|  |  |
| --- | --- |
| **Course Title:**  | Arabian Shield Geology |
| **Course Code:** | **Geo386** |
| **Program:** | **Geology** |
| **Department:**  | **Geology and Geophysical** |
| **College:** | **Of Sciences** |
| **Institution:** | **King Saud University** |

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# A. Course Identification

|  |  |
| --- | --- |
| **1. Credit hours:**  | **2(1+0+1)** |
| **2. Course type** |
| **a.** | University |  | College |  | Department | **X** | Others |  |  |
| **b.** | Required | **X** | Elective |  |  |
| **3. Level/year at which this course is offered:** | **6 / 1439 - 1440** |
| **4. Pre-requisites for this course** (if any)**: Igneous and Metamorphic Petrology (Geo 323)** |
| **5. Co-requisites for this course** (if any)**:** |
|  |

## 6. Mode of Instruction (mark all that apply)

| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage**  |
| --- | --- | --- | --- |
| **1** | **Traditional classroom** | 14 | 50% |
| **2** | **Blended**  | 5 | 15 |
| **3** | **E-learning** | 6 | 20 |
| **4** | **Correspondence** | 0 | 0 |
| **5** | **Other**  | 5 | 15 |

**7. Actual Learning Hours** (based on academic semester)

|  |  |  |
| --- | --- | --- |
| **No** | **Activity** | **Learning Hours** |
| **Contact Hours** |
| **1** | **Lecture** | 15 |
| **2** | **Laboratory/Studio** | 15 |
| **3** | **Tutorial**  | 3 |
| **4** | **Others** (specify)  | 3 |
|  | **Total** | 36 |
| **Other Learning Hours\*** |
| **1** | **Study**  | 2 |
| **2** | **Assignments** | 4 |
| **3** | **Library** | 2 |
| **4** | **Projects/Research Essays/Theses (Small Project)** | 2 |
| **5** | **Others** (specify) small project+ presentation | 2 |
|  | **Total** | 12 |

**\*** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description * Geologic feature related to the plate tectonics activities, Supercontinent assemblage and break- up in relation to Arabian Shield geology- Evolution and Origin of the Arabian Shield – stratigraphicrocks groups schemes – igneous and tectonic activity – defining Arc (island, volcanic arcs, fore and back arcs) and microcontinents - allochthonous and autochthonous rocks , AS terranes and its ophiolites and sutures – correlation with the Nubian Shield – the Pan-African episode – Archean terranes in the Arabian Shield – ore deposits in the Arabian Shield
 |
|  |
| 2. Course Main Objective |
| * + *The course will give ability to understand the geology and tectonic events of the shield.*
	+ *The course will provide the knowledge to discriminate between the different rock types along with their field's features and petrophically.*
	+ *The course will give the abilities to identify the geological setting of igneous/ metamorphic rocks terrains and analyzing their tectonic terranes.*
	+ *The course will help to establish 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 Granitoid, metamorphic and volcanic rocks, as well as will give ability demonstrate volcanoes and its volcanic activities) and its relationships with the formation of different diversities of rocks.*
	+ *The course will help to locate volcanoes formed in the Arabian Shield and its history.*
	+ *Will be acquainted with the red sea evolution along with its Harrat formation processes, as well as will be able to cover the Arabian Shield evolution and Tectonstratigraphic different terrane’s history.*
 |

## 3. Course Learning Outcomes

| **CLOs** | **Aligned****PLOs** |
| --- | --- |
| 1 | **Knowledge:** |  |
| 1.1 | **Defining, describing, record, outlines, and recall the basic concept of different rock’s types related to plate tectonic boundaries definition, geological setting of various rocks evolved vai or related to the Arabian shield microplate tectonics as principal terranes.** | I |
| 1.2 | **Listing, Rccall recognizing the Evolution of the supercontinent, Arabian-Nubian Shield, and AS geological features such as VIA, VA, Volcanoes, earthquakes, magmatism, pre-syn-post tectonic rocks characteristics related to majot plate Tectonics and its features evolution and creation processes.** | I |
| 1.3 | **Stating, writing, recall, and memorized the principal of geological features, microplate tectonics processes and evolution, structures, forming and development of various rocks types setted in the terranes (overriding plate) geology within each terranes initiated within the AS.** | I & P |
| 1... |  |  |
| **2** | **Skills :** |  |
| 2.1 | **Discussing how to present the evolution and processing of the volcanic island arc and volcanic arc plutonism and volcanism informing AS rocks related to its petrogenesis.** | P |
| 2.2 | **Explain and interpreting ,subdividing and to learn how to pre-setted and to collect data to differentiate, to compare among different magma and rocks types related to Geological, structural, and geochronology of ANS or AS’s tectonostratigraphic terranes and its sutures zones, along with evolution the AS’s microplate tectonics**  | P |
| 2.3 | **Presenting, comparing, prepare, Evaluating and justify data concerning the tectonic processes initiating the AS pre-syn- and post orogenic rocks the geology of the AS areas otits principal terranes and subterranes , and its magmatism.** | P |
| 2.3 |  | P |
| **3** | **Competence:** | P |
| 3.1 | **Students’ will be independently able to demonstrate, modify, analyze, show part of the lectures, and present their projects as assignments by students shearing discussion (Skills).** | P |
| 3.2 | **Students will modify, demonstrate and illustrate independently and as part of a project’s team (Team Works).** | P |
| 3.3 | **Students’ will be able to reading, assess, question, interpret results and data related to courses’ topics** | P |
| 3... |  |  |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | ***Introduction to plate tectonicsand supercontinents***  | 3 |
| 2 | ***Origin, development and the evolution of the Arabian Shield*** | **1** |
| 3 | ***Arabian Shield rock types, and Tectonic Activities.*** | 2 |
| 4 | ***Plutonic Rocks, and Najd Fault System*** | **2** |
| 5 | ***Island Arc and micro-continents.*** | **2** |
| 6 | ***Allochthonous and Archean Terranes.*** | **1** |
| 7 | ***Ophiolites and suture zones*** | **1** |
| 8 | ***Correlation between the Arabian Shield with the Nubian Shield.*** | **1** |
| 9 | ***The evolution of the Red sea.*** | **1** |
| 10 | The Distribution of Igneous, metamorphic and sedimentary rocks in the field | **1** |
| **Total** | 15 |

# D. Teaching and Assessment

## 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| **Code** | **Course Learning Outcomes** | **Teaching Strategies** | **Assessment Methods** |
| --- | --- | --- | --- |
| **1.0** | **Knowledge** |
| 1.1 | **Defining, describing, record, outlines, and recall the basic concept of different rock’s types related to plate tectonic boundaries definition, geological setting of various rocks evolved vai or related to the Arabian shield microplate tectonics as principal terranes.** | * **Interactive learning , and communicating its knowledge via lectures, reading topics, presentation, Practical, and field trips within the class sessions and Labs.**
* **Active learning by allowing students to talk, to listen, to read, to write, to lecture discussion by applying problem solving exercise, informal small groups.**
 | **Quizzes, Montrhly Exams, class involvements,, presentation, Assignments, Essays, homework, and final exams.** |
| 1.2 | **Listing, Rccall recognizing the Evolution of the supercontinent, Arabian-Nubian Shield, and AS geological features such as VIA, VA, Volcanoes, earthquakes, magmatism, pre-syn-post tectonic rocks characteristics related to majot plate Tectonics and its features evolution and creation processes.** | * **Active learning by allowing students to talk, to listen, to read, to write, to lecture discussion by applying problem solving exercise.**
 | * **Observing the students’ achievement on the course materials Presenttation, and Topic discussion.**

**Using the exams, homework assignments, presentation small projects, quizzes and Lab’s reports tools are used to assess the required knowledge objectives on the course’s subject.** |
| 1.3 | **Stating, writing, recall, and memorized the principal of geological features, microplate tectonics processes and evolution, structures, forming and development of various rocks types setted in the terranes (overriding plate) geology within each terranes initiated within the AS.** | * ***Cooperative Learning is a systematic educational strategy that encourages small students groups discussion to work together for the achievement of a common goal.***
* ***Integrating technology is sustaining course curriculum by proving a valuable knowledge for enhancing and extending the learning experience via mail to be a useful way to support student***

**Laboratory efforts and works.** |
| **2.0** | **Skills** |
| 2.1 | **Discussing how to present the evolution and processing of the volcanic island arc and volcanic arc plutonism and volcanism informing AS rocks related to its petrogenesis.** | * **Lectures and homework assignments were followed by a several illustrations;**
* **Student’s enhancing skill in monitoring and demonstrating knowledge of the course in their life..**
* **Participating students’ in class and laboratory discussions via questioning and answering different courses’ topics.**

visualization, association, reminders, using clues in reading comprehension, let students working in groups, they can compare and discuss their ideas, as they go  | * **Preliminary qualifying examination.**
* **Pertain to the student’s research emphasis.**
* **Oral and presenting presentation of research for qualifying gathering time within the semester.**
* **Through lectures, class exercise, homework assignments, library’s research, writing an assignments and carrying small projects.**
* **Through implementing group work techniques.**
* **Practical work**
 |
| 2.2 | **Explain and interpreting ,subdividing and to learn how to pre-setted and to collect data to differentiate, to compare among different magma and rocks types related to Geological, structural, and geochronology of ANS or AS’s tectonostratigraphic terranes and its sutures zones, along with evolution the AS’s microplate tectonics**  |  |  |
| 2,3 | **Presenting, comparing, prepare, Evaluating and justify data concerning the tectonic processes initiating the AS pre-syn- and post orogenic rocks the geology of the AS areas otits principal terranes and subterranes , and its magmatism.** |  |  |
| **3.0** | **Competence** |
| 3.1 | **Students’ will be independently able to demonstrate, modify, analyze, show part of the lectures, and present their projects as assignments by students shearing discussion (Skills).** | * **By writing a group reports (Case [presentation).**
* **Communicate results of work to others.**

**Practical work is planned around a number of historical geology problems.** |  **By Discussion and evaluating the course studying topics, homeworks, labss’ reports and projects assignments, in addition, by running oral and med. exams, and quizzes.** |
| 3.2 |  |  |  |
| … |  |  |  |

## 2. Assessment Tasks for Students

| **#** | **Assessment task\***  | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| **1** | **Attendance, Homeworks (Questions, research on topics or a literature reviews ), and assignments** | ***5 -9- 12*** | ***5%*** |
| **2** | **First Assessment Exam** | **6** | **10%** |
| **3** | **Presentation of Projects**  | **8** | **5%** |
| **4** | **Lab and Quizes**  | **4 – 8 - 12** | **30%** |
| **5** | **Second Assessment Exam** | **13** | **10%** |
| **6** | **Final Exam**  | **15** | **40%** |
| **7** | **Total** |  | 100 |
| **8** |  |  |  |

**\*Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

# E. Student Academic Counseling and Support

|  |
| --- |
| **Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :** |
| * ***The faculty member by role and college regulation has to allocate a six consultation office hours per week.***
* ***These consultation office hours should be scheduled, timed and to be put or hanged on front of the faculty member’s office door for seeking the students’ attention.***
 |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** | * **Johnson, p., and Katan, F.. 92017). The Saudi Arabia Arabian Shield,**
* **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.**
* **Grainger, D. J, 2007, The geologic evolution of Saudi Arabia: a voyage through space and time, Jeddah: Saudi Geological Survey.**
 |
| **Essential References Materials** | * **Masaru Yoshida, Brian F. Windley, Somnath Dasgupta, 2002, Proterozoic East Gondwana: supercontinent assembly and breakup.**
* **Maps and reports of various parts of the Arabian shield prepared by the SGS.**
* **أحمد الشنطي، 1993. جيولوجية الدرع العربين ، مركز النشر العلمي ، جامعة الملك عبد العزيز ، جدة.**
 |
| **Electronic Materials** | <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/petrology> |
| **Other Learning Materials** | Internet websites |

## 2. Facilities Required

| **Item** | **Resources** |
| --- | --- |
| **Accommodation**(Classrooms, laboratories, demonstration rooms/labs, etc.) | * **Class room equipped with smart boards connected with networks, overhead projector.**
* **The Lab equipped with blackboard, data show projectors aligned with computer.**
* **The Lab facilitated with scientific materials such as hand specimen of rocks, rock-forming minerals, optical microscope, ……etc.**
 |
| **Technology Resources** (AV, data show, Smart Board, software, etc.) | * ***Computer Lab should be equipped with at least 15 hardware, assisted with suitable software, one data show, and one smart board. at least 15 systems.***
 |
| **Other Resources** (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | * ***Availability of chemicals, glassware and equipment relevant to the course material.***
* ***Safety facilitie.***
 |

# G. Course Quality Evaluation

| **Evaluation****Areas/Issues**  | **Evaluators**  | **Evaluation Methods** |
| --- | --- | --- |
| * + ***Conducting workshops given by experts on the teaching and learning***

***Methodologies.*** | * **Running Course evaluation by students via a designed professional questionnaire.**
 | **Exams, Quizzes, presentations, etc. are generally direct methods . meanwhile surveys and interviews assessment used as indirect methods.** |
| * + ***Periodical departmental revisions of its methods of teaching.***
 | * + **Students-faculty get-together for meeting and course discussion**
 |  |
| * + ***Monitoring of teaching activates by senior faculty members.***
 |  | Peer to peer review evaluation, and By reviewing and to be signed by department’s head.  |
| * + **Committees of quality system will review all deficiencies based on the students evaluation, faculty input, course files, and program assessments.**
 |  |  |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

# H. Specification Approval Data

|  |  |
| --- | --- |
| **Council / Committee** |  |
| **Reference No.** |  |
| **Date** |  |