

Module Details	
Module Title	Organic Chemistry 1 (at distance)
Module Code	CFS4028-B
Academic Year	2021/2
Credits	20
School	School of Chemistry and Biosciences
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Online Tutorials (Synchronous)	48
Directed Study	156

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

Module Aims
<p>This module will introduce you to undergraduate level organic chemistry. Organic chemistry has its own language, and way of presenting information. By the end of this module you will be confident in using the language of organic chemistry to discuss the path of simple reactions. Through lectures, workshops and tutorial sessions you will develop your understanding and appreciation of organic chemistry.</p>

## Outline Syllabus

The language of organic chemistry: Drawing organic compounds, functional groups and nomenclature. Isomerism: Conformation and configuration, enantiomers and diastereoisomers. Mechanism: Orbitals and hybridisation, curly arrows, electrophiles, radicals and nucleophiles, reactive intermediates and transition states, inductive, resonance and hyperconjugation effects, strength of nucleophiles and electrophiles, carbocation stabilities, rearrangements, pKa.

Analytical tools for organic chemistry: IR spectra of functional group containing compounds. Introduction to mass spectrometry. Origins and applications of proton and carbon NMR spectra. Elucidating structures from spectra.

Classification of reactions and reaction selectivity: Acid-base reactions, oxidation and reduction, polar addition and polar substitution, radical reactions and pericyclic reactions. Substitution and elimination, the concepts of chemo-, regio- and stereoselectivity.

Nucleophilic substitution and elimination: Leaving groups and the relation to pKa, the course of the SN1 and SN2 reactions. Elimination reaction mechanisms E1 and E2, Saytzev versus Hoffman.

Alkenes and alkynes: Electrophilic addition, Radical addition, Epoxidation and simple pericyclic reaction.

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. Properties, synthesis and interconversion reactions of alcohols, ethers, amines, ketones, aldehydes, and carboxylic acids with their derivatives.

## Learning Outcomes

Outcome Number	Description
01	Apply nomenclature and chemical notation to describe the structure of organic molecules, and their reactions.
02	Interpret the reactivity of molecules and intermediates based on their electronic properties.
03	Use reaction mechanism to rationalise the outcome of simple organic reactions.
04	Propose starting materials, reaction conditions and products for several representative organic reactions.
05	Interpret data and propose chemical structures based on FTIR, <sup>1</sup> H, <sup>13</sup> C, IR and MS data.
06	Develop team-based problem solving skills in the application of analytical techniques.

## 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 theory and practice of organic chemistry.

**Assessment 1:** A coursework exercise will cover LOs 5 and 6. This is a group exercise that you will undertake in your course tutor group. Formative feedback will be provided on previous group problem solving activities that you have undertaken as part of the module.

**Assessment 2:** An on-line assessment task in January will cover material from semester 1. Covers LOs 1, 2 and 5.

**Assessment 3:** Summative examination in Bradford at the end of the academic year to cover the whole module, apart from LO6 .

Formative feedback for assessments 2 and 3 will be provided through the tutorial sessions where your answers to questions will be discussed.

## Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - Closed Book	Examination (2 Hrs)	50%
Summative	Coursework - Written	Group problem solving exercise (2 Hrs)	30%
Summative	Online MCQ Examination	Remote, on-line assessment (MCQ) (1 Hrs)	20%
Formative	Not assessed	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.*