

Subject Description Form

Subject Code	ABCT2742
Subject Title	ORGANIC CHEMISTRY I
Credit Value	3
Level	2
Pre-requisite	ABCT1741 General Chemistry I
Objectives	The aim of this subject is to enable students to understand organic chemistry through a study of the basic reaction types, the basic principles and the uses of common spectroscopic techniques available for functional group identification. Emphasis will be placed on reactions and compounds with structural interest as well as biological and industrial importance.
Intended Learning Outcomes	On successfully completing this subject, students will be able to a) comprehend the concept of acid/base, the knowledge of organic functional groups and their reactions as well as the basic principles of stereochemistry for studying various reaction mechanisms; b) recognize factors affecting reactivity and predict the reactivity of various basic reactions in different conditions; c) understand the basic principles of mass spectrometry, UV, IR and proton NMR spectroscopies and apply the knowledge acquired to deduce structure of simple organic molecules via chemical reactions as well as combined use of spectroscopic techniques; d) demonstrate the abilities of problem-solving skills, analytical thinking and interpersonal skills.
Subject Synopsis/ Indicative Syllabus	<p><u>Alkanes, Alkenes, Alkynes and Aromatic Compounds</u> Structures, reactivity and properties; conformation of alkanes and cycloalkanes; addition reactions; mechanism, stereochemistry and regioselectivity; hydration; halogenation; hydrohalogenation; hydrogenation; hydroxylation; epoxidation; hydroboration; electrophilic aromatic substitution reactions; Friedel-Crafts reactions; substituent effects in electrophilic aromatic substitution; mechanism; nitration; sulphonation.</p> <p><u>Stereochemistry</u> Structural parameters and strains; stereoisomerism-configuration and conformation; chirality, enantiomerism, and diastereomerism.</p> <p><u>Spectral Analysis of Functional Groups</u> Basic principles and uses of mass spectrometry, infrared, ultraviolet-visible and ¹H nuclear magnetic resonance spectroscopies in the identification of functional groups of simple organic compounds.</p> <p><u>Alkyl Halides</u> Structure of alkyl halides; preparation of alkyl halides; nucleophilic substitution reactions; elimination reactions; mechanism and stereochemistry; regioselectivity; factors affecting nucleophilic substitution and elimination reactions: molecular structure, solvent, nucleophile, leaving group and neighbouring group.</p> <p><u>Alcohols, Phenols, Ethers and Epoxides</u> Structure, reactivity and preparation; hydrogen bonding; acidity; dehydration;</p>

	oxidation. <u>Aldehydes and Ketones</u> Structure, properties and reactions; oxidation; nucleophilic addition reactions; hydration; acetal formation; imine formation; alcohol formation. <u>Carboxylic Acids and Derivatives</u> Classification, reactivity and preparation; acidity of carboxylic acids; nucleophilic acyl substitution reactions.																																																									
Teaching/Learning Methodology	Lectures will be used to provide fundamental principles and concepts of different topics in organic chemistry including chemical functional groups, chemical reactivity, chemical reactions, reaction mechanisms and spectroscopic analysis of organic compounds in organic chemistry. Tutorials are designed to assist students to consolidate their learned concepts, to improve their problem-solving skills and to stimulate their further interest in the subject.																																																									
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1"> <thead> <tr> <th colspan="2" rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="7">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td rowspan="2">Continuous Assessment</td> <td>Quiz</td> <td>25</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Assignment</td> <td>15</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="2">Exam</td> <td>60</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="2">Total</td> <td>100 %</td> <td colspan="7"></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assignments, quizzes and examinations are employed to gauge how much students have learned in the chemical functional groups, chemical reactivity, chemical reactions, reaction mechanisms and spectroscopic analysis of organic compounds in organic chemistry as well as problem-solving skills and analytical thinking.</p>		Specific assessment methods/tasks		% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)							a	b	c	d				Continuous Assessment	Quiz	25	√	√	√	√				Assignment	15								Exam		60	√	√	√	√				Total		100 %							
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Reading List and
References

Textbook:

- Carey, F. A. Organic Chemistry (11th ed.) McGraw-Hill 2019
- Bruice, P. Organic Chemistry, 7th ed. Pearson, 2012
- Pavia, D.L. Introduction to Spectroscopy: A Guide for Students of Organic Chemistry (3rd ed.) Thomson Learning 2001