

GE1357: INTRODUCTION TO CHEMISTRY

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Introduction to Chemistry

Subject Code

GE - Gateway Education

Course Number

1357

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

GE Area (Primary)

Area 3 - Science and Technology

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

CHEM1101 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:

- demonstrate an understanding of the basic concepts and principles of Chemistry,
- 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	
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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 LimitedHall (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)

Annex (for GE courses only)

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 1: Demonstrate the capacity for self-directed learning

3, 4

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

1, 2

PILO 3: Demonstrate critical thinking skills

3, 4

PILO 9: Value ethical and socially responsible actions

3, 4

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

3, 4

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task

The reports of laboratory demonstration will be collected and retained.