Module Specification

Module Title	Advanced Pharmaceutical Chemistry	Module Code	CHE306U

Credit Value	15	Level	6	Mode of Delivery	On Campus		Semester B

Pre-requisite modules	Co-requisite modules	Overlapping modules
CHE206A and B		

1) Content Description

Provide a description of the module, as it will appear in the Module Directory and on the Student Information System (approx. 70-80 words).

This module is concerned with the principles of drug design, drug discovery and the relationship between the molecular structure of drugs and their biological activity. Topics to be covered include: how candidate drug structures are selected for synthesis, structure activity relationships, physico-chemical properties of compounds and how these may be employed to assist in the selection of drug candidates, organic synthetic methods that are of particular relevance to the preparation of drug-like molecules.The module will build upon the knowledge and understanding of pharmaceutical chemistry gained in CHE206A and B, and examines applications of the drug discovery process by focusing on specific disease areas such as cancer, where concepts and methods of current therapies and the structures and mechanisms of action of chemotherapeutic agents are studied.

2) Module Aims

Specify the aims of the module, i.e. the broad educational purposes for offering this module.

This module aims to enable students to understand, at a molecular level, the processes by which drugs may be discovered and developed, and the mechanisms by which anti-cancer drugs may act

3) Learning Outcomes

Identify the learning outcomes for this module, i.e. knowledge, skills and attributes to be developed through completion of this module. Outcomes should be referenced to the relevant QAA benchmark statements and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2008). The SEEC Credit Level Descriptors for Further and Higher Education 2003 and Queen Mary Statement of Graduate Attributes should also be used as a guiding framework for curriculum design.

Academic Content:	
A 1	Drug Discovery • How candidate drug structures can be selected for synthesis • Use of physico-chemical properties (drug-like parameters) of compounds to assist in the selection of drug candidates (e.g. Lipinski ‘rule of 5’, Veber rules, QSAR, Craig plots and Topliss Schemes)
A 2	Drug Synthesis • The main requirements for successful pharmaceutical process chemistry (scaling up the synthesis of pharmaceutical agents), including safety, environmental and economic issues. • The role Fluorine plays in pharmaceutical chemistry

A 3	Cancer Chemotherapy • How environmental factors can cause chemical changes in DNA which may lead to the development of cancer • The range of chemotherapeutic agents and their modes of action • The organic chemical mechanisms by which anticancer drugs act; • Key themes and general aspects of cancer, and current cancer chemotherapy • Personalised Medicine in cancer therapy

Disciplinary skills - able to:	
B1	Analyse the relationships between the physico-chemical and biological properties of drug-like substances and their molecular structures; use these analyses to design structural analogues with optimum properties.
B2	Critically evaluate synthetic routes to drug-like molecules, with regard to issues of safety, economics, selectivity and environmental sustainability.
B3	Use curved arrow notation to write reasonable mechanisms for chemical reactions involved in the synthesis of drug like molecules and in the mode of action of anticancer drugs, including the use of existing knowledge to make plausible proposals when faced with unfamiliar molecular structures.

Attributes:	
C1	Acquire and apply knowledge relating to the practice of pharmaceutical chemistry
C2	Produce analyses which are grounded in experimental evidence (e.g. spectroscopic data)
C3	Apply existing knowledge and skills to investigate unfamiliar problems.

4) Reading List

Provide an indicative reading list for the module. This should include key texts and/or journals but should not be an exhaustive list of materials.

- An introduction to Medicinal Chemistry, 6th Edition, G.L.Patrick, OUP, 2017,
- Organic Chemistry, 2nd Edition, J.Clayden, N.Greeves, S.Warren and P.Wothers, OUP, 2012,
- Chemistry and Pharmacology of Anticancer Drugs, D.E.Thurston, CRC Press/Taylor & Francis, 2007,
- Medicinal Chemistry of Anticancer Drugs, C.Avendano and J.C.Menendez, Elsevier Science, 2008

5) Teaching and Learning Profile

Provide details of the method of delivery (lectures, seminars, fieldwork, practical classes, etc.) used to enable the achievement of learning outcomes and an indicative number of hours for each activity to give an overall picture of the workload a student taking the module would be expected to undertake. This information will form the Key Information Set for each undergraduate programme and will be used to populate the KIS widget found on the QMUL programme information pages. More information can be found online about KIS. You may also wish to refer to the QAA guidance on contact hours when completing this section.

Activity Type	KIS Category	Time Spent (in hours)
Lecture	Scheduled	22
Practical Classes and Workshops	Scheduled	8
Guided Independent study	Independent	120
	Total	150

Specify the total module notional study hours. This should be a total of the hours given for each activity. The notional study hours for each academic credit point is 10. A 15 credit point module therefore represents 150 notional study hours.

Activity Type	Total Time Spent (in hours)	Percentage of Time Spent
Scheduled learning and teaching	30	20
Independent Study	120	80
Total	150	100

Use the information provided in the box above to specify the total time spent and the percentage time spent in each category of teaching and learning activity.

6) Assessment Profile

Provide details of the assessment methods used to assess the achievement of learning outcomes.

Description of Assessment	Assessment Type	KIS Category	Duration/Length	Percentage Weighting	Final element of assessment	Qualifying Mark
Coursework	Written Assignment	Coursework		10%	No	
Examination	Written Exam	Written	2 Hours and 30 Minutes	90%	Yes	

Final element of assessment: The assessment that takes place last. There should normally be only one element of assessment marked as final unless two assessment or submission dates occur on the same day.
Qualifying mark: A specified minimum mark that must be obtained in one or more elements of assessment in order to pass a module. This is in addition to, and distinct from, the requirement to achieve a pass in the module mark to pass the module.

Reassessment

Provide details of the reassessment methods used, specifying whether reassessment is either standard reassessment or synoptic reassessment.

○ Standard Reassessment ◉ Synoptic Reassessment

Synoptic reassessment details (if you have indicated synoptic reassessment above, please give details)		
Brief Description of Assessment	Assessment Type	Duration/Length of Examination/ Coursework
Resit Examination	Written Exam	2 Hours and 30 Minutes