



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

QU117 – LABORATORY OF CHEMISTRY I

I. GENERAL INFORMATION

CODE	: QU117 Chemistry I
SEMESTER	: 1
CREDITS	: 1
HOURS PER WEEK	: 3 (Laboratory)
PREREQUISITES	: None (Parallel to QU117 Chemistry I)
CONDITION	: Compulsory

II. COURSE DESCRIPTION

This course is complementary to theory course QU116 Chemistry I. 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 QU116 Chemistry I

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. GETTING READY FOR EXPERIMENTAL LABORATORY WORK

Recognition and use of materials, instruments and equipment of Chemistry Laboratory.

2. FUNDAMENTAL PROCESS OF CHEMISTRY LABORATORY

Developing skills in the following operations: heating, drying, solid-liquid separation, use of scales, volume measurement, equipment calibration and setting.

3. ATOMIC STRUCTURE

Determination of electron charge / Electromagnetism / Colorimetry / Chromatography / Continue and line spectrum / Black box model formulation.

4. PERIODIC PROPERTIES

Cation coloration (transition element) / Electronic configuration / Ion identification / Halogen / Elements acidity / Amphoterism and solubility.

5. CHEMICAL BOND AND MOLECULAR FORCE

Lewis structure / Bond angles / Bond valence / Molecular models / Molecular geometry and properties.

6. GASEOUS STATE

Pressure measurement / Obtaining carbon dioxide / Obtaining hydrogen / Determination of molar volume / Verification of Graham law.

7. SOLID STATE

Amorphous solid / Crystals / Simple cubic pack / Hygroscopy, density and melting point.

8. LIQUID STATE

Property analysis: surface tension, viscosity, volatility, boiling temperature / Intermolecular forces.

9. COLLOIDS AND SOLUTIONS. WATER

Preparation of colloids and solutions / Tyndall effect / Application of colligative properties / Identification of: sulfate ions, chlorides, calcium, manganese.

10. STOICHIOMETRY

Determination of formula of hydrated salt / Performance of a chemical reaction through precipitate formation and generation of gaseous products.

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:

$$FG = (8 PP + 1 C1 + 2 C2) / 11$$

PP: Average grade of six laboratory experience work and report

C1: Average of entrance quizzes

C2: Average of experiment final quizzes

VIII. BIBLIOGRAPHY

1. BROWN THEODORE- LEMAY EUGENE.
Chemistry Laboratory Guide
National University of Engineering, Lima, Peru, 2010
2. CHANG RAYMOND
Chemistry
McGraw-Hill Editorial, 2012