



**NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF PETROLEUM AND PETROCHEMICAL ENGINEERING**

PETROLEUM ENGINEERING PROGRAM

HC516 – NATURAL GAS PROCESSES

I. GENERAL INFORMATION

CODE	: HC516 Natural Gas Processes
SEMESTER	: 9
CREDITS	: 4
HOURS PER WEEK	: 5 (Theory – Practice)
PREREQUISITES	: PP422 Natural Gas and Condensates II
CONDITION	: Compulsory

II. COURSE DESCRIPTION

The course prepares students for analyzing the different treatment processes of natural gas industry such as dehydration processes, separation processes, liquefying process and sulphur recovery processes. Environmental, safety and health issues of natural gas processes are analyzed, as well as the state and future perspectives of petroleum and natural gas industries in Peru and the world.

III. COURSE OUTCOMES

At the end of the course, students:

1. Explain the main treatment processes of natural gas.
2. Understand and analyze the processes of natural gas dehydration and pollutant removal.
3. Understand and analyze the condensation processes of natural gas.
4. Understand and analyze the processes for sulphur recovery.
5. Understand and analyze environmental safety and environmental issues in natural gas processes.

IV. LEARNING UNITS

1. FUNDAMENTALS OF NATURAL GAS INDUSTRY / 8 HOURS

Introduction / Natural gas in Peru / Technical principles of natural gas extraction and processing / Economic principles of natural gas exploitation and markets / General view of natural gas industry.

2. NATURAL GAS PRIMARY SEPARATION PROCESSES / 6 HOURS

Technologies for natural gas processing / Field and reception operations / Gas compression

3. NATURAL GAS DRYING PROCESSES / 8 HOURS

Natural gas treatment processes / Natural gas dehydration processes / Hydrocarbon recovery processes / Pollutant removal processes.

4. TREATMENT PROCESSES OF LIQUIDS AND LIQUEFIED NATURAL GAS / 9 HOURS

Condensation processes / Liquefied natural gas processes / Transport and storage.

5. SULPHUR RECOVERY PROCESSES / 5 HOURS

Sulphur properties / Sulphur recovery processes.

6. ENVIRONMENTAL ISSUES IN NATURAL GAS PROCESSES / 8 HOURS

Emission of greenhouse gases / Pollutant production in gas natural processes / Environmental legislation.

7. OCCUPATIONAL HEALTH AND SAFETY ISSUES IN NATURAL GAS PROCESSES / 8 HOURS

Safety general / Safety in natural gas processes / Legislation on occupational health and safety.

V. PRACTICAL WORK

Student should complete 8 practical work reports on themes related to natural gas transformation processes .

VI. METHODOLOGY

This course is carried out in theory and practical sessions. In theory sessions, the instructor introduces concepts, theorems and applications. In practical sessions, several problems are solved and their solution is analyzed. At the end of the course, students should submit and defend a project. In all sessions, students' active participation is encouraged.

VII. GRADING FORMULA

The final grade PF is calculated as follows:

$$\mathbf{PF = (EP + EF + PC + TC)}$$

EP: Mid-Term Exam

EF: Final Exam

PC: Average of practical work reports TC: Final report

VIII. BIBLIOGRAPHY

1. Kidnay, Arthur y Parrish, William

Fundamentals of Natural Gas Processing. Taylor & Francis Group, 2006.

2. Speight, James

Natural Gas a Basic Handbook. Gulf Publishing Company, 2007.

3. Hydrocarbon Processing

Gas Processes Handbook, 2012.