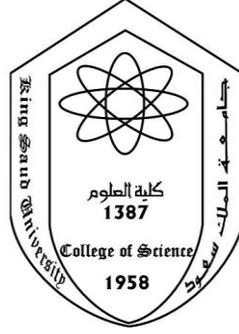


King Saud University
College of Sciences
Geology and geophysics
Department



جامعة الملك سعود
كلية العلوم
الجيولوجيا والجيوفيزياء قسم

Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation &
Assessment**

COURSE SPECIFICATION

Of

Volcanology

421 Geo

Assistant Professor / Dr. Bassam Abdulmutti Abu Amarah

1431- 1432 (2010/2011)

Institution: <i>King Saud University</i>
College/Department : <i>College of Science / Geology and Geophysics Department</i>

A) Course Identification and General Information

1. Course title and code:	<i>Volcanology (Geo 421)</i>
2. Credit hours :	<i>3(2+0+1)</i>
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs):	<i>Bachelor Degree of Science (B .Sc.) in GeologyProgram</i>
4. Name of faculty member responsible for the course:	<i>Assistant Professor / Dr. Bassam Abdulmuti A. Abu Amarah</i>
5. Level/year at which this course is offered :	<i>Level eight / fourth year</i>
6. Pre-requisites for this course (if any) :	<i>Igneous Petrology (Geo 321)</i>
7. Co-requisites for this course (if any) :	<i>Field Geology</i>
8. Location if not on main campus :	<i>King Saud University Campus in Ad-Dariyah</i>

B Objectives:

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

- a. Should learn and gain the understanding how to identify the volcanic products and their formation processes.*
- b. Will be expose to the volcanoes characteristics (Size, shape, magma type and eruptive style), and their different types of volcanoes activities (Shield volcanoes, composite (or strato-) volcanoes, cinder cones, domes, and flood lavas.*
- c. Will gain the petro graphic knowledge of the different types of volcanic Rocks(mineral composition, and textures; depending upon the both chemical composition of magma and its physical conditions) of solidification of magma.*
- d. Will be able to identify volcanic rocks in hand specimen and thin section.*
- e. Will gain an understanding of the earth structure (magma formation, magma compositions, heat generation, the concept of plate tectonics, the relationships between plate tectonics setting and classifying the different types of volcanoes and its volcanic activities) and its relationships with the formation of volcanoes.*
- f. Will increase the student's knowledge in the fields of volcanoes risks, benefits of living in potential and active volcanoes districts.*
- g. Will apply and locating the volcanoes produced, and shaped in the Arabian Shield and its history.*

Therefore, We expect from our students with a major in Geology to demonstrate that they have the ability to analyse and interpret scientific data, identify and interpret the origin of volcanic rocks, and its minerals contents in both hand specimen and thin section, to be used and to be interpreted in the field , so as to understand to read, to locate, in terms of drawing the geologic and tectonic history of any region, as well as, to construct a geological map based on its field studies.

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 and computer based programs have been utilized to support the lecture course material.*
- The course material was posted on the internet that could be accessed by the students enrolled in the course only.*
- Computer concept animation to teach earth processes, Plate Tectonics, volcanoes eruption, and volcanoes types.*

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
• <i>Introduction to volcanology: Basic concept and reviewing the definitions applied in Volcanology</i>	1	2
• <i>Volcanoes linkage with Plate Tectonic and magma (structure of the earth).</i>	1	2
• <i>magma and Volcanoes heat generation</i>	1	2
• <i>Type of magma and its origin.</i>	1	2
• <i>Dynamic of volcanoes. Type of volcanoes , and type of eruptions</i>	1	2
• <i>Spreading center volcanism, subduction zone volcanism, and intera plate volcanism.</i>	1	2
• <i>Volcano's products and its classifications.</i>	1	2
• <i>The internal structure and mechanism of volcanoes</i>	1	2
• <i>Physo-chemical factors influencing its volcanic eruptions.</i>	1	2
• <i>Volcanic and earthquake activities in Saudi Arabia.</i>	1	2
• <i>Volcanoes and environment</i>	1	2
• <i>Volcanoes risk and benefits.</i>	1	2
• <i>Volcanoes in solar system.</i>	1	2
• <i>Volcanoes records in Saudi Arabia.</i>	1	2
• <i>Historical volcanic activities</i>	1	2

2 Course components (total contact hours per semester):			
Lecture: 30	Tutorial: 15	Practical/Fieldwork: 15	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)
• <i>2-3 hours weekly for the homework and reports assignments.</i>

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. Exam is an assessment, often administered on paper or on the computer, is/ are intended to measure student knowledge, skills, aptitudes, or classification in many other topics , Students are often allowed to bring reference books especially in the teaching fields of plate tectonics. The measurement that is the goal of testing is evidence contained in an student responses to the items of a test that are related to the construct or constructs being measured.*

a. Knowledge

- (i) Description of the knowledge to be acquired:

On completion of this module students will be able to

Generic Outcomes

- *Use a range of observational, technical, deductive and analytical skills to solve problems in volcanology,*
- *Work effectively in groups and as individuals in demanding conditions.*

Subject Specific Outcomes

- *Systematically identify volcanic rocks in the field.*
- *Use observations and knowledge of field relationships to reconstruct the conditions during the formation of volcanic rocks.*
- *Gain a deep understanding of the effusive, explosive and intrusive processes that take place during volcanic eruptions.*
- *Recognise the role of regional tectonics, gravitational deformation of the volcano and major slope instabilities on the evolution of basaltic volcanoes.*
- *Explain the problems of dealing with volcanic hazards on heavily populated active volcanoes.*

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

The college is responding to social and technological pressures to be more responsive to students' needs and more concerned about how well students are prepared to assume future societal roles.

College is already feeling

- *to formulate lecture less,*
- *to make learning environments more interactive,*
- *to integrate technology into the learning experience,*
- *and to use collaborative learning strategies when appropriate.*

Some of the more prominent strategies are outlined below.

- *For many years, the lecture method was the most widely used instructional strategy in college classrooms; the lecture still remains an important way to communicate information. The lecture can be an effective way to achieve instructional goals. The advantages of the lecture is to provide a large amount of information to many listeners or students.*
- *The following recommendations can help make the lecture approach more effective (Cashin, 1990):*
 1. *Fit the lecture to the student.*
 2. *Focusing my topic – but, bearing in mind that we cannot cover everything in one lecture*
 3. *Preparing an outlines that includes 5-9 major points, I want to cover in one lecture.*
 4. *Organizing my points for clarity*
 5. *Selecting appropriate examples or illustrations*
 6. *Presenting more than one side of an issue and be sensitive to other perspectives*
 7. *Repeating points when necessary*
 8. *I have to be aware to have students awareness, and noticing or recording their feedback*

Case Method. Providing an opportunity for students to apply what they learn in the classroom to real-life experiences has proven to be an effective way of integrating knowledge.

The case method is an instructional strategy that engages students in active discussion about issues and problems inherent in practical application. It can highlight fundamental grasping of information, or critical issues.

. The case study approach works well in cooperative learning or role playing environments to stimulate critical thinking and awareness of student.

Discussion.

Obviously, a successful class discussion involves planning on side as an academic teacher, and preparation on the part of the students. I should communicate this commitment to the students on the first day of class by clearly articulating course expectations. Students must comprehend the assigned reading and show up for class on time, ready to learn.

Active Learning.

Learning environments that allow students to talk and listen, read, write, and reflect as they approach course content through problem-solving exercises, informal small groups, simulations, case studies, role playing, and other activities. Obviously, My teaching strategies should be strongly matching my course objectives of a particular lesson.

Cooperative Learning.

Cooperative Learning is a systematic educational strategy that encourages small groups of students to work together for the achievement of a common goal. The term 'Collaborative Learning' is often used as a synonym for cooperative learning when, in fact, it is a separate strategy when it is handling a wide range of group interactions such as developing learning communities, stimulating student discussions.

Integrating Technology.

Today, Integrating technology is sustaining course curriculum when it is proving a valuable knowledge for enhancing and extending the learning experience for faculty and students, respectively. Many faculty have found electronic mail to be a useful way to support student communication between class meetings.

Distance Learning.

Distance learning or distance education as a teaching strategy, however, it is an important topic of discussion on college campuses today. Obviously, the distance learning technologies take many forms such as computer simulations, interactive collaboration/discussion, and the creation of virtual learning environments connecting regions or nations. Components of distance learning such as email, and interactive software have also been useful additions to the educational setting.

<p>(iii) Methods of assessment of knowledge acquired</p> <ul style="list-style-type: none"> • <i>In class short quizzes</i> • <i>Major and final exams</i> • <i>Evaluation of laboratory reports</i>
<p>b. Cognitive Skills</p>
<p>(i) Cognitive skills to be developed</p> <ul style="list-style-type: none"> • <i>Students will be able to understand the use and application of Volcanic geology.</i> • <i>Students will be able to apply the knowledge have been achieved concerning volcanic geology in field.</i> • <i>Students will be able to identify, to interpret the shape and the way that volcanoes developed.</i> • <i>Students will be able to identify the hazard and benefits of volcanoes .</i>
<p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> • <i>Homework assignments</i> • <i>Problem solving in the tutorial / recitation sessions</i> • <i>Case studies related to the course topics and relevant field geology</i>
<p>(iii) Methods of assessment of students cognitive skills</p> <ul style="list-style-type: none"> • <i>In class short quizzes</i> • <i>Major and final exams</i> • <i>Checking the problems solved in the homework assignments</i>
<p>c. Interpersonal Skills and Responsibility</p>
<p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> • <i>Work independently,as well as affiliate of the team.</i> • <i>Manage resources, time and other members of the group</i> • <i>Communicate results of work to others</i>
<p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ul style="list-style-type: none"> • Lectures are followed by numerous examples, some of which are practical in nature, to illustrate the application and use. • Practical work is planned around a number of historical geology problems.. • Engage students in classroom and in practical session discussion with questions and answers.

<p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> • <i>Laboratory exams</i> • <i>Assessment of the laboratory reports</i> • <i>Grading homework assignments</i>
<p>d. Communication, Information Technology and Numerical Skills</p>
<p>(i) Description of the skills to be developed in this domain.</p> <ul style="list-style-type: none"> • <i>Use the computer for analysing and processing the data</i> • <i>Use computational tools</i> • <i>Report writing</i>
<p>(ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> • <i>Writing laboratory reports</i> • <i>Incorporating the use and utilization of computer in the course requirements</i>
<p>(iii) Methods of assessment of students numerical and communication skills</p> <ul style="list-style-type: none"> • <i>Evaluating the laboratory written reports</i>
<p>e. Psychomotor Skills (if applicable)</p>
<p>(i) Description of the psychomotor skills to be developed and the level of performance required</p> <p style="text-align: center;"><i>Not applicable</i></p>
<p>(ii) Teaching strategies to be used to develop these skills</p> <p style="text-align: center;"><i>Not applicable</i></p>
<p>(iii) Methods of assessment of students psychomotor skills</p> <p style="text-align: center;"><i>Not applicable</i></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	7	10%
3	Lab and field works		30%
4	Final examination		50%
5			

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

1. Required Text(s)

- *Maccdonald. (1972). Volcanoes, Prentice-Hall, Englewood Cliffs, Newjersey. L. Magloff, (2003) , Volcano, DK Publishing Inc. New york.*
- *S. Mc Collum,.. (2007). Volcanic Eruption, earth quakes, and Tusnamis. Chelsea House, Newyork.*

2. Essential References

- *T. Kusky, (2008), Volcanic eruption and their volcanic hazards, Facts On File. Inc., Newyork.*
- *J. Marti and G. Ernst, (2005), Volcanoes and environment, Cambridge University Press, New York.*
- *C. Firth, W. McGuire, (1999), Volcanoes in the Quaternary, The geological Society Publishing House, UK.*
- *J. McPhie, M. Doyle, and A. Allen, (1993), Volcanic Texture" a guide to interpretation of texture in volcanic rock" Tasmanian Government Printing Office.*

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)
<ul style="list-style-type: none"> • <i>Maccdonald. (1972). Volcanoes, Prentice-Hall, Englewood Cliffs, New jersey.</i> • <i>T. Kusky, (2008), Volcanic eruption and their volcanic hazards, Facts On File. Inc., Newyork.</i>
4-.Electronic Materials, Web Sites etc
<ul style="list-style-type: none"> • <i>Websites on the internet that are relevant to the topics of the course.</i>
5- Other learning material such as computer-based programs/CD, professional standards/regulations
<ul style="list-style-type: none"> • <i>Multi media associated with the text book and the relevant websites.</i>

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"> • <i>Lecture room with at least 25 seats.</i> • <i>Auditorium of a capacity of not less than 100 seats for large lecture format classes.</i> • <i>Geology laboratory with at least 30 places.</i>
2. Computing resources
<ul style="list-style-type: none"> • <i>Computer room containing at least 15 systems.</i>
3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)
<ul style="list-style-type: none"> • <i>Availability of chemicals, glassware and equipment relevant to the course material.</i> • <i>Safety facilities</i>

G Course Evaluation and Improvement Processes.

<p>1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching:</p> <ul style="list-style-type: none">• <i>Course evaluation by student.</i>• <i>Students- faculty meetings.</i>
<p>2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department</p> <ul style="list-style-type: none">• <i>Peer consultation on teaching.</i>• <i>Departmental council discussions.</i>• <i>Discussions within the group of faculty teaching the course.</i>
<p>3 Processes for Improvement of Teaching</p> <ul style="list-style-type: none">• <i>Conducting workshops given by experts on the teaching and learning Methodologies.</i>• <i>Periodical departmental revisions of its methods of teaching.</i>• <i>Monitoring of teaching activates by senior faculty members.</i>
<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">• <i>Providing samples of all kind of assessment in the departmental course portfolio of each course.</i>• <i>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.</i>• <i>Conducting standard exams such as the other international universities exams.</i>
<p>5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.</p> <ul style="list-style-type: none">• <i>The course material and learning outcomes are periodically reviewed and the changes to be taken are approved in the departmental and higher councils.</i>• <i>The head of department and faculty take the responsibility of implementing the proposed changes.</i>