NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF PETROLEUM AND PETROCHEMICAL ENGINEERING
PETROLEUM AND NATURAL GAS ENGINEERING PROGRAM

PG221 – SEDIMENTOLOGY AND STRATIGRAPHY

I. GENERAL INFORMATION

CODE	**:**	PG221 Sedimentology and Stratigraphy
SEMESTER	**:**	4
CREDITS	**:**	4
HOURS PER WEEK	**:**	5 (Theory – Practice)
PREREQUISITES	**:**	PG211 General Geology
CONDITION	**:**	Compulsory

II. COURSE DESCRIPTION

The course prepares students for the analysis of sediments, their properties and evolution. Students analyze diverse types of sediments including detritic sediments, limes and clays and sedimentary rocks. The relationships of sedimentology with other fields such as stratigraphy, sedimentary petrography, hydrogeology, petroleum geology are analyzed.

III. COURSE OUTCOMES

At the end of the course, students:

1. Analyze and interpret field sedimentological stations.
2. Explain the origin and properties of sediments.
3. Interpret granulometric statistical graphs.
4. Construct and interpret histograms, frequency curves and accumulative curves of sediments granulometry.
5. Identify the types of sediments, rocks and minerals of sedimentary deposits.
6. Understand the scope of stratigraphy and stratification process.
7. Identify the relationship between sedimentology and other fields of science.

IV. LEARNING UNITS

1. GENERAL CONCEPTS

Sedimentology and relationship with other geological sciences / Concept of sediment / Sediment properties: size, selection, shape, roundness, chemical and mineralogical composition, porosity, permeability, specific weight / Statistical basics for the granulometric study of sediments / Graphical representation of sediment granulometry / Bimodal distrubutions.

2. GRANULOMETRIC SCALES

Wentworth scale / Cailleux and Tricart scale / Phi scale / Detritic sediments / Lithological nature of grits and gravel / Granulometry and morphology of grits and gravels / Cailleux morphometric indexes / Sands granulometry / Sand morphoscopy / Sand mineralogical composition.

3. LIMES AND CLAYS

Granulometric study / Clay identification and classification / Sedimentary structures / Interpretations.

4. SEDIMENTARY ROCKS
Clastic and non-clastic rocks / Sedimentology and its relationship with civil engineering / Soil properties / Aggregates for roads / Clays diverse uses.

5. SEDIMENTOLOGY AND ITS RELATIONSHIP WITH OTHER FIELDS
Sedimentology and its relationship with hydrogeology and marine geology / Sedimentology and its relationship with petroleum geology and mining geology.

6. STRATIGRAPHY
Definitions / Sedimentary rocks and stratum behavior / Sedimentary processes / Rock weathering / Sediment transport / Stokes law / Impact law / Laminar and turbulent flow / Suspension transport / Traction transport / Jumping movement / Deposits of clastic and non-clastic sediments / Sedimentary rocks deposition places / Stratum characteristics / Transition basins / Stratum characteristics / Marine basins.

7. STRATIFICATION
Causes / Original position / Lithosome rocks sequences / Lithosome vertical and lateral relationships / Superposition law / Superposition recognition criteria / Inverted and perturbed stratums / Discordance. Types. Lithological, angular, erosional, stratigraphic / Identification of discordances. Criteria / Stratigraphic units / Geological time / Geochronology / Rock-time units / Chrono-stratigraphy / Litho-stratigraphy / Formation-member-group / Columnar and areal representation / Bio-stratigraphic units / Biotic amplitude zone / Stratigraphic code.

V. PRACTICAL EXPERIENCES

1. Graphical representation of sediments granulometry.
2. Sediments seaving.
3. Field study at Morro Solar, Lima.

VI. METHODOLOGY

The course takes place in theory, practice, laboratory and field study sessions. In theory sessions faculty presents concepts and methods. In practice sessions, students analyze and solve diverse problems related to sedimentology and stratigraphy. In laboratory and field study sessions student analyze samples and formulate conclusions. Students present written reports summarizing their findings and conclusions. Active student participation is promoted.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

PF = (EP + EF + PP) / 3

EP: Mid-term exam EF: Final exam
PP : Average grade of practice, laboratory and field study work.

VIII. BIBLIOGRAPHY

1. **KRUMBEIN and SLOSS**
   Stratigraphy and Sedimentation
2. **PETTIJOHN J.**
   Sedimentary rocks
   Eudeba Editions, Mexico, 2001
3. **FRIEDMAN G.M., SANDERS J.E.**
   Principles of Sedimentology
   Willey, 1998