هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Metamorphic Petrology**	
Course Code:	**Geo 326**	
Program:	**Geology**	
Department:	**Geology and Geophysics**	
College:	**Science**	
Institution:	**King Saud University**	

Table of Contents

A. Course Identification

1. Credit hours: **3(2+1)**
2. Course type **a.** University [ ] College [ ] Department [√] Others [ ] **b.** Required [√] Elective [ ]
3. Level/year at which this course is offered: 6th Level
4. Pre-requisites for this course (if any)**: Geo 324**
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**	**60**	**100%**
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**30**
2	**Laboratory/Studio**	**30**
3	**Tutorial**	
4	**Others** (specify)	
	Total	**60**

B. Course Objectives and Learning Outcomes

1. Course Description

Genesis of metamorphic rocks as determined from field, petrographic and geochemical data.

2. Course Main Objective

Apply fundamental principles of metamorphic petrology. Describe metamorphic rocks, their mineral assemblages and textures. Interpret metamorphic processes from evidence obtained in hand sample, thin section, and analytical data (mineral composition). Interpret tectonic setting of metamorphic belt, and Critically evaluate the literature regarding metamorphic principles, observations, to gain a better understanding of the earth system.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define basic concepts related to metamorphism	Acquire knowledge about petrology
1.2	Recall, describe, analyze, prepare, and revise the concept and understanding the metamorphism agents, and grades in forming different type's of metamorphism rocks type via different stages and processes.	
1.3		
1...		
2	**Skills :**	
2.1	List, define and state the meta behavior via different phase diagrams as AFM, ACF, AKF Metamorphic rocks classifications and their field relations, Tectonic movement, , thermodynamics of the rocks.	Acquire skills about geochemistry and petrology techniques
2.2		
2.3		
2...		
3	**Values:**	
3.1	Develop the student's analysis and criticize skills, and course material software.	Acquire internet facility as means of communication and a source of information. Use of field and lab instruments as well as software in mineral exploration.
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to metamorphism: its processes and categories	2
2	Review of the mineralogy of metamorphic rocks	2
3	Classification schemes and metamorphic textures	2
4	Radiometric dating of metamorphic rocks	2
5	The phase rule and composition-assemblage diagrams	2
6	Metamorphic facies	2
7	Micro-analytical techniques and recalculation of mineral analysis	2
8	Thermobarometry and P-T-t paths	2

9	Contact metamorphism	2
10	Dynamic metamorphism	2
11	Metamorphism in subduction zones	2
12	Ocean-floor metamorphism	2
13	Metamorphism in collision zones	2
14	Metamorphic and tectonic evolution of the Arabian Shield	2
15	Meteorite impacts and shock metamorphism	2
Total		**30**

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 and Understanding**		
1.1	Define basic concepts related to metamorphism	In-class lecturing Homework assignments Open discussion in class	Short quizzes Midterm tests Final exams
1.2	Recall, describe, analyze, prepare, and revise the concept and understanding the metamorphism agents, and grades in forming different type's of metamorphism rocks type via different stages and processes.		
…			
2.0	**Skills**		
2.1	List, define and state the meta behavior via different phase diagrams as AFM, ACF, AKF Metamorphic rocks classifications and their field relations, Tectonic movement, , thermodynamics of the rocks.	Brain storming In class-lecturing Homework assignments Open discussion in class	Final exams Midterm tests
2.2			
…			
3.0	**Values**		
3.1	Develop the student's analysis and criticize skills, and course material software.	Brain storming In class-lecturing Open discussion in class	Final exams Midterm tests
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments (class quizzes, scientific reports, field trip)	weekly	10%
2	First mid-term exam	6th	10%
3	Second mid-term exam	11th	10%
4	Practical exam	12th	30%
5	Final exam	16th	40%
6			
7			
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 :

Office hours allocated for students of this course are on average 3 hours per week for consultation and academic advice, with more time available in the period just before the final exams.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Yardley, B., Warren, C., 2021. An introduction to metamorphic petrology. Cambridge.
Essential References Materials	Ronald, B. F., Carol , D. F. (2014). Essential of Igneous and Metamorphic Petrology, Cambridge, University Press. Ranold F. B., Calvin G. B., William J. C., Ritchard J. A., David J. E. and Carol D. F. (2001). A Geochemical Classification for Granite Rocks, Journal of Petrology, Vol. 12, No. 11 PP 2033 – 2048.
Electronic Materials	The Association of Applied Geochemists
Other Learning Materials	Instructor will provide adequate learning resources based on his experience.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, 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.
Technology Resources (AV, data show, Smart Board, software, etc.)	Classroom with PC connected to Data show and Smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Software related to mining subjects should be provided.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student course evaluation	Students	Direct
Peer-to-peer review	Faculty member	Direct
Periodic self- assessment of the program	Program coordinator	Direct
Faculty assessment of the course and effectiveness of teaching delivery	Instructor	Direct

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	**Department of Geology and Geophysics**	
Reference No.		
Date	**Jan. 12st 2021**	