Module Definition Form (MDF)

Module code: MOD005388	**Version:** 1 **Date Amended:** 21/Apr/2016

1. Module Title
Drug Design and Discovery

2a. Module Leader
Ibrahim Tolaymat

2b. School
School of Allied Health and Social Care

2c. Faculty
Faculty of Health, Medicine and Social Care

3a. Level
7

3b. Module Type
Standard (fine graded)

4a. Credits
30

4b. Study Hours
300

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This module focuses on the major processes and techniques used in designing and developing a drug as a chemical compound with one or more biological activities. Students will gain in-depth knowledge of the processes of finding a new target causing the disease, applying virtual and experimental models for compound/drug screening, identifying leading drug candidate for further development and performing preclinical research activities. In addition, students will debate the factors governing the relationship between drug chemical structure and biological activity and establish main approaches of the chemistry of synthesising new compounds. Face-to-face and online workshop activities are designed to discuss the principles of instrumental chemical analysis of drugs and to develop awareness of Good Laboratory Practice (GLP) to ensure that proper quality system and ethical considerations are established.

This module will cover the pre-formulation aspects of pharmaceuticals such as solubility, pH solubility and stability profiles, partition coefficients, determination of pKa, polymorphism, and compatibility studies of active ingredients and excipients. Case studies are employed to allow

students to critically establish, evaluate and/or debate approaches and techniques to improve drug interactions with the targets, to reduce toxicity, or to improve pharmacokinetic performance. Students are encouraged to take an independent approach to learning, for instance, by conducting critical reviews of the scientific literature and evaluating its relevance to particular scenarios. Contemporary or challenging issues are discussed with solutions sought through group discussions and workshops, for example, drug safety, ethical issues, the readiness of potential drug for clinical trial in humans and Pharmacovigilance.

This module will be taught by a collaborative team working of academic staff having extensive experience in pharmaceutical industry, specifically in drug discovery laboratories, and currently research active in this field. The content of the module will be delivered in parallel with content of *Advanced Pharmaceutics* module, hence giving student the opportunity for more intradisciplinary integration between drug discovery and dosage forms development. This will also prepare students develop drug development proposals that reflect their scientific practice.

6b. Outline Content

Introduction to the drug discovery process

Drug targets and screening

The role of pharmacokinetics and pharmacodynamics in drug design

Prediction of drug properties and chemical compatibility (including QSAR)

Transport Mechanisms (ADME) and how drug properties affect these

Evaluating the effectiveness of drug candidates and assessing drug safety.

Clinical trials and ethical issues

The value and relevance of in-vitro tests and in-vivo trials

Intellectual property in drug discovery

Regulatory authorities, affairs and applications

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources
None

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Critically discuss the development pathway of a drug from its initial discovery to extensive clinical trials and regulatory approval
2	Knowledge and Understanding	Critically validate the preformulation processes and the methods used to characterise and/predict the physicochemical properties of drugs
3	Knowledge and Understanding	Critically appraise the regulatory issues surrounding the drug development process and the functions of the regulatory bodies involved
4	Intellectual, practical, affective and transferrable skills	Use advanced analytical and spectroscopic techniques to discuss the relationship between the chemical structure of a drug and therapeutic and medicinal properties
5	Intellectual, practical, affective and transferrable skills	Demonstrate the ability to identify priorities in drug discovery and development to diagnose, tackle and resolve issues related to safety and quality assurance

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	24	1-5	2 hours per week (12 weeks) combining lectures and seminars
Other teacher managed learning	24	1-5	2 x 4 hours laboratory session 4 x 4 hours workshops. Opportunity for formative assessment during course delivery
Student managed learning	252	1-5	Guided study engaging in collaborative online learning activities (VLE) which is student managed and resource-based
TOTAL:	300		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Examination Chelmsford	1-3	50 (%)	Fine Grade	40 (%)
MCQ + SAQ, 2000 words equivalent (2 hours exam)					

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Coursework	4-5	50 (%)	Fine Grade	40 (%)
A proposal equivalent of 3000 words in format of grant application					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]