Department of …. Earth Science and Petroleum

College of ……Science…….

University of …Salahaddin…….

Subject: ……Geomorphology…….

Course Book – (Year 2)

Lecturer's name Rebaz Muhammed Qader - MSc

Academic Year: 2022-2023

Course Book

1. Course name	Geomorphology
2. Lecturer in charge	Rebaz Muhammed Qader
3. Department/ College	Geology /Science
4. Contact	e-mail: rebaz.qader@su.edu.krd Tel:
5. Time (in hours) per week	Theory: 2 hours Practical: 2 hours
6. Office hours	Available all the week
7. Course code	
8. Teacher's academic profile	A general Geologist with a Master's degree in Engineering Geology and abroad working experience in geological sampling and procedures, including, Geomechanics, Ground Investigation, Ground Improvement Techniques, Geotechnical Design, Applied Geology, Borehole Design and Construction, Ground Water Assessment and Contaminated Land. Highly numerate with understanding of soil and rock mechanics. I achieved Master's degree in Engineering Geology - University of Newcastle - United Kingdom in the year 2013 - 2014. Relevant Courses: Geomechanics, Ground Investigation - Design, Principles and Practice, Ground Improvement Techniques, Field Class, Geotechnical Design, Engineering and Applied Geology, MSc Project and Dissertation in Geotechnical Engineering and Engineering Geology, Borehole Design, Construction and Operation, Ground Water Assessment and Contaminated Land. I am an academic staff - Assistant lecturer in Engineering Geology - College of Science - Geology Department - Salahaddin University - Erbil, from December 2014 until now.
9. Keywords	Geomorphology processes ,weathering, erosion, Mass wasting

10. Course overview:

- The importance of studying the subject

Landforms are shaped by geomorphological processes, which essentially involve the movement of mass – rock, sediment, water – across the Earth's surface.

Various tectonic, geological, climatic and ecological factors provide major influences on geomorphological processes and the movement of mass change with different time and space scales.

Landforms and landscapes are not static and unchanging, but are dynamic and develop through time In addition to changing tectonic, geological, climatic or ecological conditions, internal readjustments can also drive landform and landscape development

Landscapes contain histories of their development that potentially can be deciphered and reconstructed from study of the associated landforms and sediments

Ongoing global environmental change, which includes atmospheric warming and sea level rise, is currently driving landform development, including desert lake desiccation, ice sheet and glacial retreat, and coastline erosion
Increasingly, many geomorphological processes and landform/landscape developments are influenced by human activities
Both global environmental change and human activities are increasing the magnitude and frequency of geomorphological hazards, which occur wherever and whenever land surface stability is affected and adverse socioeconomic impacts are experienced

- Understanding of the fundamental concepts of the course

Geomorphologists seek to understand why landscapes look the way they do, to understand landform history and dynamics and to predict changes through a combination of field observations, physical experiments and numerical modeling. Geomorphology is practiced within physical geography, geology, geodesy, engineering geology, archaeology and geotechnical engineering. This broad base of interests contributes to many research styles and interests within the field.

- Principles and theories of the course
- A sound knowledge of the major areas of the subject
- Sufficient knowledge and understanding to secure employment

11. Course objective:

The course will cover selective topics of Geomorphology together with print media or internet articles which deal with geomorphology. Landforms and landscapes are created by a variety of physical processes. The aim of this course is to help the student to understand how these geomorphic processes work, and what they do. How these processes relate to landscape and to human activity and Environment-specific case studies (volcanic and Fluvial geomorphology).

12. Student's obligation

Students are expected to attend all lectures, to arrive on time, and to remain for the entire class. Cell phones should be switched off during lectures. It is the student's responsibility to note any announced schedule changes. The classroom and laboratory is expected to be a place of learning and Discovery. Each student is expected to be quiet, and courteous. Discussions are to be directed to the instructor, not individual classmates.

13. Forms of teaching

Different forms of teaching will be used to reach the objectives of the course: power point presentation for the head titles and definitions and summary of conclusions, classification of materials and any other illustration.

There will be classroom discussions and the lecture will give enough background to translate, solve ,analyze and evaluate problems sets ,and different issues discussed throughout the course.

14. Assessment scheme

Exam.	Theory	LABORATORY
QUIZZES & Daily Activity Attendance and behavior: Lab reports	points	6 points 6 points 6 points
EXAM(mid.term)	15 points	17 points
FINAL EXAM	50 points	
TOTAL	100 points	35 points

15. Student learning outcome:

After completing this course, students should possess the following skills and knowledge:
1. A broad knowledge of the scope and main areas of Geomorphology
2. Ability to classify and describe landforms in a variety of environmental settings
3. Knowledge of systems theory as applied to geomorphology, specifically with regard to the concepts of feedback, thresholds, and equilibrium
4. Broad understanding of the theories of Uniformitarianism and Catastrophism, and appreciation and knowledge of the history of geomorphological research
5. Awareness of the significance of spatial and temporal scales in geomorphology
6. Ability to analyze geomorphological systems in terms of resisting and driving forces
7. Knowledge of surface processes important in the creation of landforms
8. Ability to quantitatively use and evaluate geomorphological data with numerical, statistical and cartographical methods
9. Ability to synthesize and communicate mainstream scientific findings by writing essays and by discussion in a small group tutorial format
10. Ability to analyze relationships between physical and human aspects of environments and landscapes
11. Ability to carry out routine lines of enquiry into geomorphological issues

16. Course Reading List and References:

1-Text Book

Principles of Geomorphology ,William D. Thornbury.

2–Reference

1-Earth Science ,Edward J.Tarbuck ,Frederick K. Lutgens.
2- Earth Science and the Environment,Graham R. Thompson,
Jonathan Turk
3- physical geology

17. The Topics: Theory	Lecturer's name
Week 1 Introduction Definition, History of development of Geomorphic Idea, Views of the Ancients, Modern Geomorphic Ideas, \ Week 2 Some Fundamental Concepts , An Analysis of the Geomorphic processes ,Geomorphic agent or agency, Geomorphic processes Week 3 , 4 Exogenetic processes,Rock Weathering, Physical weathering processes (Mechanical weathering), . Week 5 Chemical weathering processes ,Most chemical weathering results Mineral-stability series in weathering. Week 6 Zone of weathering ,Front of weathering , Mass – Wasting or Gravitative Transfer of material , Conditions which favor rapid mass-wasting, Erosion and Transportation Agencies Week 7 Endogenetic processes ,plate tectonics ,Mountain Building ,Volcanoes and other Igneous Activity. Week 8 Soils, Soil profile , Soil group, Formation of soils, Description of major soil groups Week 9 The Fluvial Geomorphic cycle ,Surface Runoff , Streams and Valley ,Valley development . Week 10 Base level , Graded stream , Classification of Valleys Genetic classification, Classification of valleys according to controlling structure Week 11 Drainage patterns , An Idealized Fluvial cycle Youth , Maturity, Old age , Week 12	DrLecturer's name Dr.Nadhmia Najmaddin 2 hrs)

Velocity and sediment sorting, Alluvial fan , Channel and Flood plain Evolution ,The floodplain and associated features

Week 13

The floodplain and associated features, Desert and wind Erosion , Causes of Natural desert ,Major land forms of Arid Regions , Eolian land Forms , Lay deposits.

Week 14

Eolian Deposits , Glaciers and Glaciation

Definition of a glacier, Types of Glaciers , The Formation of Glacial Ice ,Changes in Glacier Size, Movement of Glaciers ,Glaciation

Week 15

Glaciation ,Glacial Erosion, Glacial Deposits , Glacial Marine drift

Week 16

Karst ,component of karst , Karst topography

this section the lecturer shall write titles of all topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture
Each term should include not less than 16 weeks

18. Practical Topics

Lecturer's name
Rebaz Muhammed Qader - 2 hrs

Topics and their contents
Introduction. Geomorphology as a scientific discipline. **Lab 1: Introduction to Topographic Maps** This lab will introduce you to the use of topographic maps. Many disciplines, such as geology, geography, civil engineering and soil science require a good working knowledge of topographic maps, Note the scale, magnetic declination, contour interval, various systems of determining location (e.g. latitude and longitude) and interesting cultural features.
Lab 2: Coordinates on a topographic map Cartographers use an imaginary grid of parallel lines to locate exact points on Earth. In this grid, the equator horizontal circles Earth halfway between the north and south poles. The equator separates Earth into two equal halves called the northern hemisphere and the southern hemisphere.

Lab 3: Slope angle and Slope Distance In this lab student try to determine the slope angle and slope distance between two points in geological and topographic maps
Lab 4: Slope Map Constructing a slope map
Lab 5: Basin Morphometry & Morphometric Relationships **Stream Order:** The most widely used system of ordering streams is Strahler stream order. The smallest streams in a drainage network have no tributary streams. These are called first order streams
Lab 6: Linear morphometry The establishment of stream ordering led Horton to realize that certain linear parameters of the basin are proportionately related to the stream order and that these could be expressed as a basic relationship of the drainage composition.
Lab 7: Areal Morphometric Relationships The areal aspect is the two dimensional properties of a basin. It is possible to delineate the area of the basin, which contributes water to each stream segment. The watershed can be traced from where the stream has its confluence with the higher order stream along hillcrests to pass upslope of the source and return to the junction.
Lab 8: Relief Morphometric Relationships Linear and areal features have been considered as the two dimensional aspect lie on a plan. The third dimension introduces the concept of relief. By measuring the vertical fall from the head of each stream segment to the point where it joins the higher order stream and dividing the total by the number of streams of that order, it is possible to obtain the average vertical fall.
Lab 9: Basin shape Relationships The Shape of the basin is quantitatively measured by various factors such as:Basin Form Factor (Rf), Circularity Ratio (Rc) and Elongation Ratio (Re).
Lab 10: Frequency Rose Diagram **Lab 11: Density Rose Diagram** Rose diagrams circular frequency histograms that are used for directional (azimuthal) data. Examples of these types of data include the strikes of bedding, wind direction, or ocean current directions.
Lab 12: Drainage patterns: Drainage systems are networks of streams that together from distinctive patterns. The nature of a drainage pattern can vary greatly from one type of terrain to another, primarily in response to the kinds of rock on which

the streams developed or the structural pattern of faults and folds.
Lab 13: Compass and their application
Lab 14: GPS
Lab 15: Bearing and Back bearing

19. Examinations:

Will cover theoretical material presented in lecture and studied through homework problems and the Practical Quizzes – during the practical hours.in the laboratory. Each of the tests will cover material presented in lecture prior to that test.

1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?

With their typical answers

Examples should be provided

2. True or false type of exams:

In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

3. Multiple choices:

In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.

20. Extra notes:

Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.

21. Peer review

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).

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