NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF CHEMICAL AND TEXTILE ENGINEERING
CHEMICAL ENGINEERING PROGRAM

QU435 – LABORATORY OF PHYSICAL CHEMISTRY II

I. GENERAL INFORMATION

CODE	**:**	QU435 Laboratory of Physical Chemistry II
SEMESTER	**:**	5
CREDITS	**:**	1
HOURS PER WEEK	**:**	3 (Laboratory)
PREREQUISITES	**:**	QU425 Physical Chemistry I QU426 Laboratory of Physical Chemistry I
CONDITION	**:**	Compulsory

II. COURSE DESCRIPTION

This is course is complementary to theory course QU434 Physical-Chemistry II. Students develop skills for the handling of chemical reactants, materials, laboratory instruments and equipment, applying safety norms. In this laboratory course, students experimentally verify the theoretical concepts and methods presented in course QU434 Physical-Chemistry II.

III. COURSE OUTCOMES

At the end of the course, students:

1. Carefully use chemical reactants in proper quantity and concentration according to the experiment to be done.
2. Use instruments, devices and equipment proper of the experimental practice of chemical engineering.
3. Take care safety and security measures in the handling of chemical reactants, instruments and equipment.
4. Write laboratory reports clearly describing carried out experiments, analyzing results and presenting conclusions.

IV. COURSE CONTENTS

1. Binary equilibrium: solid-liquid

2. Three-components liquid system

3. Copper and zinc electro-gravimetry

4. Measurement of electrode potentials

5. Conductimeter measurements

6. Cation selective electro-deposition

7. Transport number: ionic mobility method

8. Transport number: mobile border method

9. Thermal methods: derivatography

10. Chemical kinetic of a ionic reaction

11. Thermometric determination of active chloride in chlorinated materials

VI. METHODOLOGY

There is a guide for every laboratory experience students should read before the experience. At the beginning of the experience, an entrance test is taken to verify the preparedness of students. Students carry out the experience working by teams and following guide indications and faculty advice. At the end of the experience, students submit a report summarizing main results, analysis and conclusions. Student active participation is promoted.

VII. GRADING SYSTEM

The Final Grade (FG) is calculated with the following formula:

FG = (10 PP + 1 C1 + 2 C2) / 13

PP: Average grade of five laboratory experience work and report
C1: Average grade of entrance quizzes C2: Average grade of final quizzes

VIII. BIBLIOGRAPHY

1. PHYSICAL-CHEMISTRY Laboratory Guide
   National University of Engineering, Lima, Peru, 2010
2. **ADAMSON ARTHUR W.**
   Physical Chemistry, Reverte Editorial, Barcelona, Spain.