



National University of Engineering (UNI)
School of Computer Science
Syllabus 2026-I

1. COURSE

CH101FCCS. Chemistry I (Mandatory)

2. GENERAL INFORMATION

2.1 Course	: CH101FCCS. Chemistry I
2.2 Semester	: 1 st Semester
2.3 Credits	: 5
2.4 Horas	: 4 HT; 2 HP;
2.5 Duration of the period	: 16 weeks
2.6 Type of course	: Mandatory
2.7 Learning modality	: Face to face
2.8 Prerequisites	: None

3. PROFESSORS

Meetings after coordination with the professor

4. INTRODUCTION TO THE COURSE

Chemistry provides a foundation for understanding the composition, structure, and properties of matter. While not directly related to many aspects of programming, chemistry is relevant to computer science in areas such as materials science (developing new materials for computer components), nanotechnology, and bioinformatics. This course introduces the basic principles of general chemistry.

5. GOALS

- Understand the structure of matter at the atomic and molecular level.
- Apply the principles of stoichiometry to perform chemical calculations.
- Understand the different types of chemical bonds and their influence on the properties of substances.

6. COMPETENCES

- 1) Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions. (Usage)

AG-C08) Problem Analysis: Identifies, formulates, and analyzes complex computing problems. (Usage)

- 6) Apply computer science theory and software development fundamentals to produce computing-based solutions. (Familiarity)

AG-C07) Computing Knowledge: Applies appropriate knowledge of mathematics, science, and computing. (Assessment)

AG-C09) Solution Design and Development: Designs, implements, and evaluates solutions for complex computing problems. (Familiarity)

AG-C11) Tool Usage: Applies modern computing tools in problem-solving. (Familiarity)

7. TOPICS

Unit 1: Introduction to Chemistry (6 hours)	
Competences Expected: 1,AG-C07	
Topics	Learning Outcomes
<ul style="list-style-type: none"> • Matter and energy. • The scientific method. • Units of measurement. • Classification of matter. 	<ul style="list-style-type: none"> • Describe the properties of matter and energy. [Familiarizarse (<i>Familiarity</i>)] • Apply the scientific method to solve chemical problems. [Usar (<i>Usage</i>)] • Perform unit conversions. [Evaluar (<i>Assessment</i>)]
Readings : [BrownLeMayBursten2017], [CG16]	

Unit 2: Atomic Structure (8 hours)	
Competences Expected: 1,AG-C07	
Topics	Learning Outcomes
<ul style="list-style-type: none"> • Structure of the atom. • Atomic number, mass number, and isotopes. • Quantum model of the atom. • Electron configuration. 	<ul style="list-style-type: none"> • Describe the structure of the atom. [Familiarizarse (<i>Familiarity</i>)] • Determine the electron configuration of an atom. [Usar (<i>Usage</i>)] • Relate electron configuration to chemical properties. [Evaluar (<i>Assessment</i>)]
Readings : [BrownLeMayBursten2017], [CG16]	

Unit 3: Chemical Bonds (8 hours)	
Competences Expected: 1,AG-C07	
Topics	Learning Outcomes
<ul style="list-style-type: none"> • Ionic bonds. • Covalent bonds. • Metallic bonds. • Molecular geometry. 	<ul style="list-style-type: none"> • Describe the different types of chemical bonds. [Familiarizarse (<i>Familiarity</i>)] • Predict the molecular geometry of a molecule. [Usar (<i>Usage</i>)] • Relate the type of bond to the properties of substances. [Evaluar (<i>Assessment</i>)]
Readings : [BrownLeMayBursten2017], [CG16]	

Unit 4: Stoichiometry (8 hours)	
Competences Expected: 1,AG-C07,AG-C09	
Topics	Learning Outcomes
<ul style="list-style-type: none"> • Molar mass and mole. • Chemical reactions and chemical equations. • Stoichiometric calculations. • Limiting reactant and percent yield. 	<ul style="list-style-type: none"> • Calculate the molar mass of a compound. [Familiarizarse (<i>Familiarity</i>)] • Balance chemical equations. [Usar (<i>Usage</i>)] • Perform stoichiometric calculations to determine the amount of reactants and products. [Evaluar (<i>Assessment</i>)]
Readings : [BrownLeMayBursten2017], [CG16]	

Unit 5: States of Matter (8 hours)	
Competences Expected: 1,AG-C07	
Topics	Learning Outcomes
<ul style="list-style-type: none"> • Gases. • Liquids. • Solids. • Changes of state. 	<ul style="list-style-type: none"> • Describe the properties of the different states of matter. [Familiarizarse (<i>Familiarity</i>)] • Explain changes of state and phase diagrams. [Usar (<i>Usage</i>)] • Apply the ideal gas laws. [Evaluar (<i>Assessment</i>)]
Readings : [BrownLeMayBursten2017], [CG16]	

Unit 6: Chemistry and Computing (10 hours)	
Competences Expected: 1,AG-C07	
Topics	Learning Outcomes
<ul style="list-style-type: none"> • Molecular modeling. • Chemical simulations. • Materials science in computing. 	<ul style="list-style-type: none"> • Describe how chemistry is used in molecular modeling. [Familiarizarse (<i>Familiarity</i>)] • Explain the role of chemistry in chemical simulations. [Usar (<i>Usage</i>)] • Analyze the importance of chemistry in materials science for computing. [Evaluar (<i>Assessment</i>)]
Readings : [BrownLeMayBursten2017]	

8. WORKPLAN

8.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

8.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

8.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

9. EVALUATION SYSTEM

***** EVALUATION MISSING *****

10. BASIC BIBLIOGRAPHY

[CG16] Raymond Chang and Kenneth A. Goldsby. *Chemistry*. McGraw-Hill Education, 2016.