

## DIM-GITI-123 Chemistry

**SEMESTER:** Fall/ Spring  
**CREDITS:** 6 ECTS (4 hrs. per week)  
**LANGUAGE:** Spanish  
**DEGREES:** GITI

### Course overview

Introduction to chemistry, with emphasis on basic principles and their industrial applications.

The main goals of this course are:

Learning how to represent chemical reactions by chemical equations in order to establish quantitative relations among the reactants and the products of a reaction.

Understanding the characteristics of ideal gases.

To study the energy and heat associated with chemical reactions and/or physical transformations.

To describe others states of the matter, liquids and solids, using the intermolecular forces.

To explore several solutions properties whose values depend on the concentration of solutions.

Understanding how chemical reactions can be used to produce electricity and how electricity can be used to cause chemical reactions.

### Prerequisites

Although no specific prerequisites are required, a basic chemistry course at high school level is highly recommended.

### Course contents

#### Theory:

1. Chemicals Reactions. Chemicals Equations and Stoichiometry. Chemical reactions in solution. Determining the limiting reactant.
2. Introduction to Reactions in Aqueous Solutions. Oxidation-Reduction Equations: Some general principles. Balancing Oxidation-Reduction equations. Acid-base Reactions. Precipitation reactions. Stoichiometry .of reactions in aqueous solutions: Titrations.
3. Gases. Properties of gases. Applications of the ideal gas Equation. Gases in Chemical reactions. Mixtures of gases. Kinetic-Molecular theory of gases.

4. Thermochemistry. Heat of reactions and Calorimetry. Work. The first law of thermodynamics. Heats of reaction. Indirect determination of  $\Delta H$ . Standard enthalpies of formation.
5. Liquid, solids and intermolecular forces. Intermolecular forces and some properties of liquids. Some properties of solids. Phase diagrams. Crystal structures.
6. Solution and Their Physical Properties. Types of solution. Solution Concentration. Solution Formation and Equilibrium. Colligative properties.
7. Electrochemistry. Electrode Potentials and their measurement. Standard Electrode Potentials. Practical application: Batteries and fuel cells

### Laboratory:

There will be three 2-hour sessions to become familiar with basic laboratory instruments and measurement techniques.

### Textbook

- Ralph H. Petrucci; F. Geoffrey Herring; Jeffry D. Madura y Carey Bissonnette. Química. Pearson Custom Publishing. Pearson Educación S.A. 2013.

### Grading

There will be two midterm exams (20% of the final grade each), a final exam (50% of the final grade), and homework assignments (10% of the final grade).