



NATIONAL UNIVERSITY OF ENGINEERING

COLLEGE OF CIVIL ENGINEERING

CIVIL ENGINEERING PROGRAM

SYLLABUS: GENERAL GEOLOGY

I. GENERAL INFORMATION

CODE	: GE 001
CREDITS	: 4
HOURS PER WEEK	: 6 (Theory, Practice and Field Visits)
PRE-REQUISITE	: CB109 Chemistry
CONDITION	: Mandatory
DEPARTMENT	: Soil Mechanics
INSTRUCTOR	: Luis Gonzales
E-MAIL	: lhijar8@hotmail.com

II. COURSE DESCRIPTION

The course provides students the knowledge for understanding the diverse geological processes that have taken place and that are taking place on Earth, as well as for analyzing the diverse types of materials and geological structures conforming the Earth owed to the geological events that happened in antiquity. The course pretends to raise in students the interest in geology for research and proposals of solutions to the different geological problems related to engineering such as earthquakes as well as the effects of climate changes on soils, soils over which houses and buildings are constructed.

III. COURSE OUTCOMES

1. Understand and analyze how the Earth was formed and its differences respect to other planets of the solar system.
2. Understand and explain geological concepts and its relationships with diverse engineering fields.
3. Understand how the Geological Time is elaborated and how it is used for the reconstruction of events that happened in Earth history.
4. Interpret the rocks cycle and understand the origin of the concentration of mineral deposits with economic value.
5. Explain how mountains and ranges were formed, strata bendings and their relationship with seismic belts and volcano activity.
6. Explain how ocean floor was shaped as well as the drifting of continents.
7. Graphically represent Earth internal structure and define the origin of Earth magnetic field.

IV. LEARNING UNITS

1. INTRODUCTION

Importance of geology in the diverse engineering fields.

2. MAGMATISM

Magma origin. Formation of volcanic and intrusive rocks.

3. METEORIZATION

Meteorization of rocks. Soils formation.

4. METAMORPHISM AND METAMORPHIC ROCKS

Metamorphism types and principal rocks.

5. GEOLOGICAL TIME AND MEANING OF FOSSILS

Scales of the geological time.

6. SURFACE LAND MOTION

Glissades, collapses and floods.

7. GEOLOGICAL ACTION OF SURFACE WATER

Hydrologic cycle and the origin of valleys.

8. GEOLOGICAL ACTION OF UNDERGROUND WATER

Aquifers, wellsprings, thermal Wells, fountains and artesian wells.

9. GEOLOGICAL ACTION OF SEA

Waves geological action, types of cliffs and coral reefs.

10. GEOLOGICAL ACTION OF WINDS AND GLACIERS

Formation of dunes. Geological work of glaciers.

11. DEFORMATION OF EARTH CRUST

Origin of geological faults and fractures. Geological unconformity.

12. FORMATION OF MOUNTAINS

Bending mountains, fault blocks mountains and volcanoes. Plateaus and tectonic trenches.

13. EARTHQUAKES

Causes of earthquakes. Seismic scales. Epicenter. Seismograph.

14. NATURAL RESOURCES

Origen of metal and non-metal deposits. Energy sources.

V. METHODOLOGY

The course includes theory and practice sessions as well as field visits. In theory sessions the instructor presents the concepts, definitions and applications promoting students participation. In practice sessions students solve diverse problems and applications of geology in engineering. In field visits, students guided by the instructor visit diverse places around Lima city to study in-site diverse geological faults, rocks, mountains, cliffs, slopes and so on. At the end of the academic semester, students should present and defend a report.

VI. EVALUATION FORMULA

The final grade (PF) is obtained as follows:

$$PF = 0.25 EP + 0.35 EF + 0.15 PA + 0.15 CC + 0.10 TE$$

Where:

EP: Mid-term exam

EF: Final exam

PA: Average of three quizzes

CC: Average of three field visit reports

TE: Final report

VII. BIBLIOGRAPHY

1. Tarbuck Edward J, Lutgens Frederick K.
Earth. An Introduction to Physical Geology
Edit. Prentice Hall, Inc.

2. Rodriguez A., Valdez G.
General Geology
National University of Engineering Editions, Lima, Peru.