UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title:	Organic Chemistry 2
Module Code:	CFS5017-B
Academic Year:	2019-20
Credit Rating:	20
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry
FHEQ Level:	FHEQ Level 5
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	**Hours**
Lectures	40
Tutorials	8
Directed Study	152

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

Module Aims

This module will introduce you to how modern chemists control the stereochemistry of molecules that they synthesise. Building on the organic chemistry you studied in stage 1, you will see how the reagents and conditions can be chosen to form single diastereoisomers of a desired product. You will be introduced to physical organic chemistry and will see how the reactivity of aromatic compounds can be explained from an orbital perspective. The importance of heterocyclic chemistry and its application in medicinal chemistry will be introduced. Finally, you will learn the tools of retrosynthetic analysis and will see its application to commercial products. Your transferable skills you will continue to be developed in this module as you hone your scientific writing skills and are introduced to the primary chemical literature and methods for effective access to information.

Outline Syllabus

Conformational analysis and diastereoselectivity: Stereoselective and stereospecific reactions in acyclic molocules. Conformation, ring strain and stereoselectivity of reactions in alicyclic molecules.
Carbonyl chemistry continued: Enols, enolates and enamines. The aldol and Claisen reactions. Addition to aldehydes with an □ stereocentre - Cram and Felkin-Anh control, chelation control in reactions of enolates. Chiral auxiliaries in synthesis – for example RAMP and SAMP.

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 effects in nucleophilic substitution.
Aromatic chemistry - Aromaticity, electrophilic aromatic substitution, directing groups, double substitution on benzene: Understanding directing groups in terms of this mechanism, sequencing of reactions. Heterocycles - Structure, properties and synthesis of 5, and 6 membered heterocycles.
Retrosynthesis – key concepts and application to aromatic chemistry and heterocycles. Illustrative routes to commercial compounds.

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

Learning Outcomes

1	Propose reagents and conditions for the synthesis of carbonyl containing compounds.
2	Rationalise the stereochemical outcome of selected reactions in acyclic and alicyclic systems.
3	Rationalise the reactivity of aromatic compounds from an orbital perspective.
4	Compare and contrast the behaviour and reactivity of heterocyclic compounds.
5	Apply retrosynthesis to, and design a synthetic sequence to, simple molecular targets.
6	Rationalise the role of solvents in nucleophilic substitutions.
7	Apply search strategies in chemical databases and produce a fully referenced report that evidences engagement with the primary and secondary literature.

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 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. 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 chemical databases. You will produce a fully referenced written report on your search results. This exercise measures

LOs 7.

Assessment 2: A classroom test, to cover LOs 1 and 2.

Assessment 3: Summative examination in May to cover all LOs apart from LO 7.

Mode of Assessment				
Type	**Method**	**Description**	**Length**	**Weighting**
Summative	Examination - closed book	Summative assessment: closed book examination	2 hours	50%
Summative	Coursework	A written report based upon a chemical search exercise		30%
Summative	Classroom test	Classroom test	1 hour	20%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html.

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.