |
|--|---|
| <ul style="list-style-type: none"> <li>- three days studying types of rocks and their classifications ,</li> <li>- one week (six days) for practicing geological , topographical maps and imageries readings and mappings</li> <li>- three days practicing geophysical instruments (magnetic, seismic and electrical )</li> <li>- two days for construction of stratigraphical columns ,</li> <li>- one day for drawing geologic sections</li> <li>- three days for final project</li> <li>- one week (six days) at university campus for report writing (office works)</li> </ul> |   |
| <b>3. Student Activities</b> Describe the principal activities in which the students will be involved during the field experience. <ul style="list-style-type: none"> <li>- field geological skills</li> <li>- reading geological , topographical maps and imageries</li> <li>- drawing geological maps, sections and traverses</li> <li>- studying different types of rocks and their classifications</li> <li>- attending lectures on report writing skills</li> <li>- a brief seminars when possible</li> </ul>   |   |
| 4. Student assignments or reports (if any)   | b. When are these assignments or reports required?                            |
| a. Title or description  |   |
| - basics of geologic field skills ,e.g. Paces, compasses, hand levels, GPS,  | in the same day of the field practice , or at end of its duration time limits |
| - making a geological traverse   | in the same day of the field practice , or at end of its duration time limits |
| - making contour map for a small mountain using survey instruments (theodolites) or GPS  | in the same day of the field practice , or at end of its duration time limits |
| - making geologic columns  | in the same day of the field practice , or at end of its duration time limits |
| - reporting on different types of rocks and geological features  | in the same day of the field practice , or at end of its duration time limits |
| reporting on geological structures and earth history   | in the same day of the field practice , or at end of its duration time limits |
| - final project reports  | One week after returning back   |
| <b>5. Follow up with Students.</b> What arrangements are made for follow up with students to reflect on their experiences and apply what they have learned to future situations? <ul style="list-style-type: none"> <li>- tutorials,</li> <li>- individual consultations</li> <li>- assessments</li> </ul>   |   |
| <b>6. Responsibilities of Supervisory Staff in the Field.</b> Describe the main responsibilities of supervising staff working in the field location. <ul style="list-style-type: none"> <li>- planning and scheduling activities for students,</li> <li>- material support (geological tools, maps, air photos, pc softwares)</li> <li>- moral support ( advices , teaching, knowledge , experience, encouragement, etc)</li> <li>- assessment of student performance , practices , activities and understanding</li> </ul>  |   |
| <b>7. Responsibilities of Supervisory Faculty from the Institution.</b> Describe the main responsibilities of supervising faculty from the institution. <ul style="list-style-type: none"> <li>- consultation</li> <li>- planning and advice to field supervisors and students</li> <li>- students assessments</li> <li>- scheduling</li> </ul>  |   |



- nutrition and transportation
- final report on the total field trip activities( e.g. places, instruments, meetings, skills , etc)

#### **8. Arrangements for student guidance and support**

- continuous follow up with students (works, duties , performance and procedures ,etc)

#### **9. What facilities and support are required at the field experience location? (if any)**

##### **a. Accommodation**

*Residence , nutrition , transportations, places for lecturing , first aids , etc*

##### **b Computer resources**

*Recommended to have a Laptop Computer for each student*

##### **c Learning support materials**

- pc geologic softwares
- web networks information

##### **d Other**

- lecturing on skills for surviving in desert

## **D Planning and Preparation**

#### **1. Identification of Field Placements.** What processes are used to identify appropriate field placements?

- field placements are already known. They are in Abha and Khamis mushit areas, for their fine climate in summer and availability of good geological sites .

#### **2. Preparation of Field Supervisors.** Briefly describe and indicate timing of arrangements made to ensure full understanding of roles and responsibilities of supervising faculty/staff in the field setting.

- the head master of the trip should be assigned at beginning of 2<sup>nd</sup> semester
- arranging meetings with staff and students, at least one week before field trip
- arranging for transportation food supply
- arranging for residence in field placements
- follow up consultation,
- follow up training and staff development
- follow up lecturing before field trip
- notes for guidance

#### **3. Preparation of Students.** Briefly describe and indicate timing of arrangements made for preparation of students for participation in the field experience activity. (Cross reference to any written notes provided)

- announcement for students to join the field , before at least the mid of 2<sup>nd</sup> semester
- study the students application and their academic applicability to join the trip
- students lecturing to explain the plan and targets of the field trip and their duties and responsibilities
- distribute notices on their needs in the field (e.g. camp gear, clothing, shoes, drafting supplies ... etc ).
- distribute notices on safety and risks in the field
- lecturing on skills for surviving in desert

#### **4. Safety and Risk Management** Describe process used to ensure safety and identify potential risks to students, persons with whom they work, or facilities where they will be located, and strategies to minimize and protect against those risks (including insurance

**arrangements).**

- *distribute notices on safety in the field, identifying potential risks ( e.g. sunstroke, sunburn, insects and snake bites , falling down and injuries )*
- *distribute notices on desert surviving.*
- *divide students into smaller groups to work in teams for safety*
- *distribute notices for surviving in deserts*

## **E Student Assessment**

**1. Basis for Assessments.** List the major performance criteria or matters considered in deciding on student grades. These may include assessments of work performance and personal characteristics and written reports of assignments. If specified weightings are given for different tasks or criteria indicate the weighting given to each component

*Student grades are decided on the following criteria*

- *performance and personal characteristics and attitudes*
- *written reports*
- *assignments and oral exams*
- *final personal project*
- *final team project*
- *a final exam*

**2. Field Supervisors Responsibility for Assessment.** Describe the responsibility of supervising staff in the field location for student assessment

- *follow up the performance of students*
- *check and grading written reports , assignments and final exams*
- *review final project with students and grading*

**3. Supervising Faculty Responsibility for Assessment.** Describe the responsibility of supervising faculty from the institution for student assessment

- *grading assessments*

**4 Resolution of Differences in Assessments.** If supervising staff in the field location and faculty from the institution share responsibility for student assessment, what process is followed for resolving any differences between them?

- *There is no institution share responsibility , all assessments are the responsibility of the field boss who is a faculty from department*

## **F Evaluation of the Field Experience**

**1. Arrangements for evaluation of field experience activity by:**

**a. Students**

- *a questionnaire for evaluation of field experience at end of the field*

**b. Supervising staff in the field setting**

- *write an evaluation , comments, notices etc*

**c. Supervising faculty from the institution**

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**e. Others—(eg. graduates, independent evaluator, etc.)**

**2. Describe the planning arrangements for periodically reviewing the effectiveness of the field experience and planning for improvement.**

- *a periodical discussion at department council, especially when arranging for the next field trip*



## **GEO 406: Data Analysis in Geology**

### **Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                |
| College/Department | <b>Science Faculty – Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |   |
|---|---|
| 1. Course title and code:   | <b>Data Analysis in Geology-GEO 406</b> |
| 2. Credit hours   | <b>2(1+1)</b>                           |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b>  |
| 4. Name of faculty member responsible for the course  |   |
| 5. Level/year at which this course is offered   |   |
| 6. Pre-requisites for this course (if any)  | <b>GEO 383, STAT 101</b>                |
| 7. Co-requisites for this course (if any)   |   |
| 8. Location if not on main campus   |   |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field on using some survey and field tools.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered           |             |               |
|----------------------------------|-------------|---------------|
| Topic                            | No of Weeks | Contact hours |
| <b>1- Sampling methods</b>       | <b>1</b>    | <b>2</b>      |
| <b>2- Data distributions</b>     | <b>1</b>    | <b>2</b>      |
| <b>3- Precision and accuracy</b> | <b>1</b>    | <b>2</b>      |
| <b>4- Confidence intervals</b>   | <b>1</b>    | <b>2</b>      |
| <b>5- Least squares methods</b>  | <b>1</b>    | <b>2</b>      |
| <b>6- Correlation</b>            | <b>1</b>    | <b>2</b>      |

|  |          |          |
|--|----------|----------|
| <b>7- Time series analysis</b>                 | <b>1</b> | <b>2</b> |
| <b>8- Multivariate techniques</b>              | <b>1</b> | <b>2</b> |
| <b>9- Cluster analysis</b>                     | <b>1</b> | <b>2</b> |
| <b>10- Principal component analysis</b>        | <b>1</b> | <b>2</b> |
| <b>11- Kriging</b>                             | <b>1</b> | <b>2</b> |
| <b>12- Using statistical software packages</b> | <b>1</b> | <b>2</b> |
| <b>13- Geologic modeling</b>                   | <b>2</b> | <b>4</b> |

|   |                |   |              |
|---|----------------|---|--------------|
| 2 Course components (total contact hours per semester): |                |   |              |
| Lecture: <b>28 hours</b>                                | Tutorial: ---- | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

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|--|
| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) |
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|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
|---|

|   |
|---|
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>- <b>Knowledge and understanding of behavior and properties of different type of rocks.</b></li> <li>- <b>Know the different techniques.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                                 |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <b>b. Cognitive Skills</b>  |
| <p>(i) Cognitive skills to be developed</p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul> |

|  |
|--|
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>                                |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>                     |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>   |



|   |
|---|
| (ii) Teaching strategies to be used to develop these skills   |
| <b>Use computer software to present and analyse structural geology and structural deformation data.</b>   |
| (iii) Methods of assessment of students numerical and communication skills  |
| <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required   |
| (ii) Teaching strategies to be used to develop these skills   |
| (iii) Methods of assessment of students psychomotor skills  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

|   |
|---|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) |
| <ul style="list-style-type: none"> <li>• <b>Working hours 7hrs/day.</b></li> <li>• <b>Office hours 3hrs/day</b></li> </ul>  |

## E Learning Resources

|   |
|---|
| 1. Required Text(s)   |
| 2. Essential References<br><b>Davis, J. C., 2002, Statistics and data analysis in geology, 3<sup>rd</sup> edition, New York, John Wiley &amp; Sons, 656 p</b>   |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br><b>Swan, A. R. H., and M. Sandilands, 1995, Introduction to geological data analysis, Blackwell Science, 446 p.</b> |
| 4- Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations   |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"><li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li><li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li></ul> |
| 2. Computing resources <ul style="list-style-type: none"><li>• <b>An easily accessible computer lab.</b></li></ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br><b>Printer – Scanner – data show</b>   |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li><li>• <b>Meeting and discussion between faculty and students</b></li></ul> |
|--|

|  |
|--|
|  |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li> <li>• <b>Periodic self- assessment of the program.</b></li> </ul>  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li> <li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li> <li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul> |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Not activated yet</b></li> </ul>  |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li> </ul>   |



## **Geo 421: Volcanology**

## **Course Specification**

**Revised March 2009**



## **Course Specification**

|                     |   |
|---------------------|---|
| Institution:        | <b>King Saud University</b>                 |
| College/Department: | <b>Science Faculty – Geology Department</b> |

### **A Course Identification and General Information**

|   |   |
|---|---|
| 1. Course title and code:   | <b>Volcanology – Geo 421</b>                      |
| 2. Credit hours:  | <b>3(2+1)</b>                                     |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b>            |
| 4. Name of faculty member responsible for the course:   | <b>Prof. Dr. Jomaa Abdel Rahem Aoud El Allawy</b> |
| 5. Level/year at which this course is offered:  | <b>8<sup>th</sup> level/4<sup>rd</sup> year</b>   |
| 6. Pre-requisites for this course (if any):   | <b>Geo 321</b>                                    |
| 7. Co-requisites for this course (if any):  | <b>Field Geology</b>                              |
| 8. Location if not on main campus:  |   |

## B Objectives

|   |
|---|
| 1. Summary of the main learning outcomes for students enrolled in the course. <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of origin of Volcanics and localities.</b></li><li>• <b>To develop the students' understanding of the properties of different types of Volcanics, shapes and parts.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of Volcanics.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect some information about the volcanics and knowledge it in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field and the laboratory on using volcanics samples.</b></li></ul>              |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Introduction of Internal Earth</b>                                  | <b>1</b>    | <b>3</b>      |
| <b>Study of origin and Plate tectonics</b>                             | <b>1</b>    | <b>3</b>      |
| <b>Evolution of Volcanology</b>  | <b>1</b>    | <b>3</b>      |
| <b>Eruption patterns and products of volcanoes</b>                     | <b>1</b>    | <b>3</b>      |
| <b>Thermal energy</b>  | <b>1</b>    | <b>3</b>      |
| <b>Lava flows and mechanism of the internal structure of volcanoes</b> | <b>1</b>    | <b>3</b>      |

|  |          |          |
|--|----------|----------|
| <b>Types and distribution of volcanic rocks.</b>   | <b>1</b> | <b>3</b> |
| <b>Causes of volcanism, and relation to plate tectonics</b>                              | <b>1</b> | <b>3</b> |
| <b>The relationship between the Earthquake and Volcanics</b>                             | <b>1</b> | <b>3</b> |
| <b>Earthquake and tectonic of Saudi Arabia</b>   | <b>1</b> | <b>3</b> |
| <b>Tectonic of Saudi Arabia Kingdom</b>  | <b>1</b> | <b>3</b> |
| <b>Examples and illustrations from volcanic rocks within the Kingdom of Saudi Arabia</b> | <b>1</b> | <b>3</b> |
| <b>Volcanic in other plants</b>  | <b>1</b> | <b>3</b> |
| <b>Field applications</b>  | <b>1</b> | <b>3</b> |

|   |                 |   |              |
|---|-----------------|---|--------------|
| 2 Course components (total contact hours per semester): |                 |   |              |
| Lecture: <b>42 hours</b>                                | Tutorial: ----- | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week)<br><br>----- |
|---|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop.</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill.</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul>                                     |
| <p><b>a. Knowledge</b></p>  |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Knowledge and understanding of behavior and properties of different type of Volcanics Rocks.</b></li> <li>• <b>Know the different techniques for Volcanics.</b></li> <li>• <b>Knowledge of the different methods and techniques used in producing volcanics and lava flow.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> <li>• <b>Field trips and field discussions</b></li> </ul> |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p>   |



|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Students will be able to apply the knowledge of behaviour and properties of Volcanics Rocks that they have learnt in this course in practical and field work.</b></li> <li>• <b>To be able to plan and conduct experiments and determine lava flow and the volcano different localities.</b></li> <li>• <b>To be able to differentiate between the different of Volcanics Rocks associated to the different types of rocks and locality.</b></li> <li>• <b>Students will be able to use and apply the gain knowledge to differentiate and nominate the different volcanics movement in the field and lectures.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>  |

|  |
|--|
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Use computer software to present and analyse volcanics and lava flow data.</b></li> </ul>   |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>-----</p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p>-----</p>  |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p>-----</p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E. Learning Resources

|  |
|--|
| Required Text(s): <b>Bolt, B. A., 1980: Earthquakes and Volcanoes, reading from Scientific American, W H Freeman and company, San Francisco, USA, 154 pp.</b>  |
| Essential References <b>Introduction for the Volcanics – Dr. Jomaa Abdel Rahem Aoud El Allawy</b>  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br><b>The instructor will provide a list of references for the students, as the course contains diverse topics.</b> |
| 4- Electronic Materials, Web Sites etc<br><br><b>Search through Google for related topics.</b>   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations<br><br><b>The instructor may provide some relevant materials and learning aids.</b>                      |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"><li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li><li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li></ul> |
| 2. Computing resources <ul style="list-style-type: none"><li>• <b>An easily accessible computer lab.</b></li></ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br><b>Printer – Scanner – data show</b>   |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li><li>• <b>Meeting and discussion between faculty and students</b></li></ul>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"><li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li><li>• <b>Periodic self- assessment of the program.</b></li></ul>  |
| 3 Processes for Improvement of Teaching <ul style="list-style-type: none"><li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li><li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li><li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li><li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li></ul> |

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

- **Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements.**
- **A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- **Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.**

**KING SAUD UNIVERSITY**  
**College of Science**

**Department of Geology and Geophysics**



**جامعة الملك سعود**  
**كلية العلوم**  
**قسم الجيولوجيا والجيوفيزياء**

## **Geo 431: CARBONATE ROCKS**

## **Course Specification**

**Revised March 2007**



## Course Specification

|                    |                      |
|--------------------|----------------------|
| Institution        | KING SAUD UNIVERSITY |
| College/Department | SCIENCE / GEOLOGY    |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>CARBONATE ROCKS / GEO 431</b>  |
| 2. Credit hours 3 HRS   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>GEOLOGY</b> |
| 4. Name of faculty member responsible for the course DR. SALEH MOHAMED OKLA   |
| 5. Level/year at which this course is offered 4 <sup>TH</sup> (SENIOR YEAR)   |
| 6. Pre-requisites for this course (if any) GEO 333  |
| 7. Co-requisites for this course (if any) NONE  |
| 8. Location if not on main campus -   |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• LEARNING HOW THE CARBONATE ROCKS WERE AND ARE DEPOSITED</li> <li>• LEARNING HOW TO IDENTIFY THEIR CONSTITUENTS</li> <li>• LEARNING HOW TO IDENTIFY THEIR DIAGENESIS</li> </ul>         |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <p>THE COURSE CONTENTS WILL BE RECEIVED EACH SEMESTER AND NEW MATERIALS ARE ADDED</p> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                 |             |               |
|--|-------------|---------------|
| Topic                                  | No of Weeks | Contact hours |
| CHEMISTRY AND MINERALOGY               | 1           | 2             |
| PETROGRAPHY OF SKELETAL GRAINS         | 5           | 10            |
| PETROGRAPHY OF NON SKELETAL GRAINS     | 1           | 2             |
| PETROGRAPHY OF MUD AND CEMENT          | 1           | 2             |
| RECENT CARBONATE ENVIRONMENTS – ARABIA | 3           | 6             |
| " " " " BAHAMA                         | 2           | 4             |
| DIAGENESIS                             | 2           | 4             |
| RECENT DOLOMITES                       |             |               |

| 2 Course components (total contact hours per semester): |           |                                 |              |
|---|-----------|---------------------------------|--------------|
| Lecture:  | Tutorial: | Practical/Fieldwork/Internship: | Other:       |
| 32 HOURS  | -         | ONE FIELD TRIP                  | LAB 32 HOURS |



3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- HOW THE CARBONATE ROCKS ARE AND WERE FORMED
- HOW THEY CHANGE WITH TIME
- HOW THEY ARE IDENTIFIE

(ii) Teaching strategies to be used to develop that knowledge

- COURSE MATERIAL IN LECTURE
- THIN SECTIONS IN LABORATORY
- FIELD TRIPS NEAR THE CAMPUS

(iii) Methods of assessment of knowledge acquired

- EXAMS IN LECTURE
- EXAMS IN LABORATORY
- FINAL EXAMS

##### **b. Cognitive Skills**

(i) Cognitive skills to be developed

- STUDENT WILL BE ABLE TO IDENTIFY THE CONSTITUENTS OF CARBONATE ROCKS
- THEY WILL BE ABLE TO INTERPRET THEIR DEPOSTION ENVIRONMENT
- THEY WILL BE ABLE TO IDENTIFY LATER CHANGES

|  |
|--|
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>LECTURES ARE FOLLOWED BY MANY EXAMPLES LABORATORY WORK WILL PROVIDE THIN SECTION OF MANY TYPES OF CARBONATE.\</li> </ul>                                   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>EXAMS</li> <li>LABORATORY HOMEWORK AND REPORTS</li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>PUNCTUAL ATTENDENCE OF CLASSES AND LABS</li> <li>STUDENT LEARNS TO DESCRIBE THIN SECTIONS</li> </ul>                            |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>PARTICIPATION OF STUDENTS IN CLASS ROOM DISCUSSIONS</li> <li>LABORATORY REPORTS TO BE WRITTEN</li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>CLASS ATTENDENCE OF STUDENTS AT THE BIGNNING OF THE LECTURES IS TAKEN.</li> <li>RECORDING OF GRADES AND LAB REPORTS</li> </ul> |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>ABILITY OF STUDENTS TO APPLY GEOLOGIC CONCEPTS</li> <li>ABILITY TO USE LIGHT MICROSCOPE</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>QUESTIONS OF TESTS AND LAB ASSESMENTS</li> </ul>   |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>EVALUATION OF WRITING LAB REPORTS</li> </ul>  |

|  |
|--|
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required <ul style="list-style-type: none"> <li>NOT APPLICABLE</li> </ul> |
| (ii) Teaching strategies to be used to develop these skills-   |
| (iii) Methods of assessment of students psychomotor skills   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                  |                                |
|--|--|------------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due         | Proportion of Final Assessment |
| 1  | LAB REPORTS  | 2                | 5%                             |
| 2  | FIRST EXAM IN LECTURER   | 6 <sup>TH</sup>  | 20%                            |
| 3  | FIRST EXAM IN LAB  | 6 <sup>TH</sup>  | 20%                            |
| 4  | FINAL EXAM (LAB)   | 15 <sup>TH</sup> | 10%                            |
| 5  | FINAL EXAM IN LECTURE  |                  | 50%                            |
| 6  | (AS SCHEDULE BY THE REGISTRAR                                      |                  |                                |
| 7  |  |                  |                                |
| 8  |  |                  |                                |

## D. Student Support

|  |
|--|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) <ul style="list-style-type: none"> <li>I WILL BE AVAILABLE IN MY OFFICE FOR STUDENT CONSULTATION AND ACADEMIC ADVISING.</li> </ul> |
|--|

## E Learning Resources

|   |
|---|
| 1. Required Text(s) BATHURS R.G. (1975) CARBONATE ROCKS AND THEIR DIAGENESIS ELSEWHERE. |
|---|

|   |
|---|
| 2. Essential References<br><br>HOROWIT H.S. AND POTTER R.E.(9171)<br><br>INTRODUCTORY PETROGRAPHY OF FOSSILS SPRINGER                                 |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br>FINGEL E. (1982) MICROFACIES ANALYSIS OF LIMESTONE SPRINGER |
| 4- Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations   |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)                       |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"> <li>LECTURE ROOM WITH A BLACK BOARD</li> <li>LAB WITH LIGHT MICROSCOPES AND THIN SECTIONS</li> </ul> |
| 2. Computing resources <p style="text-align: center;">-</p>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <p style="text-align: center;">-</p>                                       |

## G Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>STUDENT COURSE EVALUATION AT THE END OF THE COURSE</li> </ul> |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> <li>PERIODIC SELF ASSESSMENT OF THE COURSE</li> </ul> |

|   |
|---|
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• REVIEW BY THE DEPARTMENT</li> </ul>   |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• REVIEW BY THE DEPARTMENT</li> </ul> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• SELF ASSESSMENT EVERY TWO YEARS</li> </ul>   |



## **GEO 432: Quaternary Geology**

## **Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                      |
| College/Department | <b>Faculty of Science / Department of Geology and Geophysics</b> |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Quaternary Geology (GEO 432)</b>   |
| 2. Credit hours <b>2 (2+0)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology</b> |
| 4. Name of faculty member responsible for the course  |
| 5. Level/year at which this course is offered   |
| 6. Pre-requisites for this course (if any)<br><b>GEO 236</b>  |
| 7. Co-requisites for this course (if any)<br><b>Field Geology</b>   |
| 8. Location if not on main campus   |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and stratigraphy.</b></li><li>• <b>To understand the different concepts, properties and formation of rocks during recent depositions.</b></li></ul>                             |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li></ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>Introduction</b>   | <b>1</b>    | <b>2</b>      |
| <b>Characteristics, distribution, and origin of recent deposits</b>       | <b>1</b>    | <b>2</b>      |
| <b>Stratigraphy and chronology</b>  | <b>2</b>    | <b>4</b>      |
| <b>Paleosols</b>  | <b>2</b>    | <b>4</b>      |
| <b>Formation of landforms</b>   | <b>1</b>    | <b>2</b>      |
| <b>Glacial and inter-glacial periods – glacial deposits and landforms</b> | <b>2</b>    | <b>4</b>      |



|                                    |          |          |
|------------------------------------|----------|----------|
| <b>Changes in sea level</b>        | <b>2</b> | <b>4</b> |
| <b>Biodiversity and extinction</b> | <b>2</b> | <b>4</b> |
| <b>Appearance of man</b>           | <b>2</b> | <b>4</b> |
| <b>One day field trip</b>          |          |          |

|   |           |                                 |        |
|---|-----------|---------------------------------|--------|
| 2 Course components (total contact hours per semester): |           |                                 |        |
| Lecture: <b>30 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: | Other: |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Knowledge and understanding of behavior and properties of different type</b></li> </ul>  |

|   |
|---|
| <p><b>of rocks to understand of the principles of sedimentary deposits.</b></p> <ul style="list-style-type: none"> <li>• <b>Know the different field work techniques related to the geologic concepts.</b></li> <li>• <b>Knowledge of the different methods and techniques used in collecting field samples, analysis and interpretation of sedimentary structure and stratigraphy.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and sedimentary deposits.</b></li> <li>• <b>Interactive learning process through questions and discussion in class.</b></li> <li>• <b>Field trips and field discussions</b></li> </ul>  |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the sedimentary processes.</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will be able to apply the knowledge of behaviour and properties of sedimentary geology and stratigraphy that they have learnt in this course in field work.</b></li> <li>• <b>To be able to differentiate between the different sedimentary processes associated to the different stratigraphic sections.</b></li> <li>• <b>Students will be able to use and apply the gain knowledge to differentiate and nominate the different sedimentary structure in the field.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Engage students in field trips and class discussions with questions and answers.</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p>   |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions</b></li> </ul>   |
| <b>c. Interpersonal Skills and Responsibility</b>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>                     |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Sharing in field trips.</b></li> </ul>  |
| <b>d. Communication, Information Technology and Numerical Skills</b>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>○ <b>Use computer software to present and analyse sedimentary structure and stratigraphic logs.</b></li> </ul>   |

|  |
|--|
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written reports and other assignments that require a Written text.</b></li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br>-----   |
| (ii) Teaching strategies to be used to develop these skills<br>-----   |
| (iii) Methods of assessment of students psychomotor skills<br>-----  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |              |                                      |
|--|--|--------------|--------------------------------------|
| Assess<br>ment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due     | Proportion<br>of Final<br>Assessment |
| 1  | <b>Homework</b>  | <b>3-5-7</b> | <b>10%</b>                           |
| 2  | <b>Write Report</b>  | <b>6</b>     | <b>10%</b>                           |
| 3  | <b>First test</b>  | <b>7</b>     | <b>15%</b>                           |
| 5  | <b>Second test</b>   | <b>14</b>    | <b>15%</b>                           |
| 6  | <b>Final Exam</b>  | <b>15</b>    | <b>50%</b>                           |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E Learning Resources

|  |
|--|
| 1. Required Text(s)  |
| <b>- Lowe, J. J., &amp; Walker, M. J. C., 2008, Reconstructing Quaternary environments, 3rd Edition, Prentice Hall, 528 p.</b> |
| 2. Essential References  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)   |
| 4- Electronic Materials, Web Sites etc   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations                              |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.)  |
| <ul style="list-style-type: none"> <li><b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li> <li><b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li> </ul> |
| 2. Computing resources  |
| <ul style="list-style-type: none"> <li><b>An easily accessible computer lab.</b></li> </ul>   |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)   |
| <b>Printer – Scanner – data show</b>  |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching   |
| <ul style="list-style-type: none"> <li><b>Student questionnaire for evaluation of the conclusion of the course.</b></li> <li><b>Meeting and discussion between faculty and students</b></li> </ul> |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department   |
| <ul style="list-style-type: none"> <li><b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li> <li><b>Periodic self- assessment of the program.</b></li> </ul>        |
| 3 Processes for Improvement of Teaching  |
| <ul style="list-style-type: none"> <li><b>Undergraduate Committee will review deficiencies based on the student</b></li> </ul>   |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>evaluation, faculty input, course file, and program assessment.</b></li> <li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of sedimentary structure and stratigraphic data.</b></li> <li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul>   |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements.</b></li> <li>• <b>A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</b></li> </ul> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li> </ul>  |



**GEO 435: Oceanography**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                      |
| College/Department | <b>Faculty of Science / Department of Geology and Geophysics</b> |

### A Course Identification and General Information

|   |                               |
|---|-------------------------------|
| 1. Course title and code:   | <b>Oceanography (GEO 435)</b> |
| 2. Credit hours   | <b>2 (2+0)</b>                |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology</b>                |
| 4. Name of faculty member responsible for the course  |                               |
| 5. Level/year at which this course is offered   |                               |
| 6. Pre-requisites for this course (if any)  | <b>GEO 236</b>                |
| 7. Co-requisites for this course (if any)   |                               |
| 8. Location if not on main campus   |                               |



## B Objectives

|  |
|--|
| 1. Summary of the main learning outcomes for students enrolled in the course. <ul style="list-style-type: none"><li>• <b>To familiarize the geology students with the basic principles of different processes in the oceans</b></li><li>• <b>To enable the student to distinguish the most common physical and chemical processes in the oceans.</b></li></ul>   |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field) <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to oceanic studies.</b></li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                                |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>Introduction</b>                                   | <b>1</b>    | <b>2</b>      |
| <b>Physical processes in the oceans</b>               | <b>2</b>    | <b>4</b>      |
| <b>Waves, currents and tides</b>                      | <b>1</b>    | <b>2</b>      |
| <b>Formation of ocean basins</b>                      | <b>1</b>    | <b>2</b>      |
| <b>Turbidity currents and deep sediment transport</b> | <b>2</b>    | <b>4</b>      |
| <b>Earthquakes and tsunamis</b>                       | <b>1</b>    | <b>2</b>      |

|   |          |          |
|---|----------|----------|
| <b>Marine chemistry</b>                 | <b>1</b> | <b>2</b> |
| <b>Coastal processes</b>                | <b>2</b> | <b>4</b> |
| <b>Life in the oceans</b>               | <b>1</b> | <b>2</b> |
| <b>Ocean mineral resources</b>          | <b>2</b> | <b>4</b> |
| <b>Changes in the oceanic ecosystem</b> | <b>1</b> | <b>2</b> |

|   |           |                                 |        |
|---|-----------|---------------------------------|--------|
| 2 Course components (total contact hours per semester): |           |                                 |        |
| Lecture: <b>30 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: | Other: |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

|   |
|---|
| (ii) Teaching strategies to be used to develop these skills <ul style="list-style-type: none"> <li><b>Assignments are mostly prepared in Excel format</b></li> <li><b>Submission of assignments and reports via the internet is encouraged</b></li> </ul> |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li><b>Higher grades are given to assignments submitted in digital format</b></li> </ul>  |
| <b>e. Psychomotor Skills (if applicable)      N/A</b>   |

|   |
|---|
| (i) Description of the psychomotor skills to be developed and the level of performance required |
| N/A   |
| (ii) Teaching strategies to be used to develop these skills                                     |
| N/A   |
| (iii) Methods of assessment of students psychomotor skills                                      |
| N/A   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |            |                                |
|--|--|------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due   | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>3-6</b> | <b>10%</b>                     |
| 2  | <b>Write Report</b>  | <b>5</b>   | <b>10%</b>                     |
| 3  | <b>First test</b>  | <b>7</b>   | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>13</b>  | <b>15%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>  | <b>50%</b>                     |

## D. Student Support

|   |
|---|
| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"> <li><b>Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams</b></li> </ul> |
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## E Learning Resources

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| <p>1. Required Text(s)</p> <p><b>- Garrison, T., 2007, Oceanography: an Invitation to Marine Science, 6th edition, Thomson - Brooks/Cole Publishers, 608 p.</b></p> |
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| 2. Essential References   |
| <b>- Sverdrup, K.A., &amp; Armbrust, E.V., 2008, An Introduction to the World Ocean, McGraw-Hill Publishing Co., 521 p.</b> |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)  |
| 4-.Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations                           |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.)  |
| <ul style="list-style-type: none"> <li><b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> <li><b>Laboratory seating at least 25 students, and equipped with data show.</b></li> </ul> |
| 2. Computing resources  |
| <b>A computer lab with an internet connection is needed for some lectures.</b>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)   |
| <b>Printer – Scanner – data show</b>  |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching   |
| <b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment</b>                        |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department   |
| <ul style="list-style-type: none"> <li><b>Constat discussions with other instructors within and outside King Saud</b></li> </ul> |

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| <p><b>University who are currently teaching similar courses.</b></p> <ul style="list-style-type: none"> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>   |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>                    |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <p><b>- Exam results are made available upon request to relevant committees.</b></p> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p><b>- An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></p>  |

**KING SAUD UNIVERSITY**  
**College of Science**

Department of Geology and Geophysics



جامعة الملك سعود  
كلية العلوم  
قسم الجيولوجيا والجيوفيزياء

## **GEO 441: Vertebrate Paleontology**

## **Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                      |
| College/Department | <b>Faculty of Science / Department of Geology and Geophysics</b> |

### A Course Identification and General Information

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|---|
| 1. Course title and code: <b>Vertebrate Paleontology (GEO 441)</b>  |
| 2. Credit hours <b>2 (1+1)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology</b> |
| 4. Name of faculty member responsible for the course  |
| 5. Level/year at which this course is offered   |
| 6. Pre-requisites for this course (if any) <b>GEO 243</b>   |
| 7. Co-requisites for this course (if any)   |
| 8. Location if not on main campus   |

## B Objectives

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| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of vertebrate paleontology methods in the field.</b></li><li>• <b>To develop the students' understanding of the vertebrate paleontology and different types of vertebrates.</b></li><li>• <b>To understand the different concepts, properties, fossilization and deposition processes during geologic ages.</b></li></ul>   |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to vertebrate paleontologic studies.</b></li></ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Introduction</b>  | <b>1</b>    | <b>2</b>      |
| <b>Origin and classification of chordates</b>                                | <b>1</b>    | <b>2</b>      |
| <b>Extraction and study of vertebrate fossils</b>                            | <b>2</b>    | <b>4</b>      |
| <b>The main vertebrate classes and the appearance in the geologic record</b> | <b>2</b>    | <b>4</b>      |
| <b>Fish and amphibians</b>   | <b>2</b>    | <b>4</b>      |
| <b>Age of the dinosaurs</b>  | <b>1</b>    | <b>2</b>      |



|                               |          |          |
|-------------------------------|----------|----------|
| <b>Birds</b>                  | <b>1</b> | <b>2</b> |
| <b>Appearance of mammals</b>  | <b>1</b> | <b>2</b> |
| <b>Primates and hominoids</b> | <b>2</b> | <b>4</b> |
| <b>Mass extinction</b>        | <b>2</b> | <b>4</b> |

|   |           |                                 |        |
|---|-----------|---------------------------------|--------|
| 2 Course components (total contact hours per semester): |           |                                 |        |
| Lecture: <b>30 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: | Other: |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Gain the skills needed to identify vertebrates.</b></li> <li>• <b>Apply the concepts of paleontology and fossilization (reservation) to the</b></li> </ul>   |

|  |
|--|
| <b>study of vertebrate.</b>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>3 weekly lectures</b></li> <li>• <b>Assignments related to subjects being discussed</b></li> <li>• <b>A weekly 2-hour Laboratory session</b></li> </ul> |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assignments and lab reports</b></li> <li>• <b>Practical exams</b></li> </ul>   |
| <b>b. Cognitive Skills</b>   |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>• <b>Identify the main vertebrate specimens.</b></li> <li>• <b>Calculate the ages of vertebrates through geologic time.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of vertebrate suites from different parts of the Saudi Arabia.</b></li> </ul>               |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments and lab reports</b></li> </ul>               |
| <b>c. Interpersonal Skills and Responsibility</b>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Personal initiative is encouraged through independent work on assignments and lab reports</b></li> </ul>             |

|   |
|---|
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to encourage independent efforts</b></li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments to ensure independent effort</b></li> <li>• <b>Questions related to the assignments are frequently included in mid-term and final exams.</b></li> </ul>                         |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> </ul>   |
| <p><b>e. Psychomotor Skills (if applicable)    N/A</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><b>N/A</b></p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p style="text-align: center;"><b>N/A</b></p>  |

(iii) Methods of assessment of students psychomotor skills

N/A

#### 5. Schedule of Assessment Tasks for Students During the Semester

| Assessment | Assessment task (eg. essay, test, group project, examination etc.) | Week due     | Proportion of Final Assessment |
|------------|--|--------------|--------------------------------|
| 1          | <b>Homework</b>  | <b>3-5-8</b> | <b>10%</b>                     |
| 2          | <b>First exam</b>  | <b>7</b>     | <b>10%</b>                     |
| 3          | <b>Practical exam</b>  | <b>12</b>    | <b>20%</b>                     |
| 4          | <b>Second exam</b>   | <b>13</b>    | <b>10%</b>                     |
| 5          | <b>Final exam</b>  | <b>16</b>    | <b>50%</b>                     |

### D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

### E Learning Resources

1. Required Text(s)

**- Benton, M. J, 2005, Vertebrate Palaeontology, 3rd ed. Chapman and Hall, London. 472 p.**

2. Essential References

**- Carroll, R. L, 1988, Vertebrate Paleontology and Evolution, W.H. Freeman & Company, 698 p.**

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

|   |
|---|
| 4-.Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| <p>1. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li><b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> <li><b>Laboratory seating at least 25 students, and equipped with petrological microscopes.</b></li> </ul> |
| <p>2. Computing resources</p> <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>  |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <p><b>9) At least 25 petrological microscopes</b></p> <p><b>10) A complete set of thin sections and hand specimens.</b></p>   |

## G Course Evaluation and Improvement Processes

|   |
|---|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment</b></p>  |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li><b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li><b>Review of the course material by relevant departmental committee(s)</b></li> </ul> |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li><b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li><b>Review of the course material by relevant departmental committee(s)</b></li> </ul>  |

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

**- Exam results are made available upon request to relevant committees.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

**- An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work**



**GEO 445: Sedimentary Basin  
Analysis**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution        | King Saud University                                      |
| College/Department | Faculty of Science / Department of Geology and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Sedimentary Basin Analysis (GEO 445)</b>   |
| 2. Credit hours <b>2 (1+1)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>Geology</b> |
| 4. Name of faculty member responsible for the course  |
| 5. Level/year at which this course is offered   |
| 6. Pre-requisites for this course (if any) <b>GEO 334</b>   |
| 7. Co-requisites for this course (if any) <b>Field Geology</b>  |
| 8. Location if not on main campus   |



## B Objectives

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| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize the geology students with the basic principles of Sedimentary Basin Analysis.</b></li><li>• <b>To enable the student to distinguish the most common stratigraphic and sedimentary facies in the field.</b></li><li>• <b>The student should eventually be capable of linking the geology of sedimentary basin analysis with their geological expressions.</b></li></ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to crustal studies especially in sedimentary terrains.</b></li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                   |             |               |
|--|-------------|---------------|
| Topic                                    | No of Weeks | Contact hours |
| <b>Introduction</b>                      | <b>1</b>    | <b>2</b>      |
| <b>Stratigraphic and facies analysis</b> | <b>2</b>    | <b>4</b>      |
| <b>Sub-surface methods</b>               | <b>1</b>    | <b>2</b>      |
| <b>Stratigraphic correlations</b>        | <b>2</b>    | <b>4</b>      |
| <b>Biostratigraphy and biozones</b>      | <b>1</b>    | <b>2</b>      |

|   |          |          |
|---|----------|----------|
| <b>Sequence stratigraphy</b>                  | <b>2</b> | <b>4</b> |
| <b>Basin maps</b>                             | <b>1</b> | <b>2</b> |
| <b>Paleocurrent analysis</b>                  | <b>2</b> | <b>4</b> |
| <b>Subsidence and burial history</b>          | <b>1</b> | <b>2</b> |
| <b>Basin models</b>                           | <b>2</b> | <b>4</b> |
| <b>Basin classification</b>                   | <b>1</b> | <b>2</b> |
| <b>Processes generating oil, gas and coal</b> | <b>2</b> | <b>4</b> |
| <b>Two day field trip</b>                     |          |          |

|   |           |                                 |        |
|---|-----------|---------------------------------|--------|
| 2 Course components (total contact hours per semester): |           |                                 |        |
| Lecture: <b>36 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: | Other: |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <p><b>a. Knowledge</b></p>  |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>• <b>Gain the skills needed to identify Sequence stratigraphy, Stratigraphic correlations and Subsidence and burial history in the field.</b></li> <li>• <b>Apply the concepts of Sequence stratigraphy to the study of sedimentary cover.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>3 weekly lectures</b></li> <li>• <b>Assignments related to subjects being discussed</b></li> <li>• <b>A weekly 2-hour Laboratory session</b></li> </ul>  |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assignments and lab reports</b></li> <li>• <b>Practical exams</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>• <b>Identify the main sedimentary feature and textures in thin sections using the petrological microscope.</b></li> <li>• <b>To be able to differentiate between the different sedimentary basins associated to the different sedimentary environments.</b></li> </ul>  |

|   |
|---|
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of sedimentary basins suites from different parts of the Saudi Arabia sedimentary cover.</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments and lab reports</b></li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Personal initiative is encouraged through independent work on assignments and lab reports</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to encourage independent efforts</b></li> </ul>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments to ensure independent effort</b></li> <li>• <b>Questions related to the assignments are frequently included in mid-term and final exams.</b></li> </ul> |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> </ul>  |

|   |
|---|
| <ul style="list-style-type: none"> <li><b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul>   |
| (ii) Teaching strategies to be used to develop these skills <ul style="list-style-type: none"> <li><b>Assignments are mostly prepared in Excel format</b></li> <li><b>Submission of assignments and reports via the internet is encouraged</b></li> </ul> |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li><b>Higher grades are given to assignments submitted in digital format</b></li> </ul>  |
| <b>e. Psychomotor Skills (if applicable) N/A</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br>N/A  |
| (ii) Teaching strategies to be used to develop these skills<br><br>N/A  |
| (iii) Methods of assessment of students psychomotor skills<br><br>N/A   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |               |                                |
|--|--|---------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due      | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9-12</b> | <b>10%</b>                     |
| 2  | <b>Write Report</b>  | <b>7</b>      | <b>5%</b>                      |
| 3  | <b>First test</b>  | <b>6</b>      | <b>10%</b>                     |
| 4  | <b>Practical test</b>  | <b>13</b>     | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>     | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>     | <b>50%</b>                     |

## D. Student Support

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|--|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) <ul style="list-style-type: none"> <li><b>Office hours allocated for students of this course are on average 3-4 hours</b></li> </ul> |
|--|

per week, with more time available in the period just before the final exams

## E Learning Resources

|   |
|---|
| 1. Required Text(s)   |
| <b>1- Allen, P.A. &amp; Allen, J.R., 2005, Basin Analysis: Principles and Applications, 2 edition, Wiley-Blackwell, 560 pp.</b>         |
| <b>2- Miall, A. D, 2000, Principles of Sedimentary Basin Analysis; Springer-Verlag, New York, 616 p.</b>                                |
| 2. Essential References   |
| <b>- Busby, C. J. &amp; Ingersoll, R. V. (editors), 1995, Tectonics of Sedimentary Basins, Blackwell Science, Cambridge, MA, 579 p.</b> |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)  |
| 4- Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations                                       |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.)  |
| <ul style="list-style-type: none"><li><b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li><li><b>Laboratory seating at least 25 students, and equipped with petrological microscopes.</b></li></ul> |
| 2. Computing resources  |
| <b>A computer lab with an internet connection is needed for some lectures.</b>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach   |

list)

**11) At least 25 petrological microscopes**

**12) Printer – Scanner – data show**

## **G Course Evaluation and Improvement Processes**

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

**A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment**

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- **Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.**
- **Review of the course material by relevant departmental committee(s)**

3 Processes for Improvement of Teaching

- **Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.**
- **Review of the course material by relevant departmental committee(s)**

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

**- Exam results are made available upon request to relevant committees.**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

**- An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work**



**GEO 450**

**Ore Geology**

**Course Specification**

**Revised November 2009**





## Course Specification

|                    |  |
|--------------------|--|
| Institution        | King Saud University                                   |
| College/Department | College of Science / Geology Department and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Ore Geology (GEO 450)</b>  |
| 2. Credit hours <b>3.0</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>Geology program</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Ahmad Al-Saleh</b>   |
| 5. Level/year at which this course is offered <b>7<sup>th</sup> level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>GEO 323</b>  |
| 7. Co-requisites for this course (if any)<br><b>none</b>  |
| 8. Location if not on main campus   |

### B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• <b>To provide the student with an overall knowledge of the processes of ore genesis.</b></li> <li>• <b>To enable the student to distinguish the main ore minerals in hand specimen.</b></li> </ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li> <li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li> </ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                                |              |               |
|---|--------------|---------------|
| Topic   | No. of Weeks | Contact hours |
| <b>Basic definitions and morphology of ore bodies</b> | <b>1</b>     | <b>2</b>      |
| <b>ore textures</b>                                   | <b>1</b>     | <b>2</b>      |
| <b>theories of ore genesis</b>                        | <b>1</b>     | <b>2</b>      |
| <b>classification of ore deposits</b>                 | <b>1</b>     | <b>2</b>      |
| <b>orthomagmatic deposits</b>                         | <b>1</b>     | <b>2</b>      |
| <b>diamonds and kimberlites</b>                       | <b>1</b>     | <b>2</b>      |
| <b>the carbonatite environment</b>                    | <b>1</b>     | <b>2</b>      |
| <b>volcanogenic massive sulphides</b>                 | <b>1</b>     | <b>2</b>      |
| <b>greisen and skarn</b>                              | <b>1</b>     | <b>2</b>      |
| <b>hydrothermal deposits</b>                          | <b>1</b>     | <b>2</b>      |
| <b>strata-bound deposits</b>                          | <b>1</b>     | <b>2</b>      |
| <b>sedimentary Fe and Mn deposits</b>                 | <b>1</b>     | <b>2</b>      |
| <b>metamorphic ores</b>                               | <b>1</b>     | <b>2</b>      |
| <b>supergene enrichment</b>                           | <b>1</b>     | <b>2</b>      |
| <b>industrial minerals</b>                            | <b>1</b>     | <b>2</b>      |

|   |                                    |   |        |
|---|------------------------------------|---|--------|
| 2 Course components (total contact hours per semester): |                                    |   |        |
| Lecture: <b>30</b>                                      | Tutorial:<br><b>Not applicable</b> | Practical/Fieldwork/Internship: <b>48 (practical) + 30 (fieldwork) = 78</b> | Other: |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

**2 hours weekly for assignments and field and lab reports.**

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- **Gain the skills needed to identify ores, their textures and constituent minerals in the field and under the polarizing microscope.**
- **Develop the ability to conduct field work in areas with metallogenic potential.**
- **Apply the concepts of plate tectonics to the process of metallogenesis.**

(ii) Teaching strategies to be used to develop that knowledge

- **2 weekly lectures**
- **Assignments related to subjects being discussed**
- **A weekly 2-hour Laboratory session**
- **A 3-day Field trip to an mineral locality the Arabian Shield**

(iii) Methods of assessment of knowledge acquired

- **Mid-term and final exams**
- **Assignments and field reports**
- **Practical exams**

|   |
|---|
| <b>b. Cognitive Skills</b>  |
| <ul style="list-style-type: none"> <li>• Cognitive skills to be developed</li> <li>• <b>Identify the main ore minerals in hand specimen.</b></li> <li>• <b>General field techniques with special emphasis on mineralized Precambrian terrains</b></li> </ul>  |
| <ul style="list-style-type: none"> <li>• (ii) Teaching strategies to be used to develop these cognitive skills</li> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of ore suites from different parts of the Arabian Shield</b></li> <li>• <b>Field trip to relevant areas</b></li> </ul>   |
| (iii) Methods of assessment of students cognitive skills <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments as well as lab and field reports</b></li> </ul>  |
| <b>c. Interpersonal Skills and Responsibility</b>   |
| (i) Description of the interpersonal skills and capacity to carry responsibility to be developed <ul style="list-style-type: none"> <li>• <b>The student should learn how to conduct a proper field excursion and rely on himself in such situations.</b></li> <li>• <b>Team work is promoted by allocating the mapping of certain field areas to 3-4 student groups</b></li> <li>• <b>Personal initiative is encouraged through independent work on assignments and field reports</b></li> </ul> |
| (ii) Teaching strategies to be used to develop these skills and abilities <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to ensure independent effort</b></li> <li>• <b>Field areas are divided into sectors each of which is the responsibility of a small group of students</b></li> </ul>  |
| (iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments and field reports to ensure independent effort</b></li> <li>• <b>Questions related to the field trip and assignments are frequently included in mid-term and final exams.</b></li> </ul>   |

|  |  |  |  |
|--|--|--|--|
| <b>d. Communication, Information Technology and Numerical Skills</b>   |  |  |  |
| (i) Description of the skills to be developed in this domain.  |  |  |  |
| <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Ability to use global position systems (GPS) in field surveys</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |  |  |  |
| (ii) Teaching strategies to be used to develop these skills  |  |  |  |
| <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Students are required to show proficiency in the use of portable GPS during field trips</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>  |  |  |  |
| (iii) Methods of assessment of students numerical and communication skills   |  |  |  |
| <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> <li>• <b>Students are required to demonstrate their ability to use GPS in the field</b></li> </ul>   |  |  |  |
| <b>e. Psychomotor Skills (if applicable)      N/A</b>  |  |  |  |
| (i) Description of the psychomotor skills to be developed and the level of performance required  |  |  |  |
| N/A  |  |  |  |
| (ii) Teaching strategies to be used to develop these skills  |  |  |  |
| N/A  |  |  |  |
| (iii) Methods of assessment of students psychomotor skills   |  |  |  |
| N/A  |  |  |  |

|   |  |          |                                |
|---|--|----------|--------------------------------|
| <b>5. Schedule of Assessment Tasks for Students During the Semester</b> |  |          |                                |
| Assessment  | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |

|   |                                |                                 |     |
|---|--------------------------------|---------------------------------|-----|
| 1 | <b>6 main Assignments</b>      | Bi-weekly                       | 10% |
| 2 | <b>12 lab reports</b>          | Weekly                          | 6%  |
| 3 | <b>Mid-term exam</b>           | After the 10 <sup>th</sup> week | 10% |
| 4 | <b>1<sup>st</sup> lab exam</b> | After the 6 <sup>th</sup> week  | 12% |
| 5 | <b>2<sup>nd</sup> lab exam</b> | Last week                       | 12% |
| 6 | <b>Final exam</b>              | As per university schedule      | 50% |

#### **D. Student Support**

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

#### **E Learning Resources**

10. Required Text(s)

- **Robb, L., 2005, Introduction to Ore-Forming Processes: Blackwell Publishing Co, 373 p**
- **Evans, A.M., 1993, Ore Geology & Industrial Minerals: An Introduction, 3rd ed, Blackwell Science, 390 p.**

11. Essential References

- **Guilbert, J. M., and Parks, C. F., 2007, The Geology of Ore Deposits, Waveland Press, Inc., 985 p.**
- **Misra, K. C., 2000, Understanding Mineral Deposits: Kluwer Academic Publishers, Dordrecht, 845 p.**
- **Craig, J.R. and Vaughan, D. J., 1994, Ore microscopy and ore petrography, 2nd edition, John Wiley & Sons, 434p.**

12. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

- **Pirajno, F, 2009, Hydrothermal processes and mineral systems, Springer, 1250 p**
- **McDonald, I., Boyce, A.J., Butler, I.B., Herrington, R.J. and Polya, D.A. , 2005, (Editors): Mineral Deposits and Earth Evolution. Geological Society, Special Publications, 248, pp280.**
- **Boyce, A.J. and McDonald, I. (Editors) (2005) Giant mineral deposits and underlying Earth processes. *MINERALIUM DEPOSITA*, 40, 449-450.**
- **Pracejus, B. 2008, The Ore Minerals Under the Microscope: An Optical Guide, Elsevier Science Ltd, 895 pp.**
- **Blundell, D.J., Neubauer, F. & von Quadt, A. (eds), 2002, *The Timing and Location of Major Ore Deposits in an Evolving Orogen*, Geological Society, London, Special Publications, 369 pp.**

4-.Electronic Materials, Web Sites etc

- [Epithermal gold deposits](#)
- [Mineral Deposit Profiles](#)
- [Society of Economic Geologists](#)

5- Other learning material such as computer-based programs/CD, professional standards/regulations

**Earth Science Courseware CD's that include the following subjects:**

Basic Geochemistry: Origin and Distribution of the Elements  
Basic Petrography  
Crystallography  
Radiogenic Isotopes in Geological Sciences

## **F. Facilities Required**

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

|   |
|---|
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"> <li>• <b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> <li>• <b>Laboratory seating at least 25 students.</b></li> </ul> |
| 2. Computing resources<br><br><b>A computer lab with an internet connection is needed for some lectures.</b>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <ul style="list-style-type: none"> <li>• <b>A complete set of ore minerals</b></li> </ul>   |

## G. Course Evaluation and Improvement Processes

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching<br><br><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment.</b>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>                  |
| 3 Processes for Improvement of Teaching <ul style="list-style-type: none"> <li>• <b>Recommendations are reported to the department on the basis of feedback questionnaires to take the necessary steps.</b></li> <li>• <b>Lecture notes are reviewed regularly and kept up-to-date.</b></li> </ul>  |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution) <ul style="list-style-type: none"> <li>• <b>Exam results are made available upon request to relevant committees.</b></li> </ul> |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. <ul style="list-style-type: none"> <li>• <b>An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></li> </ul>   |



**KING SAUD UNIVERSITY**  
**College of Science**

**Department of Geology and Geophysics**



**جامعة الملك سعود**  
**كلية العلوم**  
**قسم الجيولوجيا والجيوفيزياء**

**GEO 452**  
**PETROLEUM GEOLOGY**

**Course Specification**

**Revised March 2007**



## Course Specification

|                    |                      |
|--------------------|----------------------|
| Institution        | KING SAUD UNIVERSITY |
| College/Department | SCIENCE / GEOLOGY    |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>PETROLEUM GEOLOGY/GEO452</b>   |
| 2. Credit hours 3 HRS   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>GEOLOGY</b> |
| 4. Name of faculty member responsible for the course DR SALEH MOHAMED OKLA  |
| 5. Level/year at which this course is offered 4 <sup>TH</sup> (SENIOR YEAR)   |
| 6. Pre-requisites for this course (if any) GEO 381  |
| 7. Co-requisites for this course (if any) NONE  |
| 8. Location if not on main campus -   |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>❖ LEARNING THE OCCURANCE OF PETROLEUM</li> <li>❖ LEARNING PROPERTIES OF RESERVOIR ROCKS</li> <li>❖ LEARNING PROPERTIES OF PETROLEUM</li> <li>❖ HOWTHE PETROLEUM IS FOUND</li> </ul>   |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>❖ THE COURSE CONTENTS WILL BE REVIEW EACH SEMESTER ANDNEW FINDINGS ARE ADDED</li> </ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered     |             |               |
|----------------------------|-------------|---------------|
| Topic                      | No of Weeks | Contact hours |
| THE OCCURANCE OF PETROLEUM | 3           | 6             |
| RESERVOIR ROCKS            | 2           | 4             |
| RESERVOIR PORE SPACE       | 2           | 4             |
| PORE SPACE FLUIDS          | 4           | 8             |
| STEUCTURAL TRAPS           | 2           | 4             |
| STEATIGRAPHIC TRAPS        | 1           | 2             |
| COMBINATION TRAPS          | 1           | 2             |
| ORIGINOF PETROLEUM         | 1           | 2             |

| 2 Course components (total contact hours per semester): |             |  |                     |
|---|-------------|--|---------------------|
| Lecture: 32 HOURS                                       | Tutorial: - | Practical/Fieldwork/Internship: ONE FIELD TRIP | Other: LAB 32 HOURS |

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)

-

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- ❖ HOW THE PETROLEUM OCCURS
- ❖ HOW THE PETROLEUM IS FOUND
- ❖ HOW THE PETROLEUM ORIGINATE
- ❖ HOW THE PETROLEUM ACCMMULATE

(ii) Teaching strategies to be used to develop that knowledge

- ❖ COURSE MATERIAL IN LECTURE
- ❖ MAP AND SECTIONS IN LAB
- ❖ FIELD TRIP TO ARAMCO

(iii) Methods of assessment of knowledge acquired

- ❖ EXAMS IN LECTURE
- ❖ EXAMS FIN LABORATORY
- ❖ FINAL EXAM

##### **b. Cognitive Skills**

(i) Cognitive skills to be developed

- ❖ STUDENT WILL EARN HOWTHE OIL OCCURS
- ❖ STUDENT WILL LEARN HOW THE OIL ORIGINATE
- ❖ STUDENT WILL LEARN HOW THE OIL IS FOUND

|  |
|--|
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>❖ LECTURE ARE FOLLOWED BY NUMBER OF EXAMPLES</li> <li>❖ LABORATORY WORK WITH MANY MAPS</li> <li>❖ ROSS SECTIONS AND WELL LOGS</li> </ul>                     |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>❖ EXAM</li> <li>❖ LABORATORY HOMEWORK AND REPORTS</li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>❖ PUNCTUAL ATTENDANCE OF CLASSES AND LABORATORY</li> <li>❖ STUDENT LEARN TO IDENTIFYF STRUCTURES &amp; TRAPS.</li> </ul>          |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>❖ PARTICIPATION OF STUDENTS IN CLASSROOM DISCUSSIONS</li> <li>❖ LABORATORY REPORTS TO BE WRITTEN</li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>❖ CLASS ATTENDANCE OF STUDENTS AT THE BEGINNING OF THE LECTUES IS TAKEN</li> <li>❖ RECORDING OF GRADE AND LAB REPORTS</li> </ul> |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>❖ ABILITY OF STUDENTS TO APPLY GEOLOGIC CONCEPTS</li> <li>❖ ABILITY TO FIND AND MAPS PETROLEUM TRAPS</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>❖ QUESTIONS OF TESTS AND LAB ASSIGNMENTS</li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>❖ EVALAUATION OF CONSTRUCTING MAPS AND SECTIONS</li> <li>❖ EXAMS</li> </ul>   |

|   |
|---|
| <b>e. Psychomotor Skills (if applicable)</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br>NOT APPLICABLE |
| (ii) Teaching strategies to be used to develop these skills<br><br>NOT APPLICABLE                                     |
| (iii) Methods of assessment of students psychomotor skills<br><br>NOT APPLICABLE                                      |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                  |                                |
|--|--|------------------|--------------------------------|
| Assess ment  | Assessment task (eg. essay, test, group project, examination etc.) | Week due         | Proportion of Final Assessment |
| 1  | LABS MAPS & SECTIONS   | 2                | 5%                             |
| 2  | FIRST EXAM LECTURE   | 5 <sup>TH</sup>  | 20%                            |
| 3  | FIRST EXAM LAB   | 6 <sup>TH</sup>  | 10%                            |
| 4  | FINAL EXAM (LAB)   | 15 <sup>TH</sup> | 15%                            |
| 5  | FINAL EXAM LECTURE   |                  |                                |
| 6  | AS SCHEDULED BY THE REGISTRAR                                      |                  | 50%                            |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

❖ I WILL BE AVAILABLE IN MY OFFICE FOR STUDENT CONSULTATION AND ACADEMIC ADVICE

## E Learning Resources

1. Required Text(s) LEVORSEN, A.I.(1967) GEOLOGY OF PETRPOLEUM 2<sup>ND</sup> ED. W.H. FREEMAN

|  |
|--|
| 2. Essential References TISSOT B.P.& D.H. WELLTE (1984), PETROLEUM<br>FORMATION AND OCCURRENCE, SPRINGER, BERLIN |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)                               |
| 4- Electronic Materials, Web Sites etc   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations                |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br><br>❖ LECTURE ROOM WITH A BLACKBOARD<br>❖ LABORATORY WITH DRAWING TABLES, WELL LOGS                            |
| 2. Computing resources   |
| 3. Other resources (specify –eg. If specific laboratory equipment is required, list requirements or attach list)   |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching<br><br>❖ STUDENT COURSE EVALUATION AT THE END OF THE COURSE |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department<br><br>❖ PERIODIC SELF-ASSESSMENT OF THE COURSE |
| 3 Processes for Improvement of Teaching  |

|  |
|--|
| ❖ REVIEW BY THE DEPARTMENT   |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <p>❖ REVIEW BY THE DEPARTMENT</p> |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p>❖ SELF-ASSESSMENT</p>   |



**KING SAUD UNIVERSITY**  
**College of Science**

Department of Geology and Geophysics



جامعة الملك سعود  
كلية العلوم  
قسم الجيولوجيا والجيوفيزياء

**GEO 454**

**Mining Geology**

**Course Specification**

**Revised November 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | King Saud University                                   |
| College/Department | College of Science / Geology Department and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Mining Geology (GEO 454)</b>   |
| 2. Credit hours <b>2</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology program</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Ahmad Al-Saleh</b>   |
| 5. Level/year at which this course is offered <b>8<sup>th</sup> level</b>   |
| 6. Pre-requisites for this course (if any)<br><b>GEO 450</b>  |
| 7. Co-requisites for this course (if any)<br><b>none</b>  |
| 8. Location if not on main campus   |

### B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• <b>To provide the student with a broad background in mineral exploration techniques.</b></li> <li>• <b>To develop an overall knowledge of the geologist's tasks in a mining site.</b></li> </ul>   |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li> <li>• <b>Course contents, handouts and assignments will be posted on the instructor's web page.</b></li> </ul> |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                        |              |               |
|---|--------------|---------------|
| Topic   | No. of Weeks | Contact hours |
| <b>Reconnaissance exploration</b>             | <b>1</b>     | <b>1</b>      |
| <b>Remote sensing</b>                         | <b>2</b>     | <b>2</b>      |
| <b>Geochemical exploration</b>                | <b>2</b>     | <b>2</b>      |
| <b>Geophysical exploration</b>                | <b>1</b>     | <b>1</b>      |
| <b>Drilling methods</b>                       | <b>1</b>     | <b>1</b>      |
| <b>Evaluation techniques</b>                  | <b>1</b>     | <b>1</b>      |
| <b>Feasibility studies</b>                    | <b>1</b>     | <b>1</b>      |
| <b>Surface and underground mining methods</b> | <b>3</b>     | <b>3</b>      |
| <b>Mineral processing and metallurgy</b>      | <b>2</b>     | <b>2</b>      |
| <b>Mining in Saudi Arabia</b>                 | <b>1</b>     | <b>1</b>      |

|   |                                    |   |        |
|---|------------------------------------|---|--------|
| 2 Course components (total contact hours per semester): |                                    |   |        |
| Lecture: <b>15</b>                                      | Tutorial:<br><b>Not applicable</b> | Practical/Fieldwork/Internship: <b>48 (practical) + 30 (fieldwork) = 78</b> | Other: |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

**2 hours weekly for assignments and field and lab reports.**

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- **Gain the skills needed to carry out and evaluate an exploration campaign.**
- **Develop the ability to conduct field work in mining/quarrying areas.**

(ii) Teaching strategies to be used to develop that knowledge

- **1 weekly lecture**
- **Assignments related to subjects being discussed**
- **A weekly 2-hour Laboratory session**
- **A 3-day Field trip to a mining locality in the Arabian Shield**

(iii) Methods of assessment of knowledge acquired

- **Mid-term and final exams**
- **Assignments and field reports**
- **Practical exams**

##### **b. Cognitive Skills**

|  |
|--|
| <ul style="list-style-type: none"> <li>• Cognitive skills to be developed</li> <li>• <b>The ability to assess the metallogenic potential of a certain area using various exploration techniques.</b></li> <li>• <b>General field techniques with special emphasis on mining localities in the Arabian Shield.</b></li> </ul>   |
| <ul style="list-style-type: none"> <li>• (ii) Teaching strategies to be used to develop these cognitive skills</li> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of exploration expeditions and mining ventures from different parts of the world.</b></li> <li>• <b>Field trip to relevant areas</b></li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments as well as lab and field reports</b></li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>The student should learn how to conduct a proper field excursion and rely on himself in such situations.</b></li> <li>• <b>Team work is promoted by allocating the mapping of certain field areas to 3-4 student groups</b></li> <li>• <b>Personal initiative is encouraged through independent work on assignments and field reports</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to ensure independent effort</b></li> <li>• <b>Field areas are divided into sectors each of which is the responsibility of a small group of students</b></li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments and field reports to ensure independent effort</b></li> <li>• <b>Questions related to the field trip and assignments are frequently included in mid-term and final exams.</b></li> </ul>   |

|   |
|---|
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li>• <b>Ability to use global position systems (GPS) in field surveys</b></li> <li>• <b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>• <b>Assignments are mostly prepared in Excel format</b></li> <li>• <b>Students are required to show proficiency in the use of portable GPS during field trips</b></li> <li>• <b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Higher grades are given to assignments submitted in digital format</b></li> <li>• <b>Students are required to demonstrate their ability to use GPS in the field</b></li> </ul>  |
| <b>e. Psychomotor Skills (if applicable)      N/A</b>   |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><b>N/A</b></p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p style="text-align: center;"><b>N/A</b></p>  |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p style="text-align: center;"><b>N/A</b></p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                                 |                                |
|--|--|---------------------------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                        | Proportion of Final Assessment |
| 1  | <b>6 main Assignments</b>  | Bi-weekly                       | 10%                            |
| 2  | <b>12 lab reports</b>  | Weekly                          | 6%                             |
| 3  | <b>Mid-term exam</b>   | After the 10 <sup>th</sup> week | 10%                            |
| 4  | <b>1<sup>st</sup> lab exam</b>                                     | After the 6 <sup>th</sup> week  | 12%                            |
| 5  | <b>2<sup>nd</sup> lab exam</b>                                     | Last week                       | 12%                            |
| 6  | <b>Final exam</b>  | As per university schedule      | 50%                            |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

## E Learning Resources

13. Required Text(s)

- **Moon, C.J., Whateley, M.K.G., & Evans, A.M, 2006, Introduction to Mineral Exploration, 2nd edition, Blackwell Publishing Ltd., 481 p.**

14. Essential References

- **Marjoribanks, R.W, 1997, Geological Methods in Mineral Exploration and Mining, Chapman & Hall, 128 p.**
- **Peters, W.C, 1987, Exploration and Mining Geology, 2nd Edition, John Wiley & Sons, 685 p.**
- **Stocks, J. and Down, C, 1979, Mining and Mineral Processing, The Open University Press, 80 p.**

15. Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

- **Petruk, 2000, W, Applied Mineralogy in the Mining Industry, Elsevier Science, p 268.**
- **Dunn, C, 2007, Biogeochemistry in Mineral Exploration, Elsevier B.V., pp 480.**
- **Rawlings D.E. Johnson, B.D.(Editors) (2007) Biomining. Springer-Verlag Berlin Heidelberg, pp 324.**
- **Govett, G.J.S (Editor). 2000, Geochemical Remote Sensing of the Sub-Surface, Elsevier Science Ltd, 573 pp.**
- **Macdonald, Eoin H. 2007, Handbook of gold exploration and evaluation, Woodhead Publishing Limited, 664 pp.**
- **Bell, F. G, 2006, Mining and its impact on the environment, Taylor & Francis Co, 561 pp.**

4-.Electronic Materials, Web Sites etc

- [The Association of Applied Geochemists](#)
- [InfoMine](#)
- [Introduction to Exploration Geology](#)
- [USGS Minerals Information](#)
- [Camborne School of Mines](#)

5- Other learning material such as computer-based programs/CD, professional standards/regulations

**Instructor will provide adequate learning resources.**

## **F. Facilities Required**

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- **Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.**



|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Laboratory seating at least 25 students.</b></li> </ul>  |
| <p>2. Computing resources</p> <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>  |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> <li>• <b>Software related to the subject should be provided</b></li> </ul> |

## **G. Course Evaluation and Improvement Processes**

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <p><b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment.</b></p>  |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>                  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Recommendations are reported to the department on the basis of feedback questionnaires to take the necessary steps.</b></li> <li>• <b>Lecture notes are reviewed regularly and kept up-to-date.</b></li> </ul>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Exam results are made available upon request to relevant committees.</b></li> </ul> |
| <p>5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></li> </ul>   |



**GEO 455**  
**Hydrogeology**

**Course Specification**

15/ 11/ 1428 H

2007-11-25



### **Course Specification**

|   |
|---|
| Institution : King Saud University                            |
| College/Department: College of Science- Department of Geology |

### **A Course Identification and General Information**

|  |
|--|
| 1. Course title and code: Hydrogeology- Geo-455  |
| 2. Credit hours : 3 credit hours (2+1)   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br>B. Sc. program in Geology |
| 4. Name of faculty member responsible for the course: Dr. Mohammed Tahir Hussein   |
| 5. Level/year at which this course is offered: 4 <sup>th</sup> level   |
| 6. Pre-requisites for this course (if any): Geo-381  |
| 7. Co-requisites for this course (if any)  |
| 8. Location if not on main campus  |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course:</p> <ul style="list-style-type: none"><li>. The course intends to introduce the student to general hydrogeology.</li><li>. Where, and how groundwater occurs.</li><li>. What causes groundwater to move; what are the controlling factors for this movement: the general flow equations, laws controlling groundwater flow in porous and fractured media.</li><li>. Groundwater wells: types, where to drill, well-design criteria.</li><li>. Groundwater quality, groundwater uses.</li><li>. How to explore groundwater: direct and indirect methods.</li><li>. What are the main water-bearing formations in Saudi Arabia(including field visits to selected aquifers outcrops or development area).</li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field):</p> <ul style="list-style-type: none"><li>-The course is dynamic in nature especially as what concerns the use of computer software in the practical exercises. Now the students are trained to apply surfer and finite extent programs.</li></ul>   |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| Introduction: Elements of the hydrologic cycle (Evaporation, Transpiration, Precipitation, Runoff, Infiltration)..definition, process, affecting factors, measurements, estimations | 2           | (4+2)         |
| Groundwater. Origin, age occurrences  | 1           | (2+1)         |

|   |   |       |
|---|---|-------|
| Geological factors controlling the occurrence of groundwater                                      | 1 | (2+1) |
| Aquifer Types: Confined, Unconfined, Leaky  | 1 | (2+1) |
| Darcy Law. General Flow Equation. Laboratorial and Field Methods to determine aquifer properties. | 3 | (6+3) |
| Water Wells: types, location, design, completion, testing   | 2 | (4+2) |
| Groundwater quality   | 2 | (4+2) |
| Groundwater exploration   | 1 | (2+1) |
| Sea water encroachment  | 1 | (2+1) |
| Saudi Arabia groundwater.   | 1 | (2+1) |

|   |           |  |        |
|---|-----------|--|--------|
| 2 Course components (total contact hours per semester): |           |  |        |
| Lecture: 30 lectures                                    | Tutorial: | Practical/Fieldwork /Internship: 15 hours + 3 days fieldwork | Other: |

|  |
|--|
| <p>3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week):</p> <p>-Students are expected an average of 2- 3 learning hours per week.</p> |
|--|

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop:
  - The course gives new information and basic knowledge on general hydrogeology, the ability to be effective as a team-partner in groundwater exploration activities.
- A description of the teaching strategies to be used in the course to develop that knowledge or skill:
  - Teaching is conducted through lectures, practical sessions and fieldwork.
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.
  - Methods of assessment include quizzes, home-works, tests, and examinations

##### **a. Knowledge**

(i) Description of the knowledge to be acquired:

-The student is expected to acquire basic knowledge of hydrogeology, groundwater occurrence, origin and movement, groundwater wells, groundwater exploration techniques, challenges facing groundwater quantity and quality plus basic information on Saudi Arabia main aquifers.

(ii) Teaching strategies to be used to develop that knowledge

-Teaching will be conducted through lectures, practical sessions and fieldwork.

(iii) Methods of assessment of knowledge acquired

- Methods of assessment include quizzes, home-works, tests and exams:
- Interactive learning process through questions and answers in class and lab
- Observation and collection of field data
- Training in solving hydrogeological problems
- Interpretation of Hydrogeological data.

##### **b. Cognitive Skills**

(i) Cognitive skills to be developed

-Students will be able to understand the use and application of hydrogeological measurements.

|  |
|--|
| <ul style="list-style-type: none"> <li>-Students will be able to apply the knowledge have learnt concerning groundwater occurrence and movement.</li> <li>-Students will be able to construct hydrogeological maps and deduce hydrogeological parameters.</li> <li>-Students will be able to choose proper sites for drilling productive wells.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>- Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</li> <li>- Practical work is planned around a number of hydrogeological problems..</li> <li>-Engage students in classroom and in practical session discussion with questions and answers.</li> </ul>   |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>-Exams and homework will include problems, solution of which requires critical thinking and identification of correct formulas.</li> <li>-Practical problems require data analysis and interpretation of data.</li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>-Punctual attendance of classes and practical session is required of the students..</li> <li>-Students will take the responsibility to solve given assignments on their own and submit the solution on time.</li> <li>-Students learn to manage their time in self study of the coarse material.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>-Assignments are given to the students at regular intervals for them to solve and submit on time. 20% of the final grade allocated to the assignments and practicals.</li> <li>- Late or no submission of assignments carries penalties or loss of grade points.</li> <li>- Practical assignments are to be written in the prescribed format and are to be submitted on time.</li> </ul> |

|   |
|---|
| -Participation of students in classroom discussion.   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <p>-Class attendance of students at the beginning of the lecture is recorded.</p> <p>-Recording of submission of assignment, and the grades.</p> |
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <p>-Ability of students to apply basic knowledge of hydrogeology in computing.</p> <p>-Use of computer in producing reports and assignments.</p> <p>-Ability to write reports.</p>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p>-Questions of tests and assignments require students' knowledge in hydrogeology and their computational capabilities for solving problems.</p>                                      |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <p>-Through students aggregate score in all tests and assignments.</p> <p>-Evaluation of written reports and other assignments that require a written text.</p>         |
| <b>e. Psychomotor Skills (if applicable)</b>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>Not applicable</p>  |
| (ii) Teaching strategies to be used to develop these skills   |
| (iii) Methods of assessment of students psychomotor skills  |



| 5. Schedule of Assessment Tasks for Students During the Semester |  |                             |                                |
|--|--|-----------------------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                    | Proportion of Final Assessment |
| 1  | Homework 1 through 5   | Every three weeks           | 5%                             |
| 2  | Practical sessions reports   | Weekly                      | 15%                            |
| 3  | 1 <sup>st</sup> mid-term exam                                      | 6 <sup>th</sup> week        | 10%                            |
| 4  | 2 <sup>nd</sup> mid-term exam                                      | 12 <sup>th</sup> week       | 10%                            |
| 5  | Practical exam   | Last week                   | 10%                            |
| 6  | Final exam   | As scheduled by the College | 50%                            |
|  |  |                             |                                |
|  |  |                             |                                |

#### D. Student Support

|   |
|---|
| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <p>- The academic staff is available in his office 3 hrs/week for students' consultation and academic advice.</p> |
|---|

#### E Learning Resources

|  |
|--|
| <p>1. Required Text(s)</p> <p>“Groundwater” by Abdulaziz Al Bassam- in Arabic language</p>   |
| <p>2. Essential References</p> <p>-“Groundwater hydrology”, David Keith Todd. John Wiley &amp; Sons.</p> <p>- “Groundwater hydrology”, Herman Bouwer. John Wiley &amp; Sons.</p> |

|   |
|---|
| - “Hydrogeology”, Davis Diewest. John Wiley & Sons.   |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br>-The instructor will provide list of references as the course proceeds.           |
| 4-.Electronic Materials, Web Sites etc<br><br>-Search through Google for related topics.  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations<br>-The instructor may provide some relevant materials and learning aids. |

## **F. Facilities Required**

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br>-Lecture room equipped with a black board, overhead projector, computer and internet connection.<br>-Fully equipped Hydrogeological lab equipped with hydrogeological models, measuring instruments, etc.<br>-The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students. |
| 2. Computing resources<br>-An easily accessible computer lab   |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)  |

## **G Course Evaluation and Improvement Processes**

|   |
|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching<br><br>- Student course evaluation at the conclusion of the course |
|---|

|  |
|--|
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>- Faculty assessment of the course and effectiveness of teaching delivery.</li> <li>- Periodic self- assessment of the program.</li> </ul>  |
| <p>6 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>-Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</li> <li>-Feedback from employers and and graduating students' input are used to identify any deficiencies in students' ability in applying hydrogeological knowledge.</li> <li>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</li> <li>-Teaching method will focus on students' learning and on course learning outcomes</li> </ul>   |
| <p>7 Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>-Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements</li> <li>- A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</li> </ul> |
| <p>8 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</p>   |



**GEO 456: Application in Petroleum  
Geology**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution        | King Saud University                                      |
| College/Department | Faculty of Science / Department of Geology and Geophysics |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Application in Petroleum Geology (GEO 456)</b>   |
| 2. Credit hours <b>2 (2+0)</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Geology</b> |
| 4. Name of faculty member responsible for the course  |
| 5. Level/year at which this course is offered   |
| 6. Pre-requisites for this course (if any)  |
| 7. Co-requisites for this course (if any)<br><b>GEO 452</b>   |
| 8. Location if not on main campus   |

## B Objectives

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|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize the geology students with the basic principles of application of Petroleum Geology.</b></li><li>• <b>To enable the student to distinguish the most common geologic and seismic exploration in the field.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>Increased use of visual displays using PowerPoint and Flash software in some lectures and lab sessions.</b></li><li>• <b>Course contents, handouts and assignments will be posted soon on the instructor's web page.</b></li><li>• <b>More emphasis will be given to the application of Petroleum Geology.</b></li></ul> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                                   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>Introduction</b>                                      | <b>2</b>    | <b>4</b>      |
| <b>Geologic and seismic exploration</b>                  | <b>2</b>    | <b>4</b>      |
| <b>Methods and problems of production</b>                | <b>3</b>    | <b>6</b>      |
| <b>Tectonic settings of oil-producing basins</b>         | <b>3</b>    | <b>6</b>      |
| <b>Depositional environments and oil and gas quality</b> | <b>2</b>    | <b>4</b>      |

|   |          |          |
|---|----------|----------|
| <b>Detailed study of hydrocarbon field in and outside the Kingdom</b> | <b>3</b> | <b>6</b> |
| <b>Two day field trip</b>   |          |          |

|   |           |                                 |        |
|---|-----------|---------------------------------|--------|
| 2 Course components (total contact hours per semester): |           |                                 |        |
| Lecture: <b>30 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: | Other: |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <p>Gain the skills needed to identify methods and problems of oil production.</p> <ul style="list-style-type: none"> <li>• <b>Apply the concepts of exploration and depositional environments to the study of oil fields.</b></li> </ul>   |
| (ii) Teaching strategies to be used to develop that knowledge   |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>3 weekly lectures</b></li> <li>• <b>Assignments related to subjects being discussed</b></li> </ul>   |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assignments and reports</b></li> </ul>   |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <p><b>Identify the main exploration methods.</b></p> <p><b>To be able to plan and conduct experiments and determine oil basin in different localities.</b></p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Homework assignments</b></li> <li>• <b>Case studies of hydrocarbon field in and outside the Kingdom.</b></li> </ul>             |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Occasional short quizzes</b></li> <li>• <b>Mid-term and final exams</b></li> <li>• <b>Assessment of assignments and reports</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Personal initiative is encouraged through independent work on assignments and reports</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Each student is given a different set of assignments to encourage independent efforts</b></li> </ul>                        |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Students are verbally quizzed on the assignments to ensure independent</b></li> </ul>               |



|   |
|---|
| <p><b>effort</b></p> <ul style="list-style-type: none"> <li><b>Questions related to the assignments are frequently included in mid-term and final exams.</b></li> </ul>   |
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li><b>Mastering the use of spreadsheets (mainly Excel) in calculating simple formulae and preparing diagrams</b></li> <li><b>Using the internet to communicate with the instructor, and also to search for and download relevant information and software</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li><b>Assignments are mostly prepared in Excel format</b></li> <li><b>Submission of assignments and reports via the internet is encouraged</b></li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li><b>Higher grades are given to assignments submitted in digital format</b></li> </ul>   |
| <b>e. Psychomotor Skills (if applicable) N/A</b>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><b>N/A</b></p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p style="text-align: center;"><b>N/A</b></p>  |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p style="text-align: center;"><b>N/A</b></p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |              |                                |
|--|--|--------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due     | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>3-5-9</b> | <b>10%</b>                     |

|   |                    |           |            |
|---|--------------------|-----------|------------|
|   |                    |           |            |
| 2 | <b>Reports</b>     | <b>6</b>  | <b>10%</b> |
| 3 | <b>First exam</b>  | <b>7</b>  | <b>15%</b> |
| 4 | <b>Second exam</b> | <b>13</b> | <b>15%</b> |
| 5 | <b>Final exam</b>  | <b>16</b> | <b>50%</b> |

#### **D. Student Support**

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Office hours allocated for students of this course are on average 3-4 hours per week, with more time available in the period just before the final exams**

#### **E Learning Resources**

1. Required Text(s)

- **Laudon, R, 1997, Principles of Petroleum Development Geology, Prentice-Hall, 267 p.**

2. Essential References

- **Beydoun. Z. R., 1991, Arabian Plate Hydrocarbon Geology and Potential-A Plate Tectonic Approach, AAPG Studies in Geology #33, 77p.**

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

4-.Electronic Materials, Web Sites etc

5- Other learning material such as computer-based programs/CD, professional standards/regulations

#### **F. Facilities Required**

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

|   |
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| <ul style="list-style-type: none"> <li>• <b>Lecture room equipped with a projector connected to DVD and video players and a computer with a broadband internet connection.</b></li> </ul>                         |
| <p>2. Computing resources</p> <p><b>A computer lab with an internet connection is needed for some lectures.</b></p>   |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p> <ul style="list-style-type: none"> <li>• <b>Printer – Scanner – data show</b></li> </ul> |

## **G Course Evaluation and Improvement Processes**

|   |
|---|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>• <b>A questionnaire has been designed to obtain feedback on various aspects of teaching and assessment</b></li> </ul>   |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul> |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Constat discussions with other instructors within and outside King Saud University who are currently teaching similar courses.</b></li> <li>• <b>Review of the course material by relevant departmental committee(s)</b></li> </ul>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <p><b>- Exam results are made available upon request to relevant committees.</b></p>                           |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p><b>- An academic-quality committee has been proposed as a forum that would review and suggest improvements to course work</b></p>  |



**GEO 473: Engineering Geology**

**Course Specification**

**Revised March 2009**



## Course Specification

|                    |   |
|--------------------|---|
| Institution        | <b>King Saud University</b>                 |
| College/Department | <b>Science Faculty – Geology Department</b> |

### A Course Identification and General Information

|   |  |
|---|--|
| 1. Course title and code:   | <b>Engineering Geology-GEO 473</b>     |
| 2. Credit hours   | <b>(2+0)</b>                           |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b> |
| 4. Name of faculty member responsible for the course  |  |
| 5. Level/year at which this course is offered   |  |
| 6. Pre-requisites for this course (if any)  | <b>GEO 381</b>                         |
| 7. Co-requisites for this course (if any)   |  |
| 8. Location if not on main campus   |  |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field on using some survey and field tools.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>1- Soil classification</b>   | <b>1</b>    | <b>2</b>      |
| <b>2- Construction problems related to swelling and shrinking soils</b> | <b>1</b>    | <b>2</b>      |
| <b>3- Soil mechanics</b>  | <b>1</b>    | <b>2</b>      |
| <b>4- Rock mechanics</b>  | <b>2</b>    | <b>4</b>      |
| <b>5- Dimension stones</b>  | <b>1</b>    | <b>2</b>      |
| <b>6- Aggregates and crushed rocks</b>                                  | <b>1</b>    | <b>2</b>      |

|                                     |          |          |
|-------------------------------------|----------|----------|
| <b>7- Site inspection</b>           | <b>1</b> | <b>2</b> |
| <b>8- Tunneling</b>                 | <b>1</b> | <b>2</b> |
| <b>9- Water reservoirs and dams</b> | <b>1</b> | <b>2</b> |
| <b>10- Roads and bridges</b>        | <b>1</b> | <b>2</b> |
| <b>11- Environmental impact</b>     | <b>2</b> | <b>4</b> |
| <b>12- Geohazards</b>               | <b>1</b> | <b>2</b> |

|   |                |   |              |
|---|----------------|---|--------------|
| 2 Course components (total contact hours per semester): |                |   |              |
| Lecture: <b>28 hours</b>                                | Tutorial: ---- | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |

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|---|
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>- <b>Knowledge and understanding of behavior and properties of different type of rocks.</b></li> <li>- <b>Know the different techniques.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                                 |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul> |



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| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>                                |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>                     |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p>   |

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|--|
| <b>Use computer software to present and analyse structural geology and structural deformation data.</b>  |
| (iii) Methods of assessment of students numerical and communication skills <ul style="list-style-type: none"> <li><b>Students tests and assignments.</b></li> <li><b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required  |
| (ii) Teaching strategies to be used to develop these skills  |
| (iii) Methods of assessment of students psychomotor skills   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

|  |
|--|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week) <ul style="list-style-type: none"> <li><b>Working hours 7hrs/day.</b></li> <li><b>Office hours 3hrs/day</b></li> </ul> |
|--|

## E Learning Resources

|  |
|--|
| 1. Required Text(s)  |
| 2. Essential References<br><br><b>Bell, F.G., 2007, Engineering Geology, 2<sup>nd</sup> edition, Butterworth &amp; Co. Ltd, London, 592 p.</b>   |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br><b>Waltham, T., 2002, Foundations of engineering geology: An Introduction, Taylor &amp; Francis Co, 104 p.</b> |
| 4-.Electronic Materials, Web Sites etc   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations  |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br><br><ul style="list-style-type: none"><li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li><li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li></ul> |
| 2. Computing resources<br><br><ul style="list-style-type: none"><li>• <b>An easily accessible computer lab.</b></li></ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br><b>Printer – Scanner – data show</b>  |

## G Course Evaluation and Improvement Processes

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li> <li>• <b>Meeting and discussion between faculty and students</b></li> </ul>   |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li> <li>• <b>Periodic self- assessment of the program.</b></li> </ul>  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li> <li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li> <li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul> |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Not activated yet</b></li> </ul>  |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li> </ul>   |



## **GEO 478: Spatial Information Systems**

## **Course Specification**

**Revised March 2009**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                |
| College/Department | <b>Science Faculty – Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |  |
|---|--|
| 1. Course title and code:   | <b>Spatial Information Systems-GEO 478</b> |
| 2. Credit hours   | <b>2(1+1)</b>                              |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b>     |
| 4. Name of faculty member responsible for the course  |  |
| 5. Level/year at which this course is offered   |  |
| 6. Pre-requisites for this course (if any)  | <b>GEO 381</b>                             |
| 7. Co-requisites for this course (if any)   |  |
| 8. Location if not on main campus   |  |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"><li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li><li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li><li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li><li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li></ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"><li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li><li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li><li>• <b>Train the student in the field on using some survey and field tools.</b></li></ul>  |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered                                   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| <b>1- The concept of GIS.</b>                            | <b>2</b>    | <b>4</b>      |
| <b>2- Maps and spatial analysis</b>                      | <b>1</b>    | <b>2</b>      |
| <b>3- Data entry, storage and retrieval</b>              | <b>1</b>    | <b>2</b>      |
| <b>4- Computer-based processing of geologic data</b>     | <b>2</b>    | <b>4</b>      |
| <b>5- Vector and raster data models and analysis</b>     | <b>2</b>    | <b>4</b>      |
| <b>6- Linking digital maps and attribute information</b> | <b>2</b>    | <b>4</b>      |

|  |          |          |
|--|----------|----------|
| <b>7- Spatial interpolation</b>                | <b>1</b> | <b>2</b> |
| <b>8- Practical application through a real</b> | <b>1</b> | <b>2</b> |
| <b>9- Life GIS project</b>                     | <b>2</b> | <b>4</b> |

|   |                |   |              |
|---|----------------|---|--------------|
| 2 Course components (total contact hours per semester): |                |   |              |
| Lecture: <b>28 hours</b>                                | Tutorial: ---- | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>- <b>Knowledge and understanding of behavior and properties of different type of rocks.</b></li> <li>- <b>Know the different techniques.</b></li> </ul>   |



|   |
|---|
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                                 |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p>   |

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| <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul> |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab. reports and sharing in field trips.</b></li> </ul>   |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p><b>Use computer software to present and analyse structural geology and structural deformation data.</b></p>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul>  |

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| <b>e. Psychomotor Skills (if applicable)</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required |
| (ii) Teaching strategies to be used to develop these skills                                     |
| (iii) Methods of assessment of students psychomotor skills                                      |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E Learning Resources

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|---|
| 1. Required Text(s)   |
| 2. Essential References<br><b>Bonham-Carter, G. F., 1994, Geographic information Systems for geoscientists: modeling with</b> |

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|---|
| <b>GIS, Pergamon Press, New York, pp 292-302.</b>   |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)                |
| 4-.Electronic Materials, Web Sites etc  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations |

## **F. Facilities Required**

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| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"> <li><b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li> <li><b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li> </ul> |
| 2. Computing resources <ul style="list-style-type: none"> <li><b>An easily accessible computer lab.</b></li> </ul>   |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <p><b>Printer – Scanner – data show</b></p>  |

## **G Course Evaluation and Improvement Processes**

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|---|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li><b>Student questionnaire for evaluation of the conclusion of the course.</b></li> <li><b>Meeting and discussion between faculty and students</b></li> </ul> |
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| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li> <li>• <b>Periodic self- assessment of the program.</b></li> </ul>  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li> <li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li> <li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul> |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Not activated yet</b></li> </ul>  |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li> </ul>   |

**KING SAUD UNIVERSITY**  
**College of Science**

Department of Geology and Geophysics



جامعة الملك سعود  
كلية العلوم  
قسم الجيولوجيا والجيوفيزياء

**GEO 482**

**Sedimentary Geology of Saudi Arabia**

## **Course Specification**

**Revised November 2009**



## Course Specification

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| Institution: King Saud University  |
| College/Department: College of Science- Department of Geology and Geophysics |

### A Course Identification and General Information

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| 1. Course title and code: <b>Sedimentary Geology of Saudi Arabia: Geo-482</b>  |
| 2. Credit hours: 3 Credit hours (2+1)  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br>B. Sc. program in Geology |
| 4. Name of faculty member responsible for the course:<br><b>Dr. Abdulaziz Abdullah Laboun</b>  |
| 5. Level/year at which this course is offered<br>8 <sup>th</sup> Level   |
| 6. Pre-requisites for this course (if any): <b>GEO 334</b>   |
| 7. Co-requisites for this course (if any)<br><b>none</b>   |
| 8. Location if not on main campus  |



## B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.
  - The course intends to introduce the student to the sedimentary geology of Saudi Arabia.
  - Application and what are the main geologic units, age, main resources in Saudi Arabia (eg. Rocks, minerals, water, Gas and Oil) this including field visits to selected outcrops and oil and/or gas fields.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g increased use of IT or web based reference material, changes in content as a result of new research in the field):
  - The course contents will be periodically reviewed by the instructors and the Undergraduate Committee to include new related topics, as and when necessary.

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| Introduction to geography, geomorphology, plate tectonics, structure, and basin analysis.     | 2           | 4             |
| Arabian Shelf Geology: Introduction, rock types, depositional environments, and paleontology. | 2           | 4             |
| Arabian Shelf Geology: Stratigraphy and tectonics   | 2           | 4             |
| Palaeozoic Stratigraphy, depositional environment, age, economic geology.                     | 2           | 4             |
| Mesozoic Stratigraphy, depositional environment, age, economic geology.                       | 3           | 6             |
| Cenozoic Stratigraphy, depositional environment, age, economic geology.                       | 2           | 4             |
| Natural Resources of Saudi Arabia: oil, gas, water, rocks, and minerals                       | 2           | 4             |

|   |           |  |        |
|---|-----------|--|--------|
| 2 Course components (total contact hours per semester): |           |  |        |
| Lecture: 30 lectures                                    | Tutorial: | Practical/Fieldwork /Internship: 15 hours + 3 days fieldwork | Other: |

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| <p>3. Additional private study/learning hours expected for students per week. (This should be an average: for the semester not a specific requirement in each week)</p> <p>- Students are expected an average of 2-3 learning hours per week.</p> |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop; <ul style="list-style-type: none"> <li>- The course gives full information and basic knowledge on the sedimentary geology of the Saudi Arabia.</li> </ul> </li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill; <ul style="list-style-type: none"> <li>- Teaching is conducted through lectures, practical sessions and fieldwork.</li> </ul> </li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned. <ul style="list-style-type: none"> <li>-Methods of assessment include quizzes, home-works, tests, and examinations.</li> </ul> </li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <p>1- The student is expected to acquire basic knowledge and Understanding the sedimentary geology of Saudi Arabia: Formation, stratigraphy, structure, paleontology, and depositional environments.</p> <p>2- Reservoir characteristics and oil and gas formation, accumulation and</p>   |

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| <p>entrapment.</p> <p>3- hydrogeologic types of groundwater and aquifers.</p>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>- Teaching will be conducted through lectures, practical sessions and fieldwork.</li> </ul>  |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>- Methods of assessment include quizzes, home-works, tests and exams.</li> <li>- Interactive learning process through questions and answers in class and lab.</li> <li>- Observation and collection of field data.</li> <li>- Oral examination in lab to examine the students' ability to perform tests and their knowledge of the sedimentary geology of Saudi Arabia.</li> </ul> |
| <p><b>b. Cognitive Skills</b></p>  |
| <p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> <li>- Students will be able to apply the knowledge have learnt concerning the whole things about the sedimentary geology of Saudi Arabia.</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>- Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use.</li> <li>- Practical work is planned around a number of hand specimen, logs and maps.</li> <li>- Engage students in classroom and in practical session discussion with questions and answers.</li> </ul>                           |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>- Exams and homework will include problems, solution of which requires critical thinking and identification of correct formulas.</li> <li>- Practical and Laboratory works require data analysis and interpretation of data.</li> </ul>   |

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| <b>c. Interpersonal Skills and Responsibility</b>  |  |
| (i) Description of the interpersonal skills and capacity to carry responsibility to be developed | <ul style="list-style-type: none"> <li>- Punctual attendance of classes and practical session is required of the students.</li> <li>- Students will take the responsibility to solve given assignments on their own and submit the solution on time.</li> <li>- Students learn to manage their time in self study of the course material.</li> </ul>   |
| (ii) Teaching strategies to be used to develop these skills and abilities                        | <ul style="list-style-type: none"> <li>- Assignments are given to the students at regular intervals for them to solve and submit on time. 20% of the final grade allocated to the assignments and practicals.</li> <li>- Late or no submission of assignments carries penalties or loss of grade points.</li> <li>- Practical assignments are to be written in the prescribed format and are to be submitted on time.</li> <li>- Participation of students in classroom discussion.</li> </ul> |
| (ii) Methods of assessment of students interpersonal skills and capacity to carry responsibility | <ul style="list-style-type: none"> <li>- Class attendance of students at the beginning of the lecture is recorded.</li> <li>- Recording of submission of assignment, and the grades.</li> </ul>  |
| <b>d. Communication, Information Technology and Numerical Skills</b>                             |  |
| (i) Description of the skills to be developed in this domain.                                    | <ul style="list-style-type: none"> <li>- Ability of students to apply basic knowledge of the sedimentary geology of Saudi Arabia data in computing.</li> <li>- Use of computer in producing reports and assignments.</li> <li>- Ability to write reports.</li> </ul>   |
| (ii) Teaching strategies to be used to develop these skills                                      | <ul style="list-style-type: none"> <li>- Questions of tests and assignments require students' knowledge in the sedimentary</li> </ul>  |

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| geology of Saudi Arabia and their computational capabilities for solving problems.   |
| (iii) Methods of assessment of students numerical and communication skills<br>- Through students aggregate score in all tests and assignments.<br>- Evaluation of written reports and other assignments that require a written text. |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br>Not applicable  |
| (ii) Teaching strategies to be used to develop these skills<br><br>Not applicable  |
| (iii) Methods of assessment of students psychomotor skills<br><br>Not applicable   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                         |                                      |
|--|--|-------------------------|--------------------------------------|
| Assess<br>ment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due                | Proportion<br>of Final<br>Assessment |
| 1  | quiz   | Every<br>three<br>weeks | 5%                                   |
| 2  | Mid-term exam  | 9 <sup>th</sup> week    | 10%                                  |
| 3  | Reports (visits, field trips, and short projects)                  | 13 <sup>th</sup> week   | 10%                                  |
| 4  | Presentations (short projects)                                     | 15 <sup>th</sup> week   | 10%                                  |

|   |               |                             |     |
|---|---------------|-----------------------------|-----|
| 5 | Lab work exam | Last week                   | 15% |
| 6 | Final exam    | As scheduled by the College | 50% |

#### **D. Student Support**

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| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"> <li>- The academic staff is available in his office 3 hrs/week for students' consultation and academic advice.</li> </ul> |
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#### **E Learning Resources**

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|---|
| <p>1. Required Text(s)</p> <ul style="list-style-type: none"> <li>- Geology of the Arabian Shield, Ahmad Al-Shanti,</li> <li>- Geology of the Arabian Peninsula: Sedimentary Geology of Saudi Arabia, Powers and others, 1966.</li> </ul>   |
| <p>2. Essential References</p> <ul style="list-style-type: none"> <li>- Sharland, P.R., Archer, R., Casey, D.M., Davies, R.B., Hall, S.H., Heward, A.P., Horbury, A.D. &amp; Simmons, M.D, 2001, Arabian Plate Sequence Stratigraphy, GeoArabia Special Publication # 2, 371 pp</li> <li>- Lexicon of the Palaeozoic and Lower Mesozoic of Saudi Arabia, Laboun, 1996.</li> <li>- Stratigraphic column of the Phanerozoic of Saudi Arabia, Halawani, 2001.</li> </ul> |
| <p>3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)</p> <ul style="list-style-type: none"> <li>- The instructor will provide list of references as the course proceeds, beside;</li> <li>- Geo-Arabia Bulletins.</li> <li>- American Association of Petroleum Geologists Bulletins.</li> <li>- Journal of Geology.</li> </ul>   |

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| <p>4-.Electronic Materials, Web Sites etc</p> <p>-Search through Google for related topics.</p>  |
| <p>5- Other learning material such as computer-based programs/CD, professional standards/regulations</p> <p>-The instructor may provide some relevant materials and learning aids.</p> |

## **F. Facilities Required**

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|---|
| <p>Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)</p>   |
| <p>3. Accommodation (Lecture rooms, laboratories, etc.)</p> <ul style="list-style-type: none"> <li>- Lecture room equipped with a black board, overhead projector, computer and internet connection.</li> <li>- Fully equipped lab, supported with polarizing microscope, hand specimens, thin section, measuring instruments, maps, computers, ..... etc.</li> <li>- The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</li> </ul> |
| <p>4. Computing resources</p> <ul style="list-style-type: none"> <li>-An easily accessible computer lab.</li> </ul>   |
| <p>3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)</p>  |

## **G Course Evaluation and Improvement Processes**

|  |
|--|
| <p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>- Student course evaluation at the conclusion of the course.</li> </ul>                           |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>- Faculty assessment of the course and effectiveness of teaching delivery.</li> </ul> |

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|--|
| <ul style="list-style-type: none"> <li>- Periodic self- assessment of the program.</li> </ul>  |
| <p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>- Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</li> <li>- Feedback from employers and graduating students' input are used to identify any deficiencies in students' ability in applying the sedimentary geology of Saudi Arabia knowledge.</li> <li>- Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</li> <li>- Teaching method will focus on students' learning and on course learning outcomes.</li> </ul>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>- Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements</li> <li>- A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</li> </ul> |
| <p>5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>- Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</li> </ul>   |





**GEO 483: Regional Geology of the Middle East-**

**Course Specification**

**Revised March 2007**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                |
| College/Department | <b>Science Faculty – Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |   |
|---|---|
| 1. Course title and code:   | <b>Regional Geology of the Middle East- GEO 483</b> |
| 2. Credit hours   | <b>2(2+0)</b>                                       |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b>              |
| 4. Name of faculty member responsible for the course  |   |
| 5. Level/year at which this course is offered   |   |
| 6. Pre-requisites for this course (if any)  | <b>GEO 482</b>                                      |
| 7. Co-requisites for this course (if any)   |   |
| 8. Location if not on main campus   |   |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li> <li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li> <li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li> <li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li> </ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li> <li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li> <li>• <b>Train the student in the field on using some survey and field tools.</b></li> </ul>   |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| <b>1- Precambrian relationships in the Arabian-Nubian Shield.</b>             | <b>3</b>    | <b>6</b>      |
| <b>2- The Arabian Shelf and its northerly extension.</b>                      | <b>3</b>    | <b>6</b>      |
| <b>3- Tectonic movements related to the opening of the Red Sea.</b>           | <b>3</b>    | <b>6</b>      |
| <b>4- Arabian Plate movement and the creation of Zagros and Taurus belts.</b> | <b>3</b>    | <b>6</b>      |
| <b>5- Oil and mineral resources of the Middle East.</b>                       | <b>2</b>    | <b>4</b>      |

|   |           |   |              |
|---|-----------|---|--------------|
| 2 Course components (total contact hours per semester): |           |   |              |
| Lecture: <b>28 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <p><b>a. Knowledge</b></p>  |
| <p>(i) Description of the knowledge to be acquired</p> <ul style="list-style-type: none"> <li>- <b>Knowledge and understanding of behavior and properties of different type of rocks.</b></li> <li>- <b>Know the different techniques.</b></li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                 |

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| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed</p>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p>  |

|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>                |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul> |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p><b>Use computer software to present and analyse structural geology and structural deformation data.</b></p>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul>  |
| <p><b>e. Psychomotor Skills (if applicable)</b></p>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p>   |
| <p>(iii) Methods of assessment of students psychomotor skills</p>  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |                |                                |
|--|--|----------------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due       | Proportion of Final Assessment |
| 1  | <b>Homework</b>  | <b>5-9- 12</b> | <b>10 %</b>                    |
| 2  | <b>Write Report</b>  | <b>7</b>       | <b>5 %</b>                     |
| 3  | <b>First test</b>  | <b>6</b>       | <b>10 %</b>                    |
| 4  | <b>Practical test</b>  | <b>13</b>      | <b>15%</b>                     |
| 5  | <b>Second test</b>   | <b>14</b>      | <b>10%</b>                     |
| 6  | <b>Final Exam</b>  | <b>15</b>      | <b>50%</b>                     |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice.  
(include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E Learning Resources

|  |
|--|
| 1. Required Text(s)  |
| 2. Essential References<br><b>Beydoun, Z.R., 1988, The Middle-East: Regional geology and petroleum resources, Scientific Press, London. 292 p.</b>   |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br><br><b>Alsharhan, A. S., &amp; Nairn, A. E. M., 1997, Sedimentary Basins and Petroleum Geology of the Middle East, Elsevier, Amsterdam, 843 p.</b> |
| 4-.Electronic Materials, Web Sites etc   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations  |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"><li>• <b>Lecture room equipped with a black board, overhead projector, computer and internet connection.</b></li><li>• <b>The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.</b></li></ul> |
| 2. Computing resources <ul style="list-style-type: none"><li>• <b>An easily accessible computer lab.</b></li></ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><b>Printer – Scanner – data show</b>   |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li><li>• <b>Meeting and discussion between faculty and students</b></li></ul>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"><li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li><li>• <b>Periodic self- assessment of the program.</b></li></ul>  |
| 3 Processes for Improvement of Teaching <ul style="list-style-type: none"><li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li><li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li><li>• <b>Organize workshop on effective teaching methods to enable instructors</b></li></ul> |



|  |
|--|
| <ul style="list-style-type: none"> <li>• <b>to improve their teaching skill.</b></li> <li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li> </ul>  |
| <p>4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>• <b>Not activated yet</b></li> </ul>  |
| <p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none"> <li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li> </ul> |



## **GEO 495: History of Geology**

### **Course Specification**

**Revised March 2007**



## Course Specification

|  |
|--|
| Institution: King saud University                                |
| College/Department : College of Science – Department of Geology. |

### A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>History of Geology – Geo 495</b>   |
| 2. Credit hours : 1   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>B.sc. program in Geology.</b> |
| 4. Name of faculty member responsible for the course<br><b>Prof . Ahmed A. Almohandis</b>   |
| 5. Level/year at which this course is offered : 8 th. level   |
| 6. Pre-requisites for this course (if any) : <b>None</b>  |
| 7. Co-requisites for this course (if any) : <b>None</b>   |
| 8. Location if not on main campus   |

## B Objectives

|  |
|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <p>-The Course Intends to Know and understand the ideas and theories in geology throughout time.</p> <p>- To Know the different branches of geology and their importance.</p>   |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <p>- The Course Content will be periodically reviewed by the instructor and the undergraduate committee as and when necessary.</p> <p>-</p> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered  |             |               |
|---|-------------|---------------|
| Topic   | No of Weeks | Contact hours |
| - Contributions of Greek and Roman scientists                 | 2           | 2             |
| - Contributions of Muslim scientists                          | 4           | 4             |
| - Development of ideas and theories in geology                | 4           | 4             |
| - Development of different branches of geology                | 2           | 2             |
| - Great geologists and their contributions to earth sciences. | 3           | 3             |
|   |             |               |
|   |             |               |
|   |             |               |
|   |             |               |

|   |                    |                                   |                 |
|---|--------------------|-----------------------------------|-----------------|
| 2 Course components (total contact hours per semester): |                    |                                   |                 |
| Lecture:<br>15  | Tutorial:<br>----- | Practical/Fieldwork/Inte<br>----- | Other:<br>----- |

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) :  
students are expected an average of 1 learning hours per week.

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- The course gives abasic knowledge in history of geology.
  - Adscription of the teaching strategies to be used in the course to develop that knowledge or skill : Teaching is conducted through lectures.
  - The methods of student assessment to be used in the course to evaluate outcomes in the domain concerned :
- methods include quizzes, homework's, tests, and examinations

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

- The student is expected to acquire basic knowledge in ideas and theories in the history of geology.
- The student is expected to have some knowledge on some great geologists and some developments in geology.

(ii) Teaching strategies to be used to develop that knowledge

- Teaching will be conducted through lectures and discussions.

|   |
|---|
| <p>(iii) Methods of assessment of knowledge acquired :<br/>Exams, quizzes, home-works and are used to assess the acquired knowledge on the subject.</p>   |
| <p><b>b. Cognitive Skills</b></p>   |
| <p>(i) Cognitive skills to be developed : Students will be able to apply their Knowledge to identify minerals under the polarizing microscope.</p> <ul style="list-style-type: none"> <li>- students will be able to differentiate clearly between geology branches and their development.</li> <li>- Students will appreciate the importance of geology and its economic value.</li> </ul>                     |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>- Assignments are given to students at regular intervals.</li> <li>- Participation of students in classroom discussions.</li> <li>- Late or no submission of assignments will be considered .</li> <li>- Practical assignment are to be written and should be submitted on time.</li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills:</p> <ul style="list-style-type: none"> <li>- Attendance of students at the beginning of the lecture is recorded .</li> <li>- Recording of submission of assignments and the grades</li> </ul>  |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>- Punctual attendance of classes is required.</li> <li>- students learn to manage their time in self-study of the course material.</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>- Teaching will be conducted through lectures and discussion.</li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>- Methods include quizzes, homework, tests and examinations.</li> </ul>   |

|   |
|---|
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>- Use of computer to producing assignments.</li> <li>- ability to write reports.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> <li>- Questions require student's knowledge of different geology branches.</li> <li>- Students should know the developments in the overall history of geology.</li> </ul> |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>- Methods include quizzes, homework and examination.</li> <li>-</li> </ul>   |
| <b>e. Psychomotor Skills (if applicable)</b>  |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>Not applicable.</p>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p>-----</p>   |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p>-----</p>  |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |          |                                |
|--|--|----------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| 1  | Assignments and attendance   |          | 10%                            |
| 2  | Midterm Examination  |          | 20%                            |
| 3  | Short tests and discussion   |          | 20%                            |
| 4  | Final Examination  |          | 50%                            |
| 5  |  |          |                                |
| 6  |  |          |                                |
| 7  |  |          |                                |
| 8  |  |          |                                |

## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)  
 - Each faculty is required to be available in his office to devote at least 3 hours a week for students' consultation and academic advice.

## E Learning Resources

|  |
|--|
| 1. Required Text(s) : White, G.W. , 1977. Essays on history of geology Arno Press, New York  |
| 2. Essential References: Faul, H. Faul, C.C. , 1983 It began with a stone : A history of geology from the stone age to Plate tectonics. John Wiley Sons, Inc. New York.<br>- |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br>-----  |
| 4- Electronic Materials, Web Sites etc<br>- Search through Google for related Topics   |



|   |
|---|
|   |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations<br>- The instructor will provide some relevant materials and learning aids. |

## F. Facilities Required

|  |
|--|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)   |
| 1. Accommodation (Lecture rooms, laboratories, etc.) <ul style="list-style-type: none"> <li>- Lecture room equipped with a blackboard, overhead projector , and internet connection.</li> <li>- The lab . have a blackboard, overhead projector and seating arrangement for the students.</li> </ul> |
| 2. Computing resources <ul style="list-style-type: none"> <li>- An easily accessible computer lab.</li> </ul>  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list) <p>-----</p>   |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>- Student course evaluation at the conclusion of the course</li> </ul>   |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department <ul style="list-style-type: none"> <li>- Faculty assessment of the course and effectiveness of teaching delivery.</li> <li>- Periodic self- assessment of the program.</li> </ul>   |
| 9 Processes for Improvement of Teaching <ul style="list-style-type: none"> <li>-Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</li> <li>-Feedback from employers and and graduating students' input are used to identify any deficiencies in students' ability in applying mineral optics knowledge.</li> <li>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</li> <li>-Teaching method will focus on students' learning and on course learning outcomes</li> </ul> |

10 Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)

-Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements

- A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.

11 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.



**GEO 496: Specialized Topics**

**Course Specification**

**Revised March 2007**



## Course Specification

|                    |  |
|--------------------|--|
| Institution        | <b>King Saud University</b>                                |
| College/Department | <b>Science Faculty – Geology Department and Geophysics</b> |

### A Course Identification and General Information

|   |  |
|---|--|
| 1. Course title and code:   | <b>Specialized Topics- GEO 496</b>     |
| 2. Credit hours   | <b>1(1+0)</b>                          |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs) | <b>Geology and Geophysics programs</b> |
| 4. Name of faculty member responsible for the course  |  |
| 5. Level/year at which this course is offered   |  |
| 6. Pre-requisites for this course (if any)  | <b>GEO 392</b>                         |
| 7. Co-requisites for this course (if any)   |  |
| 8. Location if not on main campus   |  |

## B Objectives

|   |
|---|
| <p>1. Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>• <b>To familiarize students with basic knowledge of geology methods in the field.</b></li> <li>• <b>To develop the students' understanding of the properties of different types of rocks and deformation.</b></li> <li>• <b>To understand the different concepts, properties and mechanical behavior of mineral and rocks during structural deformations and tectonic movements.</b></li> <li>• <b>To increase the ability of the student to imagine and visualize the real link between the theoretical background and the field practical experience.</b></li> </ul> |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>• <b>To motivate the ability of the students to collect and orient field samples in the field.</b></li> <li>• <b>Increase the ability of the students to use up-to-date computer softwares related to the course.</b></li> <li>• <b>Train the student in the field on using some survey and field tools.</b></li> </ul>   |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

|  |             |               |
|--|-------------|---------------|
| 1 Topics to be Covered   |             |               |
| Topic  | No of Weeks | Contact hours |
| <b>1- Advanced study of detailed aspects of certain geological problems chosen by the student, which is summarized in a brief report</b> | <b>14</b>   | <b>1</b>      |

|   |           |   |              |
|---|-----------|---|--------------|
| 2 Course components (total contact hours per semester): |           |   |              |
| Lecture: <b>14 hours</b>                                | Tutorial: | Practical/Fieldwork/Internship: <b>14/16/----</b> | Other: ----- |

|   |
|---|
| 3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week) |
|---|

|   |
|---|
| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>• A description of the teaching strategies to be used in the course to develop that knowledge or skill;</li> <li>• The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.</li> </ul> |
| <b>a. Knowledge</b>   |
| (i) Description of the knowledge to be acquired   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <ul style="list-style-type: none"> <li>• <b>Preparing lecturing slides to be available to the students via internet.</b></li> <li>• <b>Preparing presentation movies and films to show the methods of field sampling and structural techniques.</b></li> <li>• <b>Interactive learning process through questions and discussion in class and lab.</b></li> <li>• <b>Laboratory work, assignments and homework</b></li> </ul>                 |
| <p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>  |
| <b>b. Cognitive Skills</b>  |
| (i) Cognitive skills to be developed  |

|   |
|---|
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Lectures are followed by numerous examples, some of which are practical in field, to illustrate the application and use.</b></li> <li>• <b>Laboratory work is planned around a number of experiments that requires preparatory work, testing, data collection and interpretation.</b></li> <li>• <b>Engage students in field trips and laboratory discussions with questions and answers.</b></li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Exams, quizzes, homework and reports</b></li> <li>• <b>Field trip attendance and sharing in discussions.</b></li> <li>• <b>Oral examination in lab to examine the students' ability to perform tests and their knowledge of the structural behaviour and properties.</b></li> </ul>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>• <b>Students will work in group either in-class and/or in the field.</b></li> <li>• <b>Student will be able to present a part of the lecture and share discussions.</b></li> <li>• <b>Students learn to manage their time in self study of the course material.</b></li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>• <b>Part of the lecture is planned and led by students.</b></li> <li>• <b>Students will share and engaged in class discussions and field trips.</b></li> <li>• <b>Assignments are given to the students at regular intervals for them to solve and submit on time.</b></li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>• <b>Class attendance of students.</b></li> <li>• <b>Lab reports and sharing in field trips.</b></li> </ul>   |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |
| <p>(i) Description of the skills to be developed in this domain.</p>  |

|   |
|---|
| <ul style="list-style-type: none"> <li>• <b>Ability of students to use computer software related to the course topics.</b></li> <li>• <b>Use of computer in producing reports and assignments.</b></li> <li>• <b>Ability to write reports in English</b></li> </ul>                 |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p><b>Use computer software to present and analyse structural geology and structural deformation data.</b></p>   |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>• <b>Students tests and assignments.</b></li> <li>• <b>Evaluation of written lab reports and other assignments that require a Written text.</b></li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>  |
| (i) Description of the psychomotor skills to be developed and the level of performance required   |
| (ii) Teaching strategies to be used to develop these skills   |
| (iii) Methods of assessment of students psychomotor skills  |

| 5. Schedule of Assessment Tasks for Students During the Semester |   |                |                                      |
|--|---|----------------|--------------------------------------|
| Assess<br>ment   | Assessment task (eg. essay, test, group project, examination<br>etc.) | Week due       | Proportion<br>of Final<br>Assessment |
| 1  | <b>Homework</b>   | <b>5-9- 12</b> | <b>10 %</b>                          |
| 2  | <b>Write Report</b>   | <b>7</b>       | <b>5 %</b>                           |
| 3  | <b>First test</b>   | <b>6</b>       | <b>10 %</b>                          |
| 4  | <b>Practical test</b>   | <b>13</b>      | <b>15%</b>                           |
| 5  | <b>Second test</b>  | <b>14</b>      | <b>10%</b>                           |
| 6  | <b>Final Exam</b>   | <b>15</b>      | <b>50%</b>                           |



## D. Student Support

1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)

- **Working hours 7hrs/day.**
- **Office hours 3hrs/day**

## E Learning Resources

1. Required Text(s)

2. Essential References

**Lester, J. D., & Lester, J D., Jr., 2006, Writing Research Papers: A Complete Guide, 12th edition, Pearson Education Limited, New York, 448 p.**

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

4-.Electronic Materials, Web Sites etc

5- Other learning material such as computer-based programs/CD, professional standards/regulations

## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

- **Lecture room equipped with a black board, overhead projector, computer and internet connection.**
- **The laboratory will have a blackboard, overhead projector with computer connection and seating arrangement for the students.**

2. Computing resources

- **An easily accessible computer lab.**

3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

**Printer – Scanner – data show**

## **G Course Evaluation and Improvement Processes**

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching   |
| <ul style="list-style-type: none"><li>• <b>Student questionnaire for evaluation of the conclusion of the course.</b></li><li>• <b>Meeting and discussion between faculty and students</b></li></ul>  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department   |
| <ul style="list-style-type: none"><li>• <b>Faculty assessment of the course and effectiveness of teaching delivery.</b></li><li>• <b>Periodic self- assessment of the program.</b></li></ul>   |
| 3 Processes for Improvement of Teaching  |
| <ul style="list-style-type: none"><li>• <b>Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</b></li><li>• <b>Feedback from employers and alumni surveys and graduating students' input are used to identify any deficiencies in students' ability in applying knowledge of properties and the use of structural materials.</b></li><li>• <b>Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</b></li><li>• <b>Teaching method will focus on students' learning and on course learning outcomes.</b></li></ul> |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)  |
| <ul style="list-style-type: none"><li>• <b>Not activated yet</b></li></ul>   |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   |
| <ul style="list-style-type: none"><li>• <b>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</b></li></ul>   |

**KING SAUD UNIVERSITY**  
**College of Science**

**Department of Geology and Geophysics**



**جامعة الملك سعود**  
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## **GEO 498: Geology Seminar**

## **Course Specification**

**Revised March 2007**



## Course Specification

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| Institution: King saud University                                |
| College/Department : College of Science – Department of Geology. |

### A Course Identification and General Information

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|---|
| 1. Course title and code: <b>Geology Seminar Geo 492</b>  |
| 2. Credit hours :   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><b>B.sc. program in Geology.</b> |
| 4. Name of faculty member responsible for the course<br><b>Prof . Ahmed A. Almohandis</b>   |
| 5. Level/year at which this course is offered : 8 th. level   |
| 6. Pre-requisites for this course (if any) : Geo 381  |
| 7. Co-requisites for this course (if any)   |
| 8. Location if not on main campus   |

## B Objectives

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|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course. This Course is intended to provide some advice to the student on how to write good reports or topics on different aspects of geology.</p> <p>- To present the topic as a Power Point lecture.</p> <p>-</p>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <p>- The Course content will be Periodically reviewed by the instructor and the undergraduate committee as and when necessary.</p> <p>-</p> |

## C. Course Description

(Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| - This is a Geology Seminar course.  |             |               |
| - All topics will be selected and presented by students.   |             |               |
| - For this course, student will Prepare a 20 – minutes talk. This leaves time for scientific discussion and constructive criticism of presentation style and graphics. |             |               |
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|---|-----------|--------------------------|--------------------------|
| 2 Course components (total contact hours per semester): |           |                          |                          |
| Lecture:<br>15 lectures                                 | Tutorial: | Practical/Fieldwork/Inte | Other: oral Presentation |

3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) : students are expected an average of 1 learning hour per week, including discussion and oral Presentation.

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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>- The course gives a basic knowledge on how to write a topic in geology, and how to present it orally.</li> <li>- A description of the teaching strategies to be used in the course to develop that knowledge or skills : Teaching is conducted through lectures, oral presentation.</li> <li>- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned. : methods include home work, discussion and examination.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <p>- The student is expected to acquire knowledge in methods and procedures of selecting topics and how to present orally a good talk in geology.</p>  |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <p>- Teaching will be conducted through lectures, discussion and presentation of students talks.</p>   |
| <p>(iv) Methods of assessment of knowledge acquired :</p> <p>Exams, quizzes, home-works and lab reports are used to asses the acquired knowledge on the subject.</p> <p>- Assignments of talks, selecting topics and discussions are used to assess the a acquired knowledge on the subject.</p>  |

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| <b>b. Cognitive Skills</b>  |
| <p>(ii) Cognitive skills to be developed : Students will be able to apply their Knowledge to identify minerals under the polarizing microscope.</p> <ul style="list-style-type: none"> <li>- students will be able to understand the methods and procedures of selecting and presenting effectively talks in geology.</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>- Assignments are given to students at require intervals.</li> <li>- Participation of students in classroom discussions.</li> <li>- Late or no submission of assignments will be considered .</li> <li>- Assignment are to be written and should be submitted on time.</li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills:</p> <ul style="list-style-type: none"> <li>- Attendance of students at the beginning of the lecture is recorded .</li> <li>- Recording of submission of assignments and the grades</li> </ul>  |
| <b>c. Interpersonal Skills and Responsibility</b>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>- Punctual attendance of classes is required of the students.</li> <li>- Students learn to manage their time in self study of the course material.</li> </ul>  |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>- Teaching will be conducted through lectures, discussions and oral presentation.</li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>- Methods include home work, topics selected, oral presentation, and examination.</li> </ul>  |
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>- Use of computer to producing reports and assignments.</li> <li>- ability to write reports, and presenting talks by PowerPoint technique.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills</p>  |

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| <ul style="list-style-type: none"> <li>- Writing topics on one or two interesting subjects in geology.</li> <li>- Discussions of oral presentations of the students.</li> </ul>  |
| <p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> <li>- Evaluation of written topics.</li> <li>- Through students score in all assignments and oral presentations.</li> </ul> |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| <p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p>Not applicable.</p>  |
| <p>(ii) Teaching strategies to be used to develop these skills</p> <p>-----</p>  |
| <p>(iii) Methods of assessment of students psychomotor skills</p> <p>-----</p>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |  |          |                                |
|--|--|----------|--------------------------------|
| Assessment   | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| 1  | Assignments  |          | 20%                            |
| 2  | Attendance and participation                                       |          | 10%                            |
| 3  | Presentation and discussions                                       |          | 20%                            |
| 4  | Final Examination  |          | 50%                            |
| 5  |  |          |                                |
| 6  |  |          |                                |
| 7  |  |          |                                |
| 8  |  |          |                                |



## D. Student Support

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| <p>1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week)</p> <ul style="list-style-type: none"><li>- Each faculty is required to be available in his office to devote at least 3 hours a week for students' consultation and academic advice.</li></ul> |
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## E Learning Resources

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| 1. Required Text(s) :   |
| 2. Essential References:  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br>-----   |
| 4- Electronic Materials, Web Sites etc<br><br>- Search through Google for related Topics  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations<br>- The instructor will provide some relevant materials and learning aids. |

## F. Facilities Required

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| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br><br>- Lecture room equipped with a blackboard, overhead projector , and internet connection.<br>- The lab . have a blackboard, overhead projector and seating arrangement for the students. |
| 2. Computing resources<br>- An easily accessible computer lab.  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br><br>-----  |

## **G Course Evaluation and Improvement Processes**

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|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching   |
| - Student course evaluation at the conclusion of the course  |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department   |
| - Faculty assessment of the course and effectiveness of teaching delivery.<br>- Periodic self- assessment of the program.  |
| 12 Processes for Improvement of Teaching   |
| -Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.<br>-Feedback from employers and and graduating students' input are used to identify any deficiencies in students' ability in applying mineral optics knowledge.<br>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.<br>-Teaching method will focus on students' learning and on course learning outcomes |
| 13 Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)  |
| -Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements<br>- A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.   |
| 14 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.<br>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.   |

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## **GEO 499: Research Project**

## **Course Specification**

**Revised March 2007**



## Course Specification

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|--|
| Institution: King saud University                                |
| College/Department : College of Science – Department of Geology. |

### A Course Identification and General Information

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|---|
| 1. Course title and code: <b>Research Project - Geo 499</b>   |
| 2. Credit hours : 1 hour (Unit)   |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>B.sc. program in Geology.</b> |
| 4. Name of faculty member responsible for the course<br><b>Prof . Ahmed A. Almohandis</b>   |
| 5. Level/year at which this course is offered : 8 th. level   |
| 6. Pre-requisites for this course (if any) : Geo 381 + Geo 492  |
| 7. Co-requisites for this course (if any)   |
| 8. Location if not on main campus   |

## B Objectives

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|--|
| <p>1. Summary of the main learning outcomes for students enrolled in the course. This Course is intended to provide some advice to the student on how to write topics on different aspects of geology.</p> <p>- To present the topic as a Power Point lecture.</p> <p>-</p>  |
| <p>2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)</p> <p>- The Course content will be Periodically reviewed by the instructor and the undergraduate committee as and when necessary.</p> <p>-</p> |

## C. Course Description (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| Topic  | No of Weeks | Contact hours |
| - This in an individual research project for all students.   |             |               |
| - Research topic will be selected and presented by students.   |             |               |
| - For this course, student will Prepare a 20 – minutes talk. This leaves time for scientific discussion and constructive criticism of presentation style and graphics. |             |               |
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|---|-----------|------------------------------|--------------------------|
| 2 Course components (total contact hours per semester): |           |                              |                          |
| Lecture:  | Tutorial: | Practical /Inte<br>Fieldwork | Other: oral Presentation |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week) : students are expected to present a talk at the end of semester. |
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| <p>4. Development of Learning Outcomes in Domains of Learning</p> <p>For each of the domains of learning shown below indicate:</p> <ul style="list-style-type: none"> <li>• A brief summary of the knowledge or skill the course is intended to develop;</li> <li>- The course gives a basic knowledge on how to write a research report in geology, and how to present it orally.</li> <li>- A description of the teaching strategies to be used in the course to develop that knowledge or skills : Teaching is conducted through field work, reading, and writing.</li> <li>- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned. : methods include report writing and oral presentation.</li> </ul> |
| <b>a. Knowledge</b>   |
| <p>(i) Description of the knowledge to be acquired</p> <p>- The student is expected to acquire knowledge in methods and procedures of selecting and writing research project and topics and how to present orally a good talk in geology.</p>   |
| <p>(ii) Teaching strategies to be used to develop that knowledge</p> <p>- Teaching will be conducted through supervision of the student research project.</p>   |
| <p>(v) Methods of assessment of knowledge acquired :</p> <p>- Assignments of talks, selecting topics and discussions are used to assess the a acquired knowledge on the subject.</p>  |

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| <b>b. Cognitive Skills</b>  |
| <p>(iii) Cognitive skills to be developed : Students will be able to apply their Knowledge to identify minerals under the polarizing microscope.</p> <ul style="list-style-type: none"> <li>- students will be able to understand the methods and procedures of selecting and presenting effectively research projects in geology.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>- Assignments are given to students at require intervals.</li> <li>- Participation of students in classroom discussions.</li> <li>- Late or no submission of research projects will be considered .</li> <li>- Assignment are to be written and should be submitted on time.</li> </ul> |
| <p>(iii) Methods of assessment of students cognitive skills:</p> <ul style="list-style-type: none"> <li>- Recording of submission of projects and the grades</li> </ul>   |
| <b>c. Interpersonal Skills and Responsibility</b>   |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> <li>- Students learn to manage their time in self study and writing of their research projects.</li> </ul>   |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> <li>- Teaching will be conducted through supervision of student's research project.</li> </ul>  |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> <li>- Methods include topics selected, oral presentation, and writing of research projects.</li> </ul>  |
| <b>d. Communication, Information Technology and Numerical Skills</b>  |
| <p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> <li>- Use of computer to producing reports and assignments.</li> <li>- ability to write research projects and presenting talks by PowerPoint technique.</li> </ul>  |

|  |
|--|
| (i) Teaching strategies to be used to develop these skills<br>- Writing research project in geology.<br>- Discussion of oral presentations of the student.               |
| (iii) Methods of assessment of students numerical and communication skills<br>- Evaluation of written research project<br>- Through students score in oral presentation. |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br>Not applicable.   |
| (ii) Teaching strategies to be used to develop these skills<br><br><div style="text-align: center;">-----</div>  |
| (iii) Methods of assessment of students psychomotor skills<br><br><div style="text-align: center;">-----</div>   |

| 5. Schedule of Assessment Tasks for Students During the Semester |   |          |                                      |
|--|---|----------|--------------------------------------|
| Assess<br>ment   | Assessment task (eg. essay, test, group project, examination<br>etc.) | Week due | Proportion<br>of Final<br>Assessment |
| 1  |   |          |                                      |
| 2  |   |          |                                      |
| 3  |   |          |                                      |
| 4  |   |          |                                      |
| 5  |   |          |                                      |



## D. Student Support

- |   |
|---|
| 1. Arrangements for availability of faculty for individual student consultations and academic advice.<br>(include amount of time faculty are available each week)<br>- Each faculty is required to be available in his office to devote at least 3 hours a week for students' consultation and academic advice. |
|---|

## E Learning Resources

|   |
|---|
| 1. Required Text(s) :   |
| 2. Essential References:  |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)<br>-----   |
| 4-.Electronic Materials, Web Sites etc<br>- Search through Google for related Topics  |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations<br>- The instructor will provide some relevant materials and learning aids. |

## F. Facilities Required

|   |
|---|
| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)  |
| 1. Accommodation (Lecture rooms, laboratories, etc.)<br><br>- Lecture room equipped with a blackboard, overhead projector , and internet connection.<br>- The lab . have a blackboard, overhead projector and seating arrangement for the students. |
| 2. Computing resources<br>- An easily accessible computer lab.  |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)<br>-----  |

## G Course Evaluation and Improvement Processes

|  |
|--|
| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching |
|--|

|   |
|---|
| <ul style="list-style-type: none"> <li>- Student course evaluation at the conclusion of the course</li> </ul>   |
| <p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none"> <li>- Faculty assessment of the course and effectiveness of teaching delivery.</li> <li>- Periodic self- assessment of the program.</li> </ul>   |
| <p>15 Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> <li>-Undergraduate Committee will review deficiencies based on the student evaluation, faculty input, course file, and program assessment.</li> <li>-Feedback from employers and and graduating students' input are used to identify any deficiencies in students' ability in applying mineral optics knowledge.</li> <li>-Organize workshop on effective teaching methods to enable instructors to improve their teaching skill.</li> <li>-Teaching method will focus on students' learning and on course learning outcomes</li> </ul>  |
| <p>16 Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)</p> <ul style="list-style-type: none"> <li>-Undergraduate Committee will review samples of student work in this course to check on the standard of grades and achievements</li> <li>- A faculty member from a reputable university will evaluate the course material and the students' work to compare the standard of grades and achievements with those at his university. This evaluator will also comment on the laboratory facilities and the adequacy of the equipment used in the lab.</li> </ul> |
| <p>17 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <p>Self- assessment at every two years and the external assessment by the invited faculty member at every four years will be carried out. The feedback received from these assessments will be used to plan for further improvement in the course syllabus, teaching method, and delivery of course materials.</p>   |