

## University of the West of Scotland

## Module Descriptor

Session: 2024/25

<b>Title of Module: Organic Chemistry 4</b>			
<b>Code: CHEM10003</b>	<b>SCQF Level: 10 (Scottish Credit and Qualifications Framework)</b>	<b>Credit Points: 20</b>	<b>ECTS: 10 (European Credit Transfer Scheme)</b>
<b>School:</b>	School of Computing, Engineering and Physical Sciences		
<b>Module Co-ordinator:</b>	Callum McHugh		
<b>Summary of Module</b>			
<p>Lectures in this module will cover advanced or new methods of organic synthetic chemistry, as well as synthetic design. Topics will include aspects of retrosynthesis, asymmetric synthesis, pericyclic reactions, and modern reagents used in organic synthesis.</p> <p>The principles of 2-D <math>^1\text{H}</math> NMR and <math>^{13}\text{C}</math> NMR will be introduced through problem solving 'dry lab' exercises supplemented with a self-learning text. Formal assessment will be set on this element of the course.</p> <p>Students will be introduced to Spartan molecular modelling software and will complete exercises related to the Diels Alder reaction.</p> <p>The graduate attributes relevant to this module are given below:</p> <ul style="list-style-type: none"> <li>• Academic: Critical thinker, analytical, enquiring, knowledgeable, digitally literate, problem solver, autonomous, incisive, innovative</li> <li>• Personal: Effective communicator, influential, motivated, team player</li> <li>• Professional: Collaborative, research-minded, enterprising, ambitious, driven</li> </ul>			

<b>Module Delivery Method</b>					
<b>Face-To-Face</b>	<b>Blended</b>	<b>Fully Online</b>	<b>HybridC</b>	<b>Hybrid 0</b>	<b>Work-Based Learning</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>See Guidance Note for details.</b>					

<b>Campus(es) for Module Delivery</b>
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The module will <b>normally</b> be offered on the following campuses / or by Distance/Online Learning: (Provided viable student numbers permit) (tick as appropriate)						
Paisley:	Ayr:	Dumfries:	Lanarkshire:	London:	Distance/Online Learning:	Other:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Add name

Term(s) for Module Delivery					
(Provided viable student numbers permit).					
Term 1	<input checked="" type="checkbox"/>	Term 2	<input type="checkbox"/>	Term 3	<input type="checkbox"/>

Learning Outcomes: (maximum of 5 statements) These should take cognisance of the SCQF level descriptors and be at the appropriate level for the module. At the end of this module the student will be able to:	
L1	Identify and demonstrate a critical understanding of major specialised synthetic pathways in organic chemistry, involving functional group interconversions and carbon-carbon and carbon-heteroatom bond formation.
L2	Display detailed knowledge and skills in important areas at the forefront of organic chemistry associated with the fine chemicals industry.
L3	Interpret 2-D $^1\text{H}$ and $^{13}\text{C}$ NMR spectra
L4	Show competence with the use of molecular modelling software in tackling defined modelling exercises.
Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	During completion of this module, there will be an opportunity to achieve core skills in:
Knowledge and Understanding (K and U)	SCQF Level <b>10</b> Demonstrate a detailed knowledge and understanding of a variety of functional group chemistries and synthetic strategies.
Practice: Applied Knowledge and Understanding	SCQF Level <b>10</b> Apply knowledge of the specialized chemistries to devise synthetic pathways to target molecules relevant to fine chemicals industry. Carry out a series of preparative exercises to understand the use of Spartan molecular modelling software and apply that knowledge to completing set molecular modelling exercises.

Generic Cognitive skills	<b>SCQF Level 10</b> Critically evaluate, review, and analyse potential synthetic routes to target organic molecules.	
Communication, ICT and Numeracy Skills	<b>SCQF Level 10</b> Be able to source, evaluate and collate information using information retrieval and appropriate IT skills to support and enhance assignments and other exercises. Use appropriate numerical and analytical skills in structural elucidation and spectroscopic interpretation.	
Autonomy, Accountability and Working with others	<b>SCQF Level 10</b> Work effectively with others in group exercises and in identifying and addressing individual/personal learning needs in the subject area associated with the module. Exercise autonomy and initiative in practical and problem-based learning.	
<b>Pre-requisites:</b>	Before undertaking this module, the student should have undertaken the following:	
	<b>Module Code:</b> CHEM09004	<b>Module Title:</b> Organic Chemistry 3
	<b>Other:</b>	Or suitable appropriate background.
<b>Co-requisites</b>	<b>Module Code:</b>	<b>Module Title:</b>

\*Indicates that module descriptor is not published.

<b>Learning and Teaching</b>	
<p><b>In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours.</b></p> <p>This module covers a wide variety of theoretical, conceptual, and practical areas, which require a range of knowledge and skills at a more advanced level to be displayed and exercised.</p> <p>Delivery of its syllabus content therefore involves a diversity of teaching and assessment methods suitable to the learning outcomes of the module; these include formal lectures, structured tutorials (work closely integrated with the lecture material), laboratory exercises to develop practical skills and familiarisation with equipment and experimental techniques, completion and submission of written coursework making use of appropriate forms of IT and VLE, and independent study.</p>	
<b>Learning Activities</b>	<b>Student Learning Hours</b> (Normally totalling 200 hours):

	(Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture/Core Content Delivery	24
Laboratory/Practical Demonstration/Workshop	24
Independent Study	152
	200 Hours Total
<b>**Indicative Resources: (eg. Core text, journals, internet access)</b>	
<p>The following materials form essential underpinning for the module content and ultimately for the learning outcomes:</p> <p>Core text:</p> <p>Organic Chemistry 2nd Edition, J. Clayden, N. Greeves, and S. Warren (2012), Oxford University Press ISBN-978-0-19-927029-3</p> <p>Also recommended:</p> <p>An Introduction to Drug Synthesis, G. L. Patrick (2015), Oxford University Press, ISBN-978-0-19-870843-8</p> <p>J A Joule and K Mills, Heterocyclic Chemistry at a Glance, 2nd Edition, Wiley-Blackwell Publishing 2012 ISBN-13: 987-0470971215</p> <p>J A Joule and K Mills, Heterocyclic Chemistry 5th Edition, Wiley-Blackwell Publishing 2010 ASIN B-1-WEZQIO</p> <p>P Sykes, Primer to Mechanism in Organic Chemistry, Longman Scientific 1995 0-582266440</p> <p>P Wyatt and S Warren, Organic Synthesis: Strategy and Control, John Wiley 2007 0-471-48940-5</p> <p>Synthetic Methods in Organic Electronics and Photonic Materials: A Practical Guide, T. Parker and S. Marder, (2015), RSC, ISBN-978-1-84973-986-3</p>	
<p>(*N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)</p>	
<b>Attendance and Engagement Requirements</b>	

In line with the [Student Attendance and Engagement Procedure](#): Students are academically engaged if they are regularly attending and participating in timetabled on-campus and online teaching sessions, asynchronous online learning activities, course-related learning resources, and complete assessments and submit these on time.

For the purposes of this module, academic engagement equates to the following:

Attendance of all on-campus sessions (classes and laboratories), and submission of assessments.

### Equality and Diversity

The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: [UWS Equality, Diversity and Human Rights Code](#).

This module is suitable for any student with appropriate chemistry background, however it should be noted that in order for you to complete this module the laboratory element of coursework will require to be undertaken, disability support can be provided where necessary, consequently, if disability support is needed to complete this part of the module, then the University's Health and Safety Officer should be consulted to make sure that safety in the laboratory is not compromised.

(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

### Supplemental Information

<b>Divisional Programme Board</b>	Physical Sciences
<b>Assessment Results (Pass/Fail)</b>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<b>School Assessment Board</b>	Physical Sciences
<b>Moderator</b>	Andrew McLean
<b>External Examiner</b>	M. Symes
<b>Accreditation Details</b>	This module is accredited by the Royal Society of Chemistry (RSC) as part of the BSc (Hons) Chemistry programme.
<b>Changes/Version Number</b>	2.20 Module Delivery: From Hybrid-C to Face-to-Face Indicative resources: Updated

<b>Assessment: (also refer to Assessment Outcomes Grids below)</b>
Assessment 1: Exam – Unseen Open Book (65 %)
Assessment 2: Coursework – (35%)
(N.B. (i) <b>Assessment Outcomes Grids</b> for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An <b>indicative schedule</b> listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

### Assessment Outcome Grids (See Guidance Note)

Component 1						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Unseen open book exam	✓	✓			65	2

Component 2						
Assessment Type (Footnote B.)	Learning Outcome (1)	Learning Outcome (2)	Learning Outcome (3)	Learning Outcome (4)	Weighting (%) of Assessment Element	Timetabled Contact Hours
Report of practical/field/clinical work			✓	✓	35	0
<b>Combined Total for All Components</b>					<b>100%</b>	<b>2 hours</b>