



## MODULE SPECIFICATION

Part 1: Information			
Module Title	Medicinal Chemistry		
Module Code	USSKB5-15-2	Level	Level 5
For implementation from	2020-21		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	Cells, Biochemistry and Genetics 2020-21, Chemistry in Context 2020-21		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description
<p><b>Overview:</b> Pre-requisites: Students must take USSJRT-30-1 Chemistry in Context or USSKA4-30-1 Cell Biochemistry and Genetics.</p> <p><b>Educational Aims:</b> See Learning Outcomes.</p> <p><b>Outline Syllabus:</b> The syllabus includes:</p> <p>The General Principles of Medicinal Chemistry:</p> <p>General classes of drugs and their medicinal activity. Types of drug target and the origins of drug-target interactions. Identification of the essential structural features (pharmacophore) for bioactivity.</p> <p>Examples of strategies in medicinal chemistry to develop leads, to optimise drug-target binding interactions, to alter drug solubility/stability, to improve drug pharmacokinetics, to enhance drug delivery/formulation, to mass produce drugs and to control drug stereochemistry.</p> <p>Relationships between chemical structure, physicochemical properties of a drug and predicted biological availability. Structure-activity relationships (SARs) and their quantitative measurement (QSAR). Hydrophobicity and Hammett constants, Hansch analysis, Craig plots and Topliss</p>

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decision trees.

Types of prodrug and the use of classical and non-classical bioisosteres. Applications to drug design and development in medicinal chemistry.

The use of X-ray crystal structure determination and spectroscopy to identify drug intermediates and to inform drug development.

Case Studies in Medicinal Chemistry:

To illustrate major classes of medicines and their chemical development and action, a selection of the following will be discussed.

Barbiturates and the benzodiazepines

Captopril, an antihypertensive agent – the development of a lead compound.

Development of the morphinans and methadone from morphine.

Structure and activity of the antibacterial penicillins.

Asymmetric synthesis in the production of chiral drugs.

Anticancer drugs targeting DNA.

Antiulcer treatment - QSAR in the development of omeprazole or cimetidine.

**Teaching and Learning Methods:** The material will be delivered using a combination of lectorials and workshops . Lectures will be augmented by directed reading in the recommended text and in selected publications from the scientific literature, for example, Drug Discovery Today, Journal of Medicinal Chemistry. The topics selected for delivery by workshops will be designed to enhance problem solving skills and to provide experience of relevant laboratory techniques.

Technology enhanced learning will be embedded within teaching materials via links to supplementary electronic online resources of the textbook and other relevant information portals, for example, <http://www.chemspider.com>

Use will also be made of various in-house electronic resources and flash videos in chemistry for biologists available at <http://calcscience.uwe.ac.uk>

Student learning will be further supported through a variety of materials posted on the University's E-Learning Environment, Blackboard.

Contact: This module will run in semester 2.

Face-to face lectorials and workshops - 33 hours

Independent learning will take the following forms with an approximate indication of time required for each:

Essential reading to support acquisition of knowledge and completion of problem solving skills

exercises relating to lectorials and workshops – 40 hours

Preparation and submission of coursework 1 – 37 hours

Revision and preparation for exams – 37 hours

### Part 3: Assessment

Students will undertake lectorials and workshops based on synthesis of selected drugs and the principles of drug development.

The assessed coursework will be based on this material and consist of a series of questions and responses for students to complete and research in their own time.

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The examination will assess the students' knowledge acquired during lectures and workshops, and from their own directed, independent learning.

First Sit Components	Final Assessment	Element weighting	Description
Written Assignment - Component B		50 %	Worksheets with questions.
Examination (Online) - Component A	✓	50 %	Online examination (24 hours)
Resit Components	Final Assessment	Element weighting	Description
Written Assignment - Component B		50 %	Worksheets with questions.
Examination (Online) - Component A	✓	50 %	Online examination (24 hours)

### Part 4: Teaching and Learning Methods

Learning Outcomes	On successful completion of this module students will achieve the following learning outcomes:	
	<b>Module Learning Outcomes</b>	<b>Reference</b>
	Apply chemical knowledge to rationalise drug design, structural modification and synthesis	MO1
	Comment on chemical strategies used in drug development to control pharmacokinetics and delivery.	MO2
	Recognise and explain how physicochemical properties of drugs can be measured, and used to study and predict structure-activity relationships	MO3
	Describe and explain the action and development of selected examples of medicines and drugs	MO4
Contact Hours	<b>Independent Study Hours:</b>	
	Independent study/self-guided study	117
	<b>Total Independent Study Hours:</b>	117
	<b>Scheduled Learning and Teaching Hours:</b>	
	Face-to-face learning	33
	<b>Total Scheduled Learning and Teaching Hours:</b>	33
	<b>Hours to be allocated</b>	150
	<b>Allocated Hours</b>	150

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Reading List	<p><i>The reading list for this module can be accessed via the following link:</i></p> <p><a href="https://uwe.rl.talis.com/modules/usskb5-15-2.html">https://uwe.rl.talis.com/modules/usskb5-15-2.html</a></p>
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### Part 5: Contributes Towards

This module contributes towards the following programmes of study:

- Biomedical Science {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19
- Biomedical Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19
- Biomedical Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2018-19
- Biomedical Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2018-19
- Forensic Science {Foundation} [Sep][FT][Frenchay][5yrs] MSci 2018-19
- Forensic Science {Foundation} [Sep][SW][Frenchay][6yrs] MSci 2018-19
- Forensic Science {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2018-19
- Forensic Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19