CHEM2007A: PRINCIPLES OF ORGANIC CHEMISTRY

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Principles of Organic Chemistry

Subject Code
CHEM - Chemistry
Course Number
2007A

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
BCH2007A Principles of Organic Chemistry

Exclusive Courses
Nil

Additional Information
Note: CHEM2007A does not contain any practical component, and has a credit unit value of three (3).

Part II Course Details

Abstract

This course aims to provide students with an understanding of the basic principles of organic chemistry, practical laboratory experience in chemical transformation and organic analysis (CHEM2007 student only), and develop an understanding of the spectroscopic identification of the various classes of organic compounds.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Identify the classes of organic compounds, by drawing and interpreting structural formulas, explaining constitutional isomers, stereoisomers and conformational isomers, and describing the principles of electron delocalization and resonance structure.	30	x	x	x
2	Describe the definition of Lewis acid and base by using resonance and inductive effects to explain and interpret values of Ka and pKa of acids.	15	x	x	x
3	State and describe the chemistry related to alkanes, alkyl halides, alkenes, alkynes, alcohols, aromatic compounds, amines, carboxylic acids and their derivatives, apply them in analysis and synthesis and draw reaction mechanisms of the more important types of reactions.	55	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 and tutorials	Students will engage in lectures and tutorials and learn to explain the structure and bonding of organic compounds. Students will build/draw the chemistry models to see the three-dimensional nature of molecule. Students will practice to use the arrow pushing technique to explain reaction mechanism.	1	
2	Lectures and tutorials	Students will participate in lectures and tutorials and explain the principles of acid and base and electronic effect. Students will engage in the introduction of electron withdrawing and electron donating.	2	
3	Lectures and tutorials	Students will engage in a combination of lectures and tutorials, learn to explain the principles in reaction and synthesis, and see some of the biological, medicinal and environmental applications.	3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Tutorial assignment	1, 2, 3	40	Continuous Assessment (40%): - Tutorial assignment - Short quizzes	Yes
2	Short quizzes	1, 2, 3	0	-	Yes

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)
40

Assessment Rubrics (AR)

Assessment Task
Tutorial assignment

Criterion
Student completes the activity demonstrates grasp of the important concepts to the topic concerned.

Excellent (A+, A, A-)
Able to demonstrate excellent understanding of the principles of organic chemistry.

Good (B+, B, B-)
Able to describe and explain the principles of organic chemistry.

Fair (C+, C, C-)
Able to describe and explain some key principles of organic chemistry.

Marginal (D)
Able to briefly describe isolated principles of organic chemistry.

Failure (F)
Fail to accurately describe and explain relevant basic principles of organic chemistry.

Assessment Task
Short quizzes

Criterion
Student completes the activity demonstrates grasp of the important concepts to the topic concerned.

Excellent (A+, A, A-)
Able to demonstrate excellent understanding of the principles and practice of organic chemistry.

Good (B+, B, B-)
Able to describe and explain the principles of organic chemistry.

Fair (C+, C, C-)
Able to describe and explain some key principles of organic chemistry.

Marginal (D)
Able to briefly describe isolated principles of organic chemistry.

Failure (F)
Fail to accurately describe and explain relevant principles of organic chemistry.

Assessment Task
Examination

Criterion

Student demonstrates grasp of the important concepts to the topic concerned, and can apply these concepts to solve problems. Strong evidence of demonstrated use of concepts for rationalization, with some originality in thought and argument.

Excellent (A+, A, A-)

Able to demonstrate excellent understanding of the principles of organic chemistry.

Good (B+, B, B-)

Able to describe and explain the principles of organic chemistry.

Fair (C+, C, C-)

Able to describe and explain some key principles of organic chemistry.

Marginal (D)

Able to briefly describe isolated principles of organic chemistry.

Failure (F)

Fail to accurately describe and explain relevant principles of organic chemistry.

Part III Other Information

Keyword Syllabus

Carbon compounds: structural and bonding theories, isomers and functional groups
Acids and bases, electronic effect
Alkanes and cycloalkanes: nomenclature, conformational Analysis
Stereochemistry: chiral molecules, stereoisomers
Infrared spectroscopy and UV-vis spectroscopy: structure determination*
Alkyl halides: nucleophilic substitution, reactions of radical
Alkenes and alkynes: elimination and addition reactions*
Alcohols and ethers: oxidation-reduction*
Aromatic compounds: aromaticity, resonance, aromatic substitution*
Carboxylic acid and its derivatives: nucleophilic addition-elimination at the acyl carbon*
Amines*

*Topics are covered only in CHEM2007 and CHEM2007A

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Organic Chemistry / T.W. Graham Solomons, Craig B. Fryhle
2	Introduction To Spectroscopy : A Guide For Students Of Organic Chemistry / Donald L. Pavia, Gary M. Lampman, George S. Kriz, Jr.