UNIVERSITY of BRADFORD

Module Descriptor

Organic Chemistry 2

Module Code:	CFS5017-B
Academic Year:	2018-19
Credit Rating:	20
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry and Forensic Science (ceases 2016)
FHEQ Level:	FHEQ Level 5
Module Leader:	Dr William Martin

Additional Tutors:

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	40
Tutorials	8
Directed Study	152

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

This module will build on what you have learnt in Organic Chemistry 1. You will study the chemistry of carbonyl containing compounds and simple heterocycles. You will be introduced to physical organic chemistry and will see how the reactivity of aromatic compounds can be explained from an orbital perspective. An orbital appreciation of reactivity will also be used to rationalise some stereoselective and stereospecific eliminations.

You will develop scientific writing skills and will be introduced to the primary chemical literature and methods for effective access to information.

Outline Syllabus

Aromatic chemistry - Aromaticity, electrophilic aromatic substitution, directing groups, double substitution on benzene: Understanding directing groups in terms of this mechanism, sequencing of reactions.

Introduction to physical organic chemistry - Molecular orbital basis of aromaticity, kinetic and thermodynamic control in organic reactions, ortho effects. Transition states and intermediates: Meerwein intermediates, SNAr reactions. Entropy and enthalpy - conformational analysis of medium rings. Solvent and cage effects in nucleophilic substitution.

Carbonyl chemistry: Aldehydes and ketones, nucleophilic addition to carbonyls, imine formation, acetal formation. Nucleophilic acyl substitution and alpha-substitution reactions, tetrahedral intermediates. Enolisation of aldehydes, ketones and carboxylates. Alkylation, aldol and Claisen reactions - related to pKa. Introduction to organometallics 1: Grignard and organocuprate additions to carbonyl compounds. Oxidation and reduction: Selectivity and mechanism.

Heterocycles - Structure, properties and synthesis of 5, and 6 membered heterocycles with one heteroatom.

Stereospecific reactions: The E2 elimination revisited - eliminations in acyclic and constrained systems.

Accessing the primary scientific literature: Web of Science, SciFinder, Reaxys. Referencing your work, Turnitin.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 Apply mechanism to understand the chemistry of the carbonyl group.

10 Develop a deeper appreciation for reaction mechanism.

11 Use specialist search software to search for chemicals and reactions.

12 Use drawings to convey complex scientific arguments.

13 Produce a report based on the scientific literature.

14 Reference your work according to University of Bradford guidelines.

2 Propose oxidising and reducing agents for the interconversion of oxygen-containing functional groups.

3 Rationalise the reactivity of simple organometallic reagents.

4 Apply mechanism outcome to explain enolate chemistry.

5 Rationalise the reactivity of aromatic compounds.

6 Predict the reaction of simple aromatic compounds with various common reagents.

7 Rationalise the role of solvents in nucleophilic substitutions.

8 Conduct conformational analysis of cycloalkanes.

9 Rationalise the sterochemical outcome of selected reactions.

Learning, Teaching and Assessment Strategy

Lectures will deliver core content; providing students with the opportunity to acquire the information to enhance their knowledge and understanding of basic undergraduate-level organic chemistry. This will be complemented by seminars, group discussions and tutorials to allow students to apply this learning to specific exemplar problems.

Directed study provides students with the opportunity to undertake guided reading and to develop their own portfolio of learning to enhance transferable skills and knowledge relating to evaluation of own role and subject provision.
The VLE will be used to provide access to online resources, lecture notes and external links to websites of interest.

Assessment 1: You will be given a search task that will require you to use specialist search software. You will produce a fully referenced written report on your search results.

Assessment 2: A classroom test in semester 1.
Assessment 3: Summative examination in May.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	Summative assessment: closed book examination	2 hours	50%	Yes
Summative	Coursework	A written report based upon a chemical search exercise		30%	No

Summative	Classroom test	Classroom test	1 hour	20%	No

Legacy Code (if applicable)

CT-2025L

Reading List

To view Reading List, please go to **rebus:list**.