CHEM1101: INTRODUCTION TO CHEMISTRY

Effective Term
Semester A 2024/25

Part I Course Overview

Course Title
Introduction to Chemistry

Subject Code
CHEM - Chemistry
Course Number
1101

Academic Unit
Chemistry (CHEM)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
GE1357 Introduction to Chemistry

Exclusive Courses
CHEM1300 Principles of General Chemistry

Part II Course Details

Abstract

This course aims to provide basic chemistry concepts to university students without or with minimal background in chemistry and convey its importance in daily life through discussions on current issues with significant emphasis on chemical context.

Upon completion of this course, students should be able to:

a. demonstrate an understanding of the basic concepts and principles of Chemistry,

b. appreciate Chemistry and realize its importance and applications in daily life.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the concept of atoms, molecules, and ions, neutrons, protons and electrons, the periodic table, chemical formula and naming, acids and bases, states of matter, chemical reactions.	25	x	x	
2	Rationalize the electronic structures of atoms, ions, and molecules and chemical compounds through the formation of ionic and covalent bonds, and explain their physical and chemical properties.	15	x	x	
3	Discuss the basic principles of chemistry embedded within current real-world issues, such as quality of air and water, global warming, acid rain, energy resources, plastics, foods and drugs.	30	x	x	x
4	Apply the basic principles of chemistry to compare, contrast, and explain chemical phenomena in real-life examples.	30	x	x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Students will engage in formal lectures about the basic knowledge and concepts, and the relationship between them, of general chemistry principles and chemical phenomena.	1, 2, 3	

2	Tutorials	Students will engage in tutorials with interactive questioning and group discussion on real-world issues with significant chemical context; practice in rationalizing and explaining general chemistry principles and chemical phenomena embedded in these real-life examples to peers based on the basic knowledge and concepts learnt in the course.	1, 2, 3	
3	Laboratory sessions	Students will undertake laboratory sessions to acquire elementary practical skills with real-life experimental examples and applications in different activities which are related to basic concepts of chemistry. Students (in small groups) will carry out simple experiments (guided by instructors, teaching assistants, and lab staff) and analyse, discuss, rationalize, and explain the experimental observations among peers in order to deepen their basic knowledge and concepts.	1, 2, 3, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Tutorials and online assignments	1, 2, 3, 4	20	
2	Laboratory work and reports	1, 2, 3, 4	15	
3	Group discussions and online quizzes	1, 2, 3, 4	15	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for courses offered by CHEM: "A minimum of 40% in both coursework and examination components."

Assessment Rubrics (AR)

Assessment Task

Tutorials and online assignments

Criterion

Capacity for self-directed learning (including preview and review of course materials) to describe the basic principles of chemistry

Excellent (A+, A, A-)

High
with active participation in all tutorials and able to correctly answer all online assignments

Good (B+, B, B-)

Significant
with active participation in most tutorials and able to correctly answer most of the online assignments

Fair (C+, C, C-)

Moderate
with active participation in some tutorials and able to correctly answer some of the online assignments

Marginal (D)

Basic
with active participation in a few tutorials and able to correctly answer a few online assignments

Failure (F)

Below marginal level
without active participation in most tutorials and unable to answer most online assignments

---

Assessment Task

Laboratory work and reports

Criterion

Ability to practise basic chemistry experiments and apply basic knowledge and important concepts of chemistry to explain in detail chemical phenomena

Excellent (A+, A, A-)

High
with active participation in all lab sessions and able to describe and explain all principles and practices of various selected chemical phenomena

Good (B+, B, B-)

Significant
with active participation in all lab sessions and able to describe and explain most principles and practices of various selected chemical phenomena

Fair (C+, C, C-)

Moderate
with active participation in most lab sessions and able to describe and explain some key principles and practices of selected chemical phenomena

Marginal (D)

Basic
with active participation in a few lab sessions and able to describe and explain a few key principles and practices of selected chemical phenomena

Failure (F)

Below marginal level
without active participation in most lab sessions and unable to describe and explain most key principles and practices of selected chemical phenomena

---

Assessment Task

Group discussions and online quizzes

Criterion

Ability to apply basic knowledge and important concepts of chemistry for rationalization and to solve chemical problems

Excellent (A+, A, A-)

High
with active participation in all group discussions and able to describe, rationalize, compare, contrast, and explain all discussed chemistry topics

Good (B+, B, B-)

Significant
with active participation in all group discussions and able to describe, rationalize, compare, contrast, and explain most discussed chemistry topics

Fair (C+, C, C-)

Moderate
with active participation in most group discussions and able to describe, rationalize, compare, contrast, and explain some discussed chemistry topics

Marginal (D)

Basic
with active participation in a few group discussions and able to describe, rationalize, compare, contrast, and explain a few discussed chemistry topics

Failure (F)

Below marginal level
without active participation in most group discussions and unable to describe, rationalize, compare, contrast, and explain most discussed chemistry topics

---

Assessment Task

Examination

Criterion

Ability to apply basic knowledge and important concepts of chemistry for rationalization and to solve chemical problems

Excellent (A+, A, A-)

High
able to correctly answer almost all the examination questions

Good (B+, B, B-)

Significant
able to correctly answer a substantial number of the examination questions

Fair (C+, C, C-)

Moderate
able to correctly answer some of the examination questions

Marginal (D)

Basic
able to correctly answer a few of the examination questions

Failure (F)

Below marginal level
unable to correctly answer most of the examination questions

Part III Other Information

Keyword Syllabus

Fundamental Concepts:
Atoms, Ions, and Molecules
Periodic Table
Electronic Structure of Atoms
Chemical Bonding: Ionic and Covalent
States of Matters: Gases, Liquids, and Solids

Examples of Daily-Life Chemistry
The Air we breathe
Protecting the ozone layer and chemistry of global climate change
Water for life
Neutralizing the treat of acid rain
World of polymer and plastic
Molecules of life and design of drugs
Nutrition - food for thought
Energy from combustion and from electron transfer

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	“Chemistry in Context: Applying Chemistry to Society”, 6th Edition, L. P. Eubanks, C. H. Middlecamp, C. E. Heltzel, S. W. Keller, McGraw-Hill (ISBN 9780071270137)

2	“Chemistry: The Central Science in SI Units, Global Edition”, 15th Edition, T. L. Brown, H. E. LeMay, Jr., B. E. Bursten, C. J. Murphy, P. M. Woodward, M. W. Stoltzfus, Pearson Education Limited (ISBN 9781292407616)
3	“Introduction to Chemistry – A Conceptual Approach”, 2nd Edition, R. C. Bauer, J. P. Birk, P. S. Marks, McGraw-Hill (ISBN 9780070172623)
4	“Chemistry”, 9th Edition, S. S. Zumdahl, S. A. Zumdahl, Brooks/Cole Cengage Learning (ISBN 9781133611097)