

National University of Engineering (UNI)

School of Computer Science Syllabus 2024-II

1. COURSE

CH101FCCS. Chemistry I (Mandatory)

2. GENERAL INFORMATION

2.1 Course	:	CH101FCCS. Chemistry I
2.2 Semester	:	1^{st} Semester.
2.3 Credits	:	3
2.4 Horas	:	2 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 Prerrequisites	:	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. (Assessment)
- 6) Apply computer science theory and software development fundamentals to produce computing-based solutions. (Assessment)
- 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. (Usage)
- AG-C12) Applies computer science theory and software development fundamentals to produce computer-based solutions. (Usage)

7. TOPICS

Unit 1: Introduction to Chemistry (6 hours)			
Competences Expected: 1,AG-C07			
Topics	Learning Outcomes		
 Matter and energy. The scientific method. Units of measurement. Classification of matter. 	 Describe the properties of matter and energy. [Fa-miliarizarse] Apply the scientific method to solve chemical problems. [Usar] Perform unit conversions. [Evaluar] 		
Readings : [BrownLeMayBursten2017], [CG16]			

Unit 2: Atomic Structure (8 hours)		
Competences Expected: 1,AG-C07		
Topics	Learning Outcomes	
• Structure of the store	• Describe the structure of the store [Foreilionicance]	
• Structure of the atom.	• Describe the structure of the atom. [Familiarizarse]	
• Atomic number, mass number, and isotopes.	• Determine the electron configuration of an atom.	
• Quantum model of the atom.	[Usar]	
• Electron configuration.	• Relate electron configuration to chemical properties. [Evaluar]	
Readings : [BrownLeMayBursten2017], [CG16]		

Unit 3: Chemical Bonds (8 hours)		
Competences Expected: 1,AG-C07		
Topics	Learning Outcomes	
• Jonic bonds	• Describe the different types of chemical bonds [Fa-	
Covalent bonds.	miliarizarse]	
• Metallic bonds.	• Predict the molecular geometry of a molecule. [Usar]	
• Molecular geometry.	• Relate the type of bond to the properties of sub- stances. [Evaluar]	
Readings : [BrownLeMayBursten2017], [CG16]		

Unit 4: Stoichiometry (8 hours) Competences Expected: 1.AG-C07.AG-C09			
Topics	Learning Outcomes		
 Molar mass and mole. Chemical reactions and chemical equations. Stoichiometric calculations. Limiting reactant and percent yield. 	 Calculate the molar mass of a compound. [Familiar-izarse] Balance chemical equations. [Usar] Perform stoichiometric calculations to determine the amount of reactants and products. [Evaluar] 		
Readings : [BrownLeMavBursten2017], [CG16]			

Unit 5: States of Matter (8 hours)		
Competences Expected: 1,AG-C07		
Topics	Learning Outcomes	
 Gases. Liquids. Solids. Changes of state. 	 Describe the properties of the different states of matter. [Familiarizarse] Explain changes of state and phase diagrams. [Usar] Apply the ideal gas laws. [Evaluar] 	
Readings : BrownLeMayBursten2017 , CG16		

Unit 6: Chemistry and Computing (10 hours)		
Competences Expected: 1,AG-C07,AG-C12		
Topics	Learning Outcomes	
 Molecular modeling. Chemical simulations. Materials science in computing. 	 Describe how chemistry is used in molecular model- ing. [Familiarizarse] Explain the role of chemistry in chemical simula- tions. [Usar] Analyze the importance of chemistry in materials sci- ence for computing. [Evaluar] 	
Readings : [BrownLeiviayBursten2017]		

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.