UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Organic Chemistry 2 (at distance)
Module Code	CFS5021-B
Academic Year	2022/3
Credits	20
School	School of Chemistry and Biosciences
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Online Tutorials (Synchronous)	25
Online Seminar (Synchronous)	8
Directed Study	147
Interactive Learning Objects	20

Availability	
Occurrence	Location / Period
DLA	University of Bradford / Academic Year

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

Outcome Number	Description
01	Propose reagents and conditions for the synthesis of carbonyl containing compounds.
02	Rationalise the stereochemical outcome of selected reactions in acyclic and alicyclic systems.
03	Rationalise the reactivity of aromatic compounds from an orbital perspective.
04	Compare and contrast the behaviour and reactivity of heterocyclic compounds.
05	Apply retrosynthesis to, and design a synthetic sequence to, simple molecular targets.
06	Rationalise the role of solvents in nucleophilic substitutions.
07	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

This module will be delivered using a 'flipped' learning and teaching strategy: this means you will be provided with taught material which you will need to study before the class takes place. This material will be presented in a range of media including podcasts, vodcasts, and directed reading and will be delivered through the University's VLE. On-line activities such as quizzes, discussions and wikis will support the taught material.
The majority of classes will be hosted and facilitated online using collaborative software. These sessions will require you to use the knowledge you have gained through completion of the pre-work and apply it to real world problems in the discipline of organic chemistry. Furthermore, the problems will require you to take a collaborative approach to solving them, helping you develop key employability skills in a peer-learning environment.
You will interact with your course tutor and other group members on a regular, timetabled basis which will be supported via teleconferencing facilities. In these sessions, your group will be encouraged to explore both the core content and reflect on your approach to solving problems.
Your active engagement with the online discussions and activities will be crucial to success in this module and evaluation of engagement will inform the support you receive from your Supervisory Team

The assessment strategy will help you engage with the threory and practice of organic chemistry.

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. Support for this task will be through the library.

Assessment 2: An on-line assessment in semester 1. Assessment 3: Summative examination in May.

Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - Closed Book	Closed Book Examination (2 Hrs)	50%
Summative	Coursework - Written	A written report based upon a chemical search exercise 1500 wds	30%
Summative	Online MCQ Examination	On-line assessment	20%
Formative	Coursework - Written	Tutorial Sheets	N/A

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.
