



Department of Earth Science and petroleum

College of Science

University of University

Subject: Geomorphology

Course Book – 2 Year

Lecturer's name - Dr. Nadhmia Najmaddin Majeed (Phd)

Academic Year: 2022/2023

Course Book

1. Course name	Geomorphology
2. Lecturer in charge	Nadhmia Najmaddin Majeed
3. Department/ College	Earth Science and petroleum / Science
4. Contact	e-mail: Nadhmia.Majeed@su.edu.krd Tel: (optional) 07504686583
5. Time (in hours) per week	Theory: 2 Practical: 2 (4 group)
6. Office hours	6 h.
7. Course code	
8. Teacher's academic profile	<p>Date of first assignment in University - 24 / 11/ 1981 Researcher's academic attainments - Bsc , Msc and Phd Degrees from Baghdad university 1981,1989 and 2004 respectively General specialization - Geology Specific specialization - Remote sensing - Engineering Geology Academic title - Assistant Geology, Assistant Lecturer and Lecturer 1981,1989 and 2004 respectively Supervision of Postgraduate Students - Diploma Degree Thesis title :- 1)Geotechnical Treatment of Expansive Soil by Using Marble Waste powder in Bastora and Erbil Airport areas- Erbil Governorate 1/8 /2012</p> <p>2)Geotechnical Treatment of Gypsiferous soil in Makhmur Area by using limestone waste powder Jan.2015 Supervision of Postgraduate Students - Master Degree Thesis title - Geotechnical treatment of Expansive soil In Erbil City-Kurdistan Region-Iraq</p> <p>Publication - 1)Some Physical Properties Treatment of Expansive Soil Using Marble Waste Powder , International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 - Vol. 3 Issue 1, January – 2014</p> <p>2)Mineralogy of Gypsiferous Soil and the Effect of a dditiveLime Stone waste powder on its Physical Properties , Iraqi Journal of Science, 2020, Vol. 61, No. 1, pp: 83-91 DOI: 10.24996/ijs.2020.61.1.9</p> <p>3)Enhancing Engineering Properties of Expansive Soil Using Marble Waste Powder. Iraqi Geological Journal ,2021, 54 (1E), 43-53</p>

	<p>, DOI: https://doi.org/10.46717/igj.54.1E.4Ms-2021-05-25</p> <p>4)Effect of Fly ash powder on the physical properties of expansive soils. Tikrit Journal of Pure Science Vol. 27 (4) 2022. DOI: http://dx.doi.org/10.25130/tjps.27.2022.053</p>
<p>9. Keywords</p>	<p>geomorphology, landslides, natural hazards, relief</p>
<p>10. Course overview:</p> <ul style="list-style-type: none"> ▪ The importance of studying the subject <p>Geomorphology is the study of <u>landforms</u> and <u>landform</u> evolution. The topic traditionally has been studied both qualitatively, which is the description of landforms, and quantitatively, which is process-based and describes forces acting on Earth’s surface to produce landforms and landform change</p> <ul style="list-style-type: none"> ▪ Understanding of the fundamental concepts of the course <p>Fundamentals of Geomorphology begins with a consideration of the nature of geomorphology, process and form, history, and geomorphic systems, and moves on to discuss: Structure: structural landforms associated with plate tectonics and those associated with volcanoes, impact craters, and folds, faults, and joints.</p> <ul style="list-style-type: none"> ▪ Principles and theories of the course <p>This course on the principles of geomorphology looks at the relationship between processes and landforms at a variety of scales in space and time. It examines endogenic processes originating within the earth, exogenic processes occurring at the earth atmosphere ocean interface and the way they interact to create landforms. The course covers geomorphological theories, weathering, slope processes, soil erosion, fluvial and glacial processes and landforms, applied geomorphology, mountain building, rates of landscape change, supercontinent breakup, volcanic geomorphology and mega floods.</p> <ul style="list-style-type: none"> ▪ A sound knowledge of the major areas of the subject <p>It is the scientific study of landforms/landscapes and the process that shape them. It studies form, processes and history about earth. > Ancient period- descriptive study > Greeks and roman philosophers named some features and only described its origin. ▪ Concept of sudden occurrence and evolution of all types of features > Age of uniformitarianism: gradual cyclic nature of earth’s history by James Hutton in the 18th century (1726-1797) ▪ “that the same geological processes which operate today operated in the past and therefore the history of geological events repeats in cyclic manner” ▪ “present is the key to past”- reconstruction of past earth history on the basis of the present ▪ “Cyclic nature of earth’s history” ▪ “no vestige of a beginning: no prospect of an end”</p> <ul style="list-style-type: none"> ▪ Sufficient knowledge and understanding to secure employment <p>Geomorphological knowledge is critical in understanding watershed scale surface processes, including steep mountainous areas and flat lowlands, particularly if the mid- and downstream areas are densely populated and hazard assessments are highly required. However, our knowledge about such surface processes has relatively been limited in some areas</p>	
<p>11. Course objective:</p> <p>The objectives of this course are to introduce the concepts in Geomorphology in adequate manner, many facets of surface relief features and to understand various aspects of their growth and evolution on the Earth. The course will cover selective topics of Geomorphology together</p>	

with print media or internet articles which deal with geomorphology . Landforms and landscapes are created by a II 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

student attend classes for two hours, read the required lectures, teachers notes regularly as all of them are foundations for the course.

In this course, the students will be evaluated by exams and classroom discussions

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. To get the best of the course ,it is suggested that the student attend classes as much as possible ,read the required lectures, teachers notes regularly as all of them are foundations for the course. Lectures notes are for supporting and not for submitting the reading material including the handouts . Try as much as possible to participate in classroom discussions ,preparing the assignments given in the course

14. Assessment scheme

- The total mark will be **100%**.
- The final mark of semester is **50%**, and divided to:
15% for theoretical part [exam(12) + classroom discussions (3)]
35% for practical part; also the practical mark is divided to two marks: exam and reports.
- The final theoretical exam is from **50%** .

15. Student learning outcome:

- compare and discuss the formation of large-scale landforms involving both exogenous and endogenous processes
- Physical field surveys enable the students to understand the landforms, geomorphic process and associated hazards.
- The course will provide an understanding of the conceptual and dynamic aspects of landform development.
- Students will also learn the relevance of applied aspects of Geomorphology in various fields.
- Students should be able to understand the importance and uses of maps and the relationship of features therein.

On successful completion of this course, students should be able to understand the mean global atmospheric circulations and disturbances, world climate systems, climatic variability and change.

16. Course Reading List and References:

- Key references:

<p>1-Text Book : Principles of Geomorphology ,William D. Thornbury.</p> <ul style="list-style-type: none"> ▪ Useful references: <ol style="list-style-type: none"> 1-Earth Science ,Edward J.Tarback ,Frederick K. Lutgens. 2- Earth Science and the Environment,Graham R. Thompson, Jonathan Turk 3- physical geology ▪ Magazines and review (internet): Geomorphology Elsevier 	
17. The Topics:	Lecturer's name
<p>Week 1 Introduction Definition, History of development of Geomorphic Idea, Views of the Ancients, Modern Geomorphic Ideas.</p> <p>Week 2 Some Fundamental Concept, An Analysis of the Geomorphic processes, Geomorphic agent or agency, Geomorphic processes</p> <p>Week 3 Exogenetic processes, Rock Weathering, Physical weathering processes (Mechanical weathering).</p> <p>Week 4 Chemical weathering processes, Most chemical weathering results Mineral-stability series in weathering.</p> <p>Week 5 Zone of weathering, Front of weathering, Mass – Wasting or Gravitative Transfer of material, Conditions which favor rapid mass-wasting, Erosion and Transportation Agencies</p> <p>Week 6 Endogenetic processes, plate tectonics, Mountain Building, Volcanoes and other Igneous Activity.</p> <p>Week 7 Soils, Soil profile, Soil group, Formation of soils, Description of major soil groups</p> <p>Week 8 The Fluvial Geomorphic cycle, Surface Runoff, Streams and Valley, Valley development.</p> <p>Week 9 Base level, Graded stream, Classification of Valleys Genetic classification, Classification of valleys according to controlling structure</p> <p>Week 10 Drainage patterns, An Idealized Fluvial cycle Youth, Maturity, Old age.</p> <p>Week 11 Velocity and sediment sorting, Alluvial fan, Channel and Flood plain Evolution, The floodplain and associated features</p> <p>Week 12 The floodplain and associated features, Desert and wind Erosion, Causes of Natural desert, Major land forms of Arid Regions, Eolian land Forms, Lay deposits.</p> <p>Week 13 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</p> <p>Week 14 Glaciation, Glacial Erosion, Glacial Deposits, Glacial Marine drift</p> <p>Week 15 Karst ,component of karst , Karst topography</p>	<p>Dr.Nadhmia Najmaddin Majeed</p> <p>2 hrs. per week</p> <p>ex: 7/9/2022</p>

18. Examinations:

Q1) Write about the following:-

- 1- Hydration.
- 2- The Geomorphic processes for:-
 - 1- Ground water
 - 2- Wind
 - 3- Gravity
 - 4- Running water.

Q2) What are the causes of the following :-

- 1-Sheety structure in granitoid rocks.
- 2-Structural factors which favor rapid mass-wasting.

Q3) Complete the followings :-

- 1- Endogenetic processes are
- 2- Subsequent valley is
- 3- Types of gradation are
- 4- Front of weathering are
- 5- The delta of a river varied in size according to

Q4) Correct the wrong statements:-

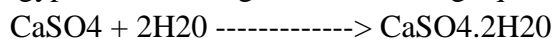
- 1- Valley may be widening by head ward erosion.
- 2- Tundra soils develop under forest vegetation at high altitudes and low latitude.
- 3- Trellis patterns characterized irregular branching of tributary stream in many direction and at almost any angle less than a right angle.
- 4- Solifluction down ward displacement of surficial earth material without a free surface and horizontal displacement.
- 5-in the Youth age valleys are extremely broad and gently sloping.

Answer

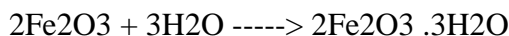
Q1) Write about the following:-

1- Hydration.

The process involves adsorption of water conversion of anhydrite to gypsum according to the following equation :-



The conversion of hematite to limonite also involves this process



Both of the above reactions are rather easily reversible upon application of heat , which indicates that there has been no fundamental chemical change.

2- The Geomorphic processes for:-

- 1- Ground water -dissolution / precipitation
- 2- Wind - erosion / deposition
- 3- Gravity -mass wasting

- 4- Running water -erosion / deposition

Q2) What are the causes of the following :-

1-Sheety structure in granitoid rocks.

Is believed to be produced by unloading of rock masses and

probably takes place in response to the great reduction in pressure that occurs when the overlying rock is eroded away .

2-Structural factors which favor rapid mass-wasting.

closely spaced joints , faults ,crush zones ,shear and foliation planes , and steeply dipping beds.

Q3) Complete the followings :-

1- Endogenetic processes are The geomorphic processes originate within the earths crust and are thus Designated as endogenetic , Volcanism and diastrophism belong in this class.

2- Subsequent valley

They represent structurally adjusted stream courses. Because of the coincidence of subsequent valleys with belts of weak rock it is usually concluded that any valley which follows such a course. It will be evident that most subsequent valley follow the strike of the rock.

3- Types of gradation are Degradation and Aggradations .

4- Front of weathering are The surface between weathered and un weathered rocks.

5- The delta of a river varied in size according to :

- 1) The nature of the region .
- 2) drained by the river

Q4) Correct the wrong statements:-

1- Valley may be lengthening by head ward erosion.

2- Tundra soils develop under forest vegetation at high altitudes and high latitude.

3- Dendritic patterns characterized irregular branching of tributary stream in many direction and at almost any angle less than a right angle.

4- Subsidence down ward displacement of surficial earth material without a free surface and horizontal displacement.

Or Solifluction – The slow- flowing down slope of masses of rock debris which are saturated with water and not confined to definite channel.

5-In the Old age valleys are extremely broad and gently sloping .

19. Extra notes:

The Department of Earth Sciences and Petroleum lacks the financial possibility and the lack of cars to carry out scientific and field trips

20. Peer review

Assistant Professor Dr. Muhamed Fakhri Omer