

Template syllabus of the revised course

Course Name - Physical Geology (QCB 1013)

Number of credits – 4 ECTS

Period: Fall/spring semester

Coordinator	Mohamad Shaufi Sokiman
Credits	3 credit (4 ECTS)
Lecturers	Mohamad Shaufi Sokiman
Level	Undergraduate
Host institution	University Technology of PETRONAS (UTP)
Course duration	12 weeks
New/revised	Revised

Summary

This course draws from all fields of geosciences to explore the evolution of Planet Earth. Topics include: an introduction to earth materials (minerals, rocks, soils, and water); Earth's interior structure; geological processes in operation on and beneath the surface of the earth and their effects (weathering, erosion, deformation and geologic structures, earthquakes, plate tectonics, ocean basins, running water, ground water, glaciers, winds and deserts, coasts, and shorelines); techniques of dating geological events.

Target student audiences

Undergraduate students taking Bachelor of Science (Hons) in Petroleum Geoscience degree.

Prerequisites

This subject does not have any pre-requisite as it is the first subject taken by undergraduate students during their first year first semester.

Aims and objectives.

The main course objective is to expose the undergraduate students on the basic concept of geological process and to equip them with fundamental knowledge about geology in coherent with their understanding level.

General learning outcomes:

By the end of the course, successful students will:

1. Define the formation of the earth, its place in the solar system and its interior structure.
2. Describe the main types of rocks, minerals, and fossils and how they are formed.
3. Explain the basic concepts involved in formation of geological materials.
4. Distinguish relative and absolute dating of geological time.

Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning and, where possible, avoid standing lectures and presentations.



Learning methods

- Video presentations
- Written articles/essay
- Online teaching

Course outline

Week 1 - Introduction / Overview

Week 2 - The Earth & Universe. The universe and Planet Earth; Earth history and geological time; Earth composition and Earth structure

Week 3 - Plate Tectonics. Theory of Plate Tectonic; Convergent, Divergent & Transform Plate Boundaries; Earthquake & Volcanism association

Week 4 - Geomorphology. Landform features. Formation of marine, coastal and delta environment formations and its significant to human life.

Week 5 - Rock cycle - Mineral; Igneous; Sedimentary; Metamorphic Rocks.

Week 6 - Hydrologic cycle. Surface run-off; Groundwater; Aquifers.

Week 7 - Structural geology. Tectonic and deformation; Folding; Faulting.

Week 8 - Time and geology. Fossil; Relative dating; Absolute age

Week 9 - Geohazards. Landslide; Sinkholes; Rockfalls; Earthquakes and tsunamis; Volcanism; Global warming. Potential geohazards that will affect the marine, coastal and delta environment.

Week 10 - Earth energy and resources. Hydrocarbon; Oil shale and coal; Radioactive; Metals and ores; Non-metallic industrial minerals; Renewable energy.

Literature

Compulsory

1. Charles C. Plummer, Diane H. Carlsen, Lisa Hammersley (2013). Physical Geology (14th Edition), Mc Graw Hill, New York, USA.
2. Edward J. Tarbuck, Frederick K. Lutgens (2011), Earth, An Introduction to Physical Geology (10th Edition), Pearson Prentice Hall, USA.
3. Cernicoff, S. and Whitney, D. (2007): Geology (an Introduction to physical geology), Pearson Int. Ed
4. Frederick K. Lutgens, Edward J. Tarbuck, and Dennis Tasa (2007). The Earth: Introduction to Physical Geology (9th Edition), Prentice Hall

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (50 hours)			
Guided Learning and Moderated in-class discussions	1. Describe the earth system and the solar system.	Class participation and preparedness for discussions	4
Guided Learning and Moderated in-class discussions	2. Explain the plate tectonics theory and its significant effect to the earth geomorphology.	Class participation and preparedness for discussions	6
Guided Learning and Moderated in-class discussions	3. Describe various morphological features, occurrence processes, and their individual properties.	Class participation and preparedness for discussions	6
Guided Learning and Moderated in-class discussions	4. Describe the basic properties of 3 dominant type of lithology that can be found on earth surfaces which includes igneous, metamorphic, and sedimentary rocks.	Class participation and preparedness for discussions	6
Guided Learning and Moderated in-class discussions	5. Explain the principle and mechanism for surface and subsurface water run-off.	Class participation and preparedness for discussions	4
Guided Learning and Moderated in-class discussions	6. Describe the various geological structure and the process creating it.	Class participation and preparedness for discussions	6
Guided Learning and Moderated in-class discussions	7. Explain the geological time scale and the significant event related to geology.	Class participation and preparedness for discussions	6
Guided Learning and Moderated in-class discussions	8. Describe the geohazards potential in correlation with various geomorphological features.	Class participation and preparedness for discussions	6
Guided Learning and Moderated in-class discussions	9. Describe the economic resources from the geological resources.	Class participation and preparedness for discussions	6
Independent work (70 hours)			
Self-Learning (Independent Learning)	1. Describe the earth system and the solar system.	Quizzes, tests, and extended assignment	6
Self-Learning (Independent Learning)	2. Explain the plate tectonics theory and its significant effect to the earth geomorphology.	Quizzes, tests, and extended assignment	8
Self-Learning (Independent Learning)	3. Describe various morphological features, occurrence processes, and their individual properties.	Quizzes, tests, and extended assignment	8
Self-Learning (Independent Learning)	4. Describe the basic properties of 3 dominant type of lithology that can be found on earth surfaces which includes igneous, metamorphic, and sedimentary rocks.	Quizzes, tests, assignment, and extended assignment	8



Self-Learning (Independent Learning)	5. Explain the principle and mechanism for surface and subsurface water run-off.	Quizzes, tests, and extended assignment	8
Self-Learning (Independent Learning)	6. Describe the various geological structure and the process creating it.	Quizzes, tests, and extended assignment	8
Self-Learning (Independent Learning)	7. Explain the geological time scale and the significant event related to geology.	Quizzes, tests, and extended assignment	8
Self-Learning (Independent Learning)	8. Describe the geohazards potential in correlation with various geomorphological features.	Quizzes, tests, assignment, and extended assignment	8
Self-Learning (Independent Learning)	9. Describe the economic resources from the geological resources.	Quizzes, tests, assignment, and extended assignment	8
Total			120

Grading

The students' performance will be based on the following:

Assessment

- Progress assessment (60%):
 - Quiz (20%): students must complete the quiz related to the topics teach.
 - Test (15%): students must complete the test related to the topics teach.
 - Assignment (25%): 1. Assignment on geological movie review (5%), 2. 1 Assignment on the importance of geological knowledge to human being (10%).3. 1 Laboratory assignment (10%)
- Final assessment (40%):
 - Final assessment will be in the form of Extended Assignment (EA)/ Open book test question where the students will give 24 hours upon submission to complete the question.

Evaluation

- A (85 - 100)
- A- (80 – 84.9)
- B+ (75 – 79.9)
- B (65 – 74.9)
- C+ (55 - 64.9)
- C (50 – 54.9)
- D+ (45 – 49.9)
- D (40 –44.9)
- F (<40)