



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF CIVIL ENGINEERING**  
**CIVIL ENGINEERING PROGRAM**

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**GE001 – GENERAL GEOLOGY**

**I. GENERAL INFORMATION**

<b>CODE</b>	: GE001 – General Geology
<b>SEMESTER</b>	: 4
<b>CREDITS</b>	: 04
<b>HOURS PER WEEK</b>	: 05 (Theory – Workshop)
<b>PREREQUISITES</b>	: CB109 – Chemistry
<b>CONDITION</b>	: Mandatory

**II. COURSE DESCRIPTION**

Provide basic knowledge about the characteristics of the earth's crust and the processes that act on it, in order to introduce students to earth science research and its application in Civil Engineering works.

**III. COURSE OUTCOMES**

At the end of the course the student will:

- Understand and analyze how the earth formed and its difference with other planets in the solar system.
- Geological Time and methods for the reconstruction of the events that occurred in the earth history.
- Interpret the rock cycle, understand how the mountain ranges have formed, the folding and their relationship with seismic belts and volcanic activity and drift from the continents.

**IV. LEARNING UNITS**

**1. INTRODUCTION**

Definition of geology / Relationship with the various sciences / The geological cycle / Importance of geology in Engineering.

**2. MINERALS**

Definition / Substances / Nature of crystals / Chemical composition / Physical properties / Origin of minerals / Rock-forming minerals.

**3. IGNEOUS ROCKS AND INTRUSIVE AND VOLCANIC IGNEOUS ACTIVITY**

Magma and lava / Origin and evolution of magma / Igneous rocks / Intrusive igneous bodies: Plutons / Extrusive magmatism / Volcanoes / Volcanic Eruptions / Projected materials / Lava Currents / Submarine Volcanoes / Fumaroles and Sulfurates / Intrusive Magmatism / Silicified minerals.

**4. WEATHERING, EROSION AND SOIL FORMATION**

Types of mechanical and chemical weathering. Factors that control chemical weathering / Soil / Soil profile / Factors that control soil formation.

## **5. SEDIMENT AND SEDIMENTARY ROCKS**

Transport and deposition of sediments / Lithification / Sedimentary-detritic, chemical and biochemical rocks.

## **6. METAMORPHISM AND METAMORPHIC ROCKS**

Metamorphism Concept / Formation of metamorphic rocks; Agents / Types of Metamorphism.

## **7. THE GEOLOGICAL AND MEANING TIME OF THE FOSSILS**

Geological time / Absolute and relative time / Radioactivity. Strata / Fossil / Correlations / Scale / Geological time.

## **8. SURFACE LAND MOVEMENT**

Definition and Classification. Fast movements: Landslides, rock landslides, debris landslides, mudflows / Land Flows. Slow movements Slip and Solifluction.

## **9. GEOLOGICAL ACTION OF SURFACE AND UNDERGROUND WATERS**

The Hydrological Cycle / Geological action of water flows, transport, erosion and deposition. Valley formation / Cycles and types of erosion / Aeration zone and saturation zone / Groundwater movement / Underground hydrological basins / The karst process / Geological action of the sea / Waves / Underwater morphology.

## **10. WIND GEOLOGICAL ACTION**

Wind as a weather agent / Wind erosion: Types of erosion / Wind transport / Geological deposition / Loes / Dunes / Deserts: Definition - Distribution and Origin / Desert wind work / Glaciation.

## **11. CRUST DEFORMATION**

Origin / Mountain Formation / General Concepts of tectonic movements. Orogenic and Cratogenic Zones / Orogenic Zones / Rock Deformation Mechanics.

## **12. SEISMIC MOVEMENTS**

Nature of seismic movements and their effects / Causes of seismic movements / Seismic zones and isosist lines / Seismic scales / Magnitude and energy of earthquakes.

## **V. LABORATORY SESSIONS**

During the cycle, three field trips are made, in order to introduce students to the field knowledge of the changes that have occurred in the formation of the earth's surface.

## **VI. METHODOLOGY**

The course is developed in sessions of theory, practice and field. In the theory and practice sessions, concepts are given, using whiteboard, power point and in some cases videos. In the field sessions the students will become familiar, with geological phenomena, in nature itself. Compulsory readings will be established, which will enrich the conversation in the classroom and at the end of the course the student must prepare and present a work whose subject is delivered to the student in the 3rd week.

## **VII. EVALUATION FORMULA**

The learning will be evaluated through the "F" system.

- Average of Practices: AP
- Qualified Practices: QP

- Staggered Work: W1
- Research Work: W2

$$AP = \frac{3 * QP1 + 3 * QP2 + 2 * W1 + 2 * W2}{10}$$

- Final Average: FA
- Mid-Term Exam: PE
- Final Exam: FE

$$FA = \frac{PE + 2 * FE + AP}{4}$$

## VIII. BIBLIOGRAPHY

- Longwell (2001). Physical Geology Mexico: Limusa.
- Meléndez, Bermudo (2001). Geology, Madrid: Paraninfo.