

Course Handbook  
**MSc Drug Discovery and Development**

2019/2020

Course Leader: Dr Enoche Oga

School of Pharmacy and Biomedical Sciences



Please read this Handbook in conjunction with the University's Student Handbook.

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## **1. Welcome to the course**

Welcome to the School of Pharmacy and Biomedical Sciences. We hope that you will enjoy your studies and experiences here at the University of Central Lancashire (UCLan), Preston. The student handbook provides information to help you answer queries that you may have about the course. If you think that we have missed something that you think should be included in the handbook, please feel free to discuss it with your Course Leader.

The MSc in Drug Discovery and Development programme is designed for students wishing to pursue either a career in the pharmaceutical industry or an allied discipline. The course has been developed with the aim of giving graduates the necessary knowledge and practical skills to become valuable team members within the pharmaceutical industry, with particular emphasis in the drug development process, appraising the journey of a medicine from discovery to product marketing.

This Handbook is intended to be a user-friendly and informative guide to your Master's degree programme. It offers a lot of essential information about the structure and content of your course and provides guidance on important issues such as studying, learning and assessment. Although sections of this Handbook may seem rather daunting at first, you will find them invaluable as you progress through your studies. This means that it is important to read your Handbook carefully, and that you should keep it handy for future reference throughout your studies at UCLan. Please note that this Handbook is not the only source of information that you need to consult. It needs to be read in conjunction with a number of other documents, in particular:

- The Module information which are produced for each module, detailing information on timetabling, lecture schedule, details of assessments and deadlines for submission of assignments.
- The Programme Specification for your degree course, which is included in the Handbook as an Appendix. This offers you a summary of the aims, learning outcomes, assessment and overall structure of the course in a condensed format.
- The School of Pharmacy and Biomedical Sciences Website (<http://www.uclan.ac.uk/schools/pharmacy/>) and the appropriate ELearn (Blackboard) support domains which provide electronic versions of all key documents associated with your course.

The University offers many opportunities: not just to learn about drug discovery and development, but also to engage in a wide range of social or sporting activities, to make new friends, develop your personal skills, and employability. You will have a great deal of independence, but with this comes responsibility. You must balance your use of time to get the most out of University while making sure that you obtain a qualification that reflects your abilities.

We want this to be a positive learning experience for you. You are expected to engage in hard work, but we hope that you will find it interesting and stimulating, and that you will have the chance to enjoy yourself along the way. We believe you can succeed, and we want you to succeed. The academic and support staff are here to help you achieve that goal.

Good luck!

## 1.1 Rationale, aims and learning outcomes of the course



- To provide an overview of drug discovery and development, with insights into the molecular basis of disease, drug targets and their validation, identification of lead compounds, structure-based drug design and analytical and synthetic techniques.
- To develop a holistic knowledge of the drug development process, including quality control/assurance and regulatory science
- To provide deeper insight into the regulatory and commercial aspects of management in the pharmaceutical industry
- To extend the student's knowledge of biopharmaceutics, pharmacokinetics and toxicology, emphasising the practical application of these disciplines.
- To develop the necessary skills to critically evaluate and discuss scientific literature and to communicate these findings.
- To develop within the context of drug discovery, a comprehensive understanding of communication, research skills and scientific methods.
- To produce scientists who are focused on drug discovery and development and who possess the key skills required for independent evaluation of data, critical evaluation of the scientific literature, and for the writing of scientific reports.
- To produce post-graduates with a knowledge and skills base that allows pursuit of both scientific and non-scientific careers in a variety of pharmaceutical work environments.
- To enable graduates to develop professional skills such as good laboratory practice, basics of good manufacturing practice, as well as transferable skills

## 1.2 Course Team

Below is the list of members of academic staff who will be teaching you during your time at UCLan.

Name	Email address	Subject area	Room number	Extension number
Ann Urmston	<a href="mailto:Aurmston@uclan.ac.uk">Aurmston@uclan.ac.uk</a>	Pharmacy practice	MB026	5837
Dr. Abdullah Isreb	<a href="mailto:Alsreb@uclan.ac.uk">Alsreb@uclan.ac.uk</a>	Crystallography & nanoformulation	MB032	5818
Dr. Amina Ferraz	<a href="mailto:Aferraz@uclan.ac.uk">Aferraz@uclan.ac.uk</a>	Respiratory drug delivery	MB240	5835
Dr. Christopher Smith	<a href="mailto:CGSSmith@uclan.ac.uk">CGSSmith@uclan.ac.uk</a>	Pharmacology	MB139	5845
Dr. Clare Lawrence	<a href="mailto:CLLawrence@uclan.ac.uk">CLLawrence@uclan.ac.uk</a>	Cell & molecular biology	MB64	5809
Dr. Enoche Oga	<a href="mailto:EOga@uclan.ac.uk">EOga@uclan.ac.uk</a>	Biopharmaceutics & absorption enhancement	MB024	5842
Dr. Leroy Shervington	<a href="mailto:LAShervington@uclan.ac.uk">LAShervington@uclan.ac.uk</a>	Drug Design and Pharmaceutical Analysis	MB027	3519
Dr. Marta Krysmann	<a href="mailto:MKrysmann@uclan.ac.uk">MKrysmann@uclan.ac.uk</a>	Pharmaceutical Chemistry	MB140	3502
Dr. Mohamed Alhnan	<a href="mailto:MAIbedAlhnan@uclan.ac.uk">MAIbedAlhnan@uclan.ac.uk</a>	3D Printing & personalised medicine	MB025	3590
Dr. Mohamed Elsayy	<a href="mailto:Melsawy@uclan.ac.uk">Melsawy@uclan.ac.uk</a>	Hydrogels & nanomedicine	MB241	5840
Dr. Sarah Wilson	<a href="mailto:SEWilson@uclan.ac.uk">SEWilson@uclan.ac.uk</a>	Pharmacy practice and Ethical	MB066	5821
Dr. Tim Snape	<a href="mailto:Tjsnape@uclan.ac.uk">Tjsnape@uclan.ac.uk</a>	Pharmaceutical Chemistry	MB065	5805
Dr. Zhengyuan Zhou	<a href="mailto:ZZhou2@uclan.ac.uk">ZZhou2@uclan.ac.uk</a>	Advanced drug delivery systems	MB210	5803
Prof. Kamalinder Singh	<a href="mailto:KSingh1@uclan.ac.uk">KSingh1@uclan.ac.uk</a>	Drug delivery and Nanomedicine	MB031	5843
Prof. Rob Forbes	<a href="mailto:RTForbes@uclan.ac.uk">RTForbes@uclan.ac.uk</a>	Biopharmaceutics & nanotechnology	MB005	3513

### 1.3 Expertise of staff

**Most of the course is delivered by university staff, including those with experience of working in the pharmaceutical industry. Some sessions will be delivered by visiting lecturers who work in the sector; they will be invited to speak with authority from their own experience and expertise.** The academic staff that are involved in teaching you are all highly qualified and specialists in the areas that they deliver. All staff are engaged in research and/or scholarly activity which helps enrich your experiences with cutting edge knowledge and practical skills. You are welcome to visit the staff's profiles – <http://www.uclan.ac.uk/schools/pharmacy/staff.php>.

### 1.4 Academic Advisor

You will be assigned an Academic Advisor who will provide additional academic support during the year. They will be the first point of call for many of the questions that you might have during the year. Your Academic Advisor will be able to help you with personal development, including developing skills in self-awareness, reflection and action planning.

Your academic advisor will be:

Name:	Dr Enoche Oga.	Room number: Maudland MB024
Email address:	<a href="mailto:EOga@uclan.ac.uk">EOga@uclan.ac.uk</a> .	Extension number: 5842



### 1.5 Administration details

Course Administration Service provides academic administration support for students and staff and are located in the following hubs which open from 8.45am until 5.15pm Monday to Thursday and until 4.00pm on Fridays. The hub can provide general assistance and advice regarding specific processes such as extenuating circumstances, extensions and appeals.

#### **Foster Building**

Pharmacy and Biomedical Sciences

Telephone: 01772 891990/891991

Email: [FosterHub@uclan.ac.uk](mailto:FosterHub@uclan.ac.uk)

### 1.6 Communication



The University expects you to use your UCLan email address and check regularly for messages from staff. If you send us email messages from other addresses they risk being filtered out as potential spam and discarded unread.

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The course team normally communicate by email, ELearn (Blackboard), notice-boards and frequently by phone and they usually respond to requests as soon as convenient, bearing in

mind that they could be preoccupied and are not always immediately available. Staff will also have office hours for students as well. If not provided, appointments can be made easily through emails.

Staff are quite friendly and approachable and they are always happy to help.

### 1.7 External Examiner

The University has appointed an External Examiner to your course who helps to ensure that the standards of your course are comparable to those provided at other higher education institutions in the UK. If you wish to make contact with your External Examiner, you should do this through your Course Leader and not directly. External Examiner reports will be made available to you electronically (Blackboard Course area

The external examiner for this course is;

Prof. Paul McCarron

Head of School of Pharmacy and Pharmaceutical Sciences

School of Pharmacy and Pharmaceutical Sciences

University of Ulster

## 2. Structure of the course

### 2.1 Overall structure

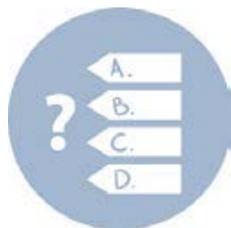
The award of the post-graduate degree of Master of Science via full time study requires you to gain 180 credits over one year study period. Extension of this period may be granted by the University by exception. The modules for the award of an MSc in Drug Discovery and Development degree are shown in Table 1, and the course structure so that the credits can be gained is shown in Figure 1.



Semester 1	Semester 2	Semester 3
Research Methods and Principles (10 credits) – <b>PJ4011</b>	Research Development (10 credits) – <b>PJ4014</b>	Research Project (60 credits) – <b>PJ4015</b>
Drug Development and Discovery (30 credits) – <b>PJ4012</b>	Quality and Regulatory Sciences (30 Credits) – <b>PJ4018</b>	
Fundamentals of Formulation Drug Delivery and Biopharmaceutics(20 Credits) – <b>PJ4013</b>	Advanced Medicinal Chemistry (20 Credits) – <b>PJ4019</b>	

Figure 1: Programme outline

## 2.2 Modules available



Each module is a self-contained block of learning with defined aims, learning outcomes and assessment. A standard module is worth 20 credits. It equates to the learning activity expected from one sixth of a full-time year. Modules may be developed as half or double modules with credit allocated up to a maximum of 120 credits per module.

### **PJ4011 Research Methods and Principles**

The aim of the module is to provide the student with transferable career skills that are related to the pharmaceutical sciences. The module aims to provide the student with an understanding of research principles and develop research skills and knowledge necessary to undertake research in the area of pharmaceutical sciences.

### **PJ4012 Drug Development and Discovery**

This full module will provide students with a systematic overview of the drug discovery and development process from drug discovery to market. Discussion on the scientific, regulatory and commercial principles that underpin the pharmaceutical drug development process will be included. Students will therefore gain an insight into the whole process of drug development, from target identification through to product marketing. In addition, this module will enable students to adopt a reflective and analytical approach towards their learning, in order to develop a critical awareness and understanding on both the technical and ethical issues often encountered in drug discovery and development. The module adopts a reflective and analytical approach to learning and encourages students to take an independent approach to learning, for instance, by seeking and referring to the scientific literature for information and evaluating its relevance to particular scenarios.

### **PJ4013 Fundamentals of Formulation, Drug Delivery & Biopharmaceutics**

The module will explore the key physicochemical properties required for a drug candidate to turn into a drug product. In addition to that, the module will discuss how the physicochemical properties of a drug influence its bioavailability. The fundamental principles of formulating small molecules with particular focus on oral route will be one of the key area to focus on as well. Students will explore the influence of formulation on the bioavailability of drugs and study about the various routes of drug administration available to the formulation scientist. This module will also explore the fundamentals of pharmacokinetics and toxicology in drug development.

### **PJ4014 Research Development**

The aim of this module is to deepen students' research skills so that they are able to apply the research methods principles to develop a well thought thorough research proposal supported by a preliminary literature review in a way that demonstrates reflective learning. This will enable the student to develop the research skills and knowledge necessary to undertake an independent research project.

## **PJ4018 Quality and Regulatory Sciences**

This module aims to develop a thorough understanding and appreciation of the concepts of quality assurance, including quality by design concepts and validation of analytical and process systems. Clinical trial design and protocols will be considered in this module as will the regulatory processes required for the development and marketing of medicines.

## **PJ4019 Advanced Medicinal Chemistry**

To develop an in-depth understanding of the strategies and techniques involved in drug discovery, design, and development. The practical aspect of this module complements the theory thus reinforcing understanding of the principles of medicinal chemistry.

## **PJ4015 Research Project**

The Individual Research Project is the culmination of the MSc Programme, where students are required to carry out a research project. The aim of the research project is to provide students with the opportunity to study a topic in depth, obtain practical experience of research methodologies and in the presentation of scientific data, both orally and as a written report. It also gives the student an opportunity to plan, conduct and report a research project in the field of industrial pharmaceuticals. To further develop the student's ability to formulate hypotheses and through the process of effective decision making, employ relevant experimental strategies. To engender a spirit of enquiry in both the practical and theoretical aspects of research. To encourage students to apply the knowledge gained in the academic programme to a research programme. To expand the student's ability to critically evaluate experimental methods and analyse data.

### **2.3 Course requirements**

Modules will be received at the School Postgraduate Assessment Board at the end of each semester. Unless specifically stated in the module descriptors, you will be expected to receive a pass mark. Students not achieving a passing module mark may be re-assessed in the deficient component(s).

### **2.4 Module Registration Options**

You will receive feedback, within modules from your module leader, module or tutors. You should use this feedback as a basis for reflecting on your academic progress as you proceed through the course. Discussions about your progression through the course normally take place in February each year. It is an opportunity for you to make plans for your study over the next academic year. The course team will tell you about the various modules / combinations available and you will both agree on the most appropriate (and legal) course of study for you.

If you wish to discuss the progression information of yours or you are worried about your progression you can contact your academic advisor and discuss your progression and options with them.

## 2.5 Study Time

### 2.5.1 Weekly timetable

A timetable will be available once you have enrolled on the programme, through the student portal.

### 2.5.2 Expected hours of study

20 credits is a standard module size and equals 200 notional learning hours.

The normal amount of work involved in achieving a successful outcome to your studies is to study for 10 hours per each credit you need to achieve – this includes attendance at UCLan and time spent in private study.

Normally you will have face-to-face contact with a member of academic staff ranging from 15-18 hours/week. This contact will be in the form of lectures, laboratory sessions, tutorials and workshops. All the modules studied under the course have module booklets which provide you with module outline and aims. These booklets can be accessed via ELearn (Blackboard). Placements involving the pharmaceutical industry are also compulsory for participation.



### 2.5.3 Attendance Requirements

You are required to attend all timetabled learning activities for each module. Notification of illness or exceptional requests for leave of absence must be made through FosterHub. Students should report non-attendance to the hub email ([FosterHubAttendance@uclan.ac.uk](mailto:FosterHubAttendance@uclan.ac.uk)) or by telephoning the hub on 01772 891990 or 01772 891991. You MUST attend your course of study regularly; under visa agreements for international students, UCLan is obliged to inform UKVI if you withdraw from a course, defer or suspend your studies, or if you fail to attend the course regularly.

You may check your attendance record regularly. Details about absence will be recorded on the students' profile and may be shared with their future employers when reference letters are requested.

## 3. Approaches to teaching and learning

### 3.1 Learning and teaching methods

Fundamentally, you are committed to study diligently and systematically on your chosen degree programme in order to learn and understand. We expect you to acquire new knowledge, general (transferable) and subject-specific skills during your time in the School. The type of learning that you will acquire is indicated in the Programme Specifications for the course, include at the end of this Handbook. Learning is generally expressed in the form of Learning Outcomes and these are descriptions of what you will be able to do upon completion of your Masters degree course as a whole, or upon completion of an individual module.

All module descriptors list the Learning Outcomes that you are expected to demonstrate upon completion and the purpose of assessments (see below) is to test your success in achieving these learning outcomes.

1. Attending the timetabled sessions.
2. Completion of assessment requirements (including prompt submission of coursework and attendance at all examinations).
3. Supplementing the taught sessions by reading and using all learning material recommended by the Module tutor – this out of class investment on your part is specified as ‘directed learning’ or ‘independent learning’.
4. Playing an active role in seminars tutorials, group work and in-class discussions/debates.

The majority of modules have been divided into a number of specific topics, where lectures will be delivered by recognised specialists in the field who will guide you on current state of development of the subject, as well as indicating future developments. This will be supported by independent learning using a case study/problem solving/data interpretation approach. You will be given guided reading based on the current literature and will be expected to work independently to gain further information on the topic, thereby extending your knowledge and understanding beyond the lecture material.

Your learning process will culminate in submitting assignments, which require assimilation and expression of the knowledge and understanding gained during formal guided and independent learning.

The final semester involves a laboratory-based research project, where you will be working independently on a specific topic of interest to a research group within the School. The project constitutes a key element in the programme and provides you with the opportunity to enhance your practical skills and engender a spirit of enquiry in an area of research associated with one or more specialist disciplines. You will become experienced in research methods, develop the ability to appraise critically information and display logical and literary skills in the final project report. The project will be housed within the postgraduate research laboratories under the supervision of research active staff. Some research projects may be supervised jointly between academic staff in the School of Pharmacy and Biomedical Sciences and appropriately qualified clinicians.

### **3.2 Study skills**

The University has an excellent study skills support facility for students called WISER. WISER is an acronym for the two ways in which you may wish to make use of this service.

**Walk-In Study Enhancement through Review** drop in, one to one tutorial consultations, which is available to all students during term-time. The focus is on specific and individual needs.

Wiser Interactions for **Study Enhancement** and **Review** workshops on topics of direct relevance to students' study needs. The workshops are not credited and are weekly per semester. See [The Student Portal](#) for further details.

[https://portal.uclan.ac.uk/webapps/portal/frameset.jsp?tab\\_tab\\_group\\_id=\\_33\\_1](https://portal.uclan.ac.uk/webapps/portal/frameset.jsp?tab_tab_group_id=_33_1)

For international students, you may wish to access the services offered by the [UCLan International Office](#) Student Support Team.

For technical support:

LIS [https://portal.uclan.ac.uk/webapps/portal/frameset.jsp?tab\\_tab\\_group\\_id=\\_25\\_1](https://portal.uclan.ac.uk/webapps/portal/frameset.jsp?tab_tab_group_id=_25_1)



### **3.3 Learning resources**

#### **3.3.1 Learning Information Services (LIS)**

Extensive resources are available to support your studies provided by LIS – library and IT staff. Take advantage of the free training sessions designed to enable you to gain all the skills you need for your research and study.

#### **3.3.2 Electronic Resources**

LIS provide access to a huge range of electronic resources – e-journals and databases, ebooks, images and texts.

### **3.4 Personal development planning**

The School's PDP programme is based around core modules and assessments rather than stand-alone modules. You are introduced to the idea of PDP and career planning through sessions in induction week, including a talk from a careers advisor or employer and meetings with your Academic Advisor. Reflection and self-assessment on your achievements and goal setting is supported by linking selected coursework to the reflection process. Each course team has identified the coursework to be included in the scheme so that it covers a wide range of skills.



#### **3.5 Preparing for your career**

Your future is important to us, so to make sure that you achieve your full potential whilst at university and beyond, your course has been designed with employability learning integrated into it. This is not extra to your degree, but an important part of it which will help you to show future employers just how valuable your degree is. These “Employability Essentials” take you on a journey of development that will help you to write your own personal story of your time at university:

- To begin with, you will explore your identity, your likes and dislikes, the things that are important to you and what you want to get out of life.
- Later, you will investigate a range of options including jobs and work experience, further postgraduate study and self-employment.
- You will then be ready to learn how to successfully tackle the recruitment process.

It's your future: take charge of it!

Careers offers a range of support for you including:-

- career and employability advice and guidance appointments
- support to find work placements, internships, voluntary opportunities, part-time employment and live projects
- workshops, seminars, modules, certificates and events to develop your skills

Daily drop in service available from 09:00-17:00 for CV checks and initial careers information. For more information, access our careers and employability resources via the Student Portal.

Links with the pharmaceutical industry have been incorporated into the Programme to help students familiarise themselves with the opportunities available when they graduate.

#### **4. Student Support**

We are sure that in the next few days you will make friends with people on your course and this friendship could last for much longer than the year you will be at UCLan. If there are any questions or queries you may wish have answered, your first port of call is normally your Course Leader. There is always one of the School's administration staff available to provide some guidance and the office is located on the ground floor of Foster Hub. The 'i' located in the library is also a very good source of information and they are always happy and willing to provide advice on a variety of areas. During Induction week you will also be introduced to the student/staff liaison officer who is a valuable source of information and guidance on numerous aspects of student life here at UCLan. A student representative of the course will be elected during the first few weeks of the course and they are also an important contact.



##### **4.1 Academic Advisors**

The role of academic advisor has already been mentioned within this handbook (Section 1.4) and will help to support and guide you as you progress through this Masters level course. Academic advisor is the term used to describe the lecturer who supports you throughout the whole of the course, through developing a relationship which facilitates personal and academic growth. S/he will provide general academic advice, monitor your attendance, offer general and personal support and write references (if required). For MSc Drug Discovery and Development, it is likely that your academic advisor will be your course leader, and you should arrange to meet with him/her at least once during the academic year, plus at other times if you have worries regarding the course. You will be assigned an Academic Advisor during the Welcome Week. The Academic Advisor will generally be a member of the Academic Staff who has a good knowledge and understanding of your course and is most likely involved to some degree in teaching specific material covered in your course.

The role of the Academic Advisor is to meet regularly with you and to provide a focal point for academic development, to provide individual feedback on progress, to help identify areas

requiring improvement and discuss strategies for achieving this, and to monitor attendance and progress through the course.

The Academic Advisor also provides academic guidance to students following Assessment Boards. In addition, Academic Advisor should provide personal support, taking account of current problems in the student's life and be available for informal appointments through email or requests via availability sheets posted on staff doors or on-line appointment sheets. Students are also supported by the Course Leaders.

#### **4.2 Students with disabilities**

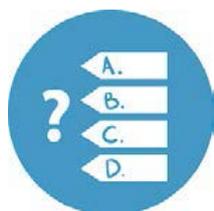
If you have a disability that may affect your studies, please either contact the Disability Advisory Service - [disability@uclan.ac.uk](mailto:disability@uclan.ac.uk) - or let one of the course team know as soon as possible. With your agreement information will be passed on to the Disability Advisory Service. The University will make reasonable adjustments to accommodate your needs and to provide appropriate support for you to complete your study successfully. Where necessary, you will be asked for evidence to help identify appropriate adjustments.

#### **4.3 Students' Union**

The Students' Union offers thousands of volunteering opportunities ranging from representative to other leadership roles. We also advertise paid work and employ student staff on a variety of roles. You can find out more information on our website:

<http://www.uclansu.co.uk/>

### **5. Assessment**



#### **5.1 Assessment Strategy**

The School recognises the main purposes of assessment as the diagnosis of strengths and weaknesses; encouragement to be involved in determining your own performance; and testing the achievement of the learning outcomes. Assessment is continuous and comprises formative and summative methods. Formative assessment encourages the development of personal self-awareness and self-evaluation such that corrective change can be instigated by the individual. This formative feedback is central to the development of the student from a dependent to independent worker which is at the heart of the programme philosophy. The nature of formative assessment varies between modules. In some there are short tests or essays, in others there is informal feedback via activities such as tutorials or discussion of experiment results during laboratory sessions.

The summative assessment strategy in each module is designed to best test the achievement of the module learning outcomes. A range of assessment methods are utilised including essays; data interpretation/analysis; both written and practical reports; group and individual presentations, phase tests/drop quizzes; posters; examinations; competence assessments; research project reports. Some of the above are on a group basis, and in this case there is an element of peer assessment. Thus assessments are extremely important and you should devote sufficient time to each one and plan your work accordingly. The

assessments of each module address specific learning outcomes listed in the programme specifications, so by the time you complete your course, you should have covered all the learning outcomes.

The criteria used for marking work at Masters level can be found in Section G of UCLan's Academic Regulations.

## **5.2 Notification of assignments and examination arrangements**

Modules handbooks will contain information about assessments strategy used in that module in addition to the deadline for that assessment whether it is a coursework or a lab report or even a written exam.

Students will be informed as well about these assessments strategy in each module in the introduction session (first session) of each module.

## **5.3 Referencing**

It is normal School policy to use the Harvard style of referencing. Below are a few examples, you will be given a lot more guidance in your modules.

Citing authors in the text:

**Single author:** The salt form of a drug affects the dissolution rate (Smith, 2010)

**Two authors:** The salt form of a drug affects the dissolution rate (Smith and Jones, 2010)

**Three or more authors:** The salt form of a drug affects the dissolution rate (Smith *et al.*, 2010)

Citations for a reference list:

Hawe, A., Hulse, W.L., Jiskoot, W. and Forbes, R.T., 2011. Taylor dispersion analysis compared to dynamic light scattering for the size analysis of therapeutic peptides and proteins and their aggregates. *Pharmaceutical research*, 28(9), pp.2302-2310.

## **5.4 Confidential material**

You are not expected to access confidential information during the course, and you need to be aware of ethical and legal responsibilities to respect confidentiality and maintain anonymity of individuals and organisations.

## **5.5 Cheating, plagiarism, collusion or re-presentation**

Please refer to the information included in section 6.6 of the University Student Handbook for full definitions. The University uses an online Assessment Tool called Turnitin. A pseudo-Turnitin assignment will be set up using the School space on Blackboard to allow students to check as many drafts as the system allows before their final submission to the 'official' Turnitin assignment. Students are required to self-submit their own assignment on Turnitin and will be given access to the Originality Reports arising from each submission. In

operating Turnitin, Schools must take steps to ensure that the University's requirement for all summative assessment to be marked anonymously is not undermined and therefore Turnitin reports should either be anonymised or considered separately from marking. Turnitin may also be used to assist with plagiarism detection and collusion, where there is suspicion about individual piece(s) of work.

You are required to sign a declaration indicating that individual work submitted for an assessment is your own.

If you attempt to influence the standard of the award you obtain through cheating, plagiarism or collusion, it will be considered as a serious academic and disciplinary offence as described within the [Academic Regulations](#) and the [Assessment Handbook](#) .

- Cheating is any deliberate attempt to deceive and covers a range of offences described in the [Assessment Handbook](#).
- Plagiarism describes copying from the works of another person without suitably attributing the published or unpublished works of others. This means that all quotes, ideas, opinions, music and images should be acknowledged and referenced within your assignments.
- Collusion is an attempt to deceive the examiners by disguising the true authorship of an assignment by copying, or imitating in close detail another student's work - this includes with the other student's consent and also when 2 or more students divide the elements of an assignment amongst themselves and copy one another's answers. It does not include the normal situation in which you learn from your peers and share ideas, as this generates the knowledge and understanding necessary for each individual to independently undertake an assignment; nor should it be confused with group work on an assignment which is specifically authorised in the assignment brief.
- Re-presentation is an attempt to gain credit twice for the same piece of work.

Please pay attention to the plagiarism and writing exercise in the induction week to help you avoid plagiarism and re-presentation of your work.

The process of investigation and penalties which will be applied can be reviewed in the [Assessment Handbook](#). If an allegation is found to be proven then the appropriate penalty will be implemented:

In the case of a single offence of cheating, plagiarism, collusion or re-presentation:

- The penalty will be 0% for the element of assessment, and an overall fail for the module.
- The plagiarised element of assessment must be resubmitted to the required standard and the mark for the module following resubmission will be restricted to the minimum pass mark.
- When it is detected for the first time on a resubmission for an already failed module, no further resubmission for the module will be permitted, and the appropriate fail grade will be awarded.

In the event of a repeat offence of cheating, plagiarism, collusion or re-presentation (irrespective of whether the repeat offence involves the same form of unfair means) on the same or any other module within the course:

- The appropriate penalty will be 0% for the module with no opportunity for reassessment. This penalty does not preclude you being able to retake the module in a subsequent year.

The penalties will apply if you transfer from one UCLan course to another during your period of study and module credits gained on the former course are transferred to the current course.

Contact the [Students' Union Advice and Representation Centre](#) by emailing: [suadvice@uclan.ac.uk](mailto:suadvice@uclan.ac.uk) for support and guidance.

## 6. Classification of Awards

The University publishes the principles underpinning the way in which awards and results are decided in [Academic Regulations](#). Decisions about the overall classification of awards are made by Assessment Boards through the application of the academic and relevant course regulations.

The Examination Board is the final decision making board of the course. At this board the results of the Research Projects (PJ4015) will be received and the results of the modules from semester 1 and 2 will be ratified subject to final ratification by the University Academic Board. It is at this board where the awards are made.



## 7. Student Feedback

You can play an important part in the process of improving the quality of this course through the feedback you give.

In addition to the on-going discussion with the course team throughout the year, there are a range of mechanisms for you to feedback about your experience of teaching and learning. We aim to respond to your feedback and let you know of our plans for improvement.

The Students' Union can support you in voicing your opinion, provide on-going advice and support, and encourage your involvement in all feedback opportunities. They will be requesting that you complete the National Student Survey (during semester 2 for students in their final year of study) or the UCLan Student Survey (all other students).

The Students' Union and University work closely together to ensure that the student voice is heard in all matters of student-life. We encourage students to provide constructive feedback throughout their time at university, through course reps, surveys and any other appropriate means,

The Union's Student Affairs Committee (SAC), members of Students' Council and School Presidents each have particular representative responsibilities, and are involved with decision making committees as high as the University Board. Therefore it is very important

students engage with the democratic processes of the Students' Union and elect the students they see as most able to represent them.

### **7.1 Student Staff Liaison Committee meetings (SSLCs)**

Details of the Protocol for the operation of SSLCs is included in section 8.2 of the University Student Handbook. The purpose of a SSLC meeting is to provide the opportunity for course representatives to feedback to staff about the course, the overall student experience and to inform developments which will improve future courses. These meetings are normally scheduled once per semester. Meetings will be facilitated using guidelines and a record of the meeting will be provided with any decisions and / or responses made and / or actions taken as a result of the discussions held. The meetings include discussion of items forwarded by course representatives, normally related to the following agenda items (dependent on time of year).

The course team encourage student feedback in all areas and recognise that additional items for discussion may also be raised at the meeting • Update on actions completed since the last meeting

- Feedback about the previous year – discussion of external examiner's report; outcomes of National /UCLan student surveys.
- Review of enrolment / induction experience;
- Course organisation and management (from each individual year group, and the course overall);
- Experience of modules - teaching, assessment, feedback;
- Experience of academic support which may include e.g. Personal Development Planning, Academic Advisor arrangements;
- Other aspects of University life relevant to student experience e.g. learning resources, IT, library;
- Any other issues raised by students or staff.

During induction week your course leader will ask you to volunteer to be a representative. Normally the representatives elected will continue in the post for the duration of the course. However, this is not mandatory and new representative(s) can be elected if required.

Representatives will be notified by the CAS Hub of the date and times of SSLC meetings. There will be an agenda and minutes will be taken. Once the minutes have been agreed by the Chair of the SSLC they will be emailed to the representatives.

## 8. Appendices

### 8.1 Programme Specification(s)

#### UNIVERSITY OF CENTRAL LANCASHIRE

#### Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

***Sources of information on the programme can be found in Section 17***

1. Awarding Institution / Body	University of Central Lancashire
2. Teaching Institution and Location of Delivery	University of Central Lancashire
3. University School/Centre	School of Pharmacy and Biomedical Sciences
4. External Accreditation	N/A
5. Title of Final Award	M.Sc. Drug Discovery and Development
6. Modes of Attendance offered	Full time
7a) UCAS Code	N/A
7b) JACS Code (only required for <b>NEW</b> programmes)	B290
8. Relevant Subject Benchmarking Group(s)	N/A
9. Other external influences	N/A
10. Date of production/revision of this form	<b>August 2017</b>
11. Aims of the Programme	<ul style="list-style-type: none"><li>To provide an overview of drug discovery and development, with insights into the molecular basis of disease, drug targets and their validation, identification of lead compounds, structure-based drug design and analytical and synthetic techniques.</li></ul>

<ul style="list-style-type: none"> <li>• To develop a holistic knowledge of the drug development process, including quality control/assurance and regulatory science.</li> </ul>
<ul style="list-style-type: none"> <li>• To provide deeper insight into the regulatory and commercial aspects of management in the pharmaceutical industry.</li> </ul>
<ul style="list-style-type: none"> <li>• To extend the student's knowledge of biopharmaceutics, pharmacokinetics and toxicology, emphasising the practical application of these disciplines.</li> </ul>
<ul style="list-style-type: none"> <li>• To develop the necessary skills to critically evaluate and discuss scientific literature and to communicate these findings.</li> </ul>
<ul style="list-style-type: none"> <li>• To develop within the context of drug discovery, a comprehensive understanding of communication, research skills and scientific methods.</li> </ul>
<ul style="list-style-type: none"> <li>• To produce scientists who are focused on drug discovery and development and who possess the key skills required for independent evaluation of data, critical evaluation of the scientific literature, and for the writing of scientific reports.</li> </ul>
<ul style="list-style-type: none"> <li>• To produce post-graduates with a knowledge and skills base that allows pursuit of both scientific and non-scientific careers in a variety of pharmaceutical work environments.</li> </ul>
<ul style="list-style-type: none"> <li>• To enable graduates to develop professional skills such as good laboratory practice, basics of good manufacturing practice, as well as transferable skills</li> </ul>

## 12. Learning Outcomes, Teaching, Learning and Assessment Methods

### A. Knowledge and Understanding

Students will be able to:

- A1. Identify and validate drug targets, identification and design of drug molecules, pre-clinical development of drug molecules and formulation to medicines, clinical trials, regulatory affairs and drug licensing.
- A2. Evaluate a wide range of practical techniques utilised in the drug discovery process including key characterisation, analytical and experimental techniques used in drug discovery and development including, computer modelling in structure-based drug design
- A3. Apply specialist scientific fields in drug discovery and development to relevant problems.
- A4. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution.
- A5. Evaluate and critically appraise the challenges encountered in the development of new drugs and the steps being taken by the pharmaceutical industry to address these problems, with specific emphasis on the introduction of new technologies.
- A6. Construct a scientifically credible research project and demonstrate the requirements for it to be undertaken in a safe, effective and logical manner.

### Teaching and Learning Methods

This would comprise;

- Laboratory practical investigation sessions, Lectures, Seminars, Demonstration of equipment and techniques, Independent learning from guided texts and work books, Research projects, Presentations, Problem based learning exercises, Placement visits to the pharmaceutical industry, Case studies, Discussions and reflection, And Group projects

### Assessment methods

- Group and individual presentations, Examinations, Posters, with oral questioning at the poster session, Case studies, Essays, Journal club presentation, Scientific reports, Innovation project, Practical report, Major project report, Literature surveys (formative and summative), And Data interpretation exercises
- 

### B. Subject-specific skills

Students will be able to:

- B1. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution.
- B2. Identify and discuss ethical and safety issues surrounding experimentation within the general area of drug discovery.

- B3. Work accurately, in an organised and safe manner across a range of major experimental techniques used in the design and discovery of new drugs.
- B4. Appraise quality assurance issues relevant to drug products in development and manufacture, taking into consideration quality by design (QbD) approach in drug development and process of analytical technology.
- B5. Discuss active molecule physicochemical properties and design to predict/evaluate bioavailability drugs.
- B6. Apply advanced skills in interpretation and discussion of data and extrapolate the significance of the results to the pharmaceutical industry/community at large
- B7. Plan and implement good and consistent practice, reliably recording methods and results using appropriate methods to critically analyse the data and evaluate the level of its uncertainty.

#### **Teaching and Learning Methods**

This would comprise;

- Laboratory practical investigation sessions, Lectures, Seminars, Demonstration of equipment and techniques, Independent learning from guided texts and work books, Research projects, Presentations, Problem based learning exercises, Placement visits to the pharmaceutical industry, Case studies, Discussions and reflection, And Group projects

#### **Assessment methods**

- Group and individual presentations, Examinations, Posters, with oral questioning at the poster session, Case studies, Essays, Journal club presentation, Scientific reports, Practical report, Major project report, Literature surveys (formative and summative), And Data interpretation exercises

#### **C. Thinking Skills**

- C1. Analyse and critically evaluate data in relevant published literature and extract pertinent information from a variety of sources, using this to write a structured argument as a report in scientific article format.
- C2. Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback.
- C3. Work with complex ideas and justify judgements made through effective use of evidence.
- C4. Ability to identify problems, and to develop ways to solve them effectively.
- C5. Collect and integrate several lines of evidence to develop and test theories, hypotheses and concepts.

#### **Teaching and Learning Methods**

This would comprise;

- Laboratory practical investigation sessions, Lectures, Seminars, Demonstration of equipment and techniques, Independent learning from guided texts and work books, Research projects, Presentations, Problem based learning exercises, Placement visits to the pharmaceutical industry, Case studies, Discussions and reflection, And Group projects

#### **Assessment methods**

- Group and individual presentations, Examinations, Posters, with oral questioning at the poster session, Case studies, Essays, Journal club presentation, Scientific reports, Practical report, Major project report, Literature surveys (formative and summative), And Data interpretation exercises

#### **D. Other skills relevant to employability and personal development**

- D1. Demonstrate proficiency in technical writing, referencing and presentation
- D2. View problems from a range of perspectives to find solutions to problems
- D3. Communicate effectively to a relevant scientific audience through a variety of media.
- D4. Display advanced interpersonal and teamwork skills.

- D5. Collate and analyse information relevant to a particular problem/proposal and generate a satisfactory written/oral report and conclusion.
- D6. Apply advanced skills in self-management and professional development.
- D7. Collect data from primary and secondary sources and use appropriate methods to manipulate and analyse this data
- D8. Identify resources needed to undertake the task (or project) and to schedule and manage the resources

#### Teaching and Learning Methods

- Coursework is required to be word processed, Workshops developing IT skills in the use of appropriate IT sources, including the internet, The use of databases (e.g. PubMed) and suitable IT analytical packages, Workshops on the library and literature searching, Presentations, Practical work incorporating numeracy, statistics and data analysis, Teamwork through seminars, Case studies and problem based learning exercises, Problem solving activities, And Reflective practice

#### Assessment methods

- Data analysis, Group and individual presentations, Examinations, Posters, with oral questioning at the poster session, Case studies, Essays, Journal club presentation, Scientific reports (including the research project);, Practical report, Major project report, Literature surveys (formative and summative) and data interpretation exercises

13. Programme Structures*				14. Awards and Credits*
Level	Module Code	Module Title	Credit rating	
Level 7	PJ4011	Research Methods Principles	10	<b>Masters Degree Drug Discovery and Development</b> Requires 180 credits at Level 7.
	PJ4012	Drug Development and Discovery	30	<b>Masters Degree Drug Discovery and Development with Distinction</b> Requires 180 credits at Level 7 with both APM and research project component falling in the range 70 - 100%
	PJ4013	Fundamentals of Formulation Drug Delivery and Biopharmaceutics	20	
	PJ4014	Applications of Research Methods	10	<b>Masters Degree Drug Discovery and Development with Merit</b> Requires 180 credits at Level 7 with both APM and research project component being in the range 60-69.99%
	PJ4015	Research project	60	
	PJ4018	Quality and Regulatory Sciences	30	<b>Postgraduate Diploma Drug Discovery and Development</b> Requires 120 credits at Level 7.
	PJ4019	Advanced Medicinal Chemistry	20	<b>Postgraduate Diploma Drug Discovery and Development with Distinction</b> Requires 120 credits at Level 7 with an APM falling in the range 70-100%
				<b>Postgraduate Certificate Drug Discovery and Development</b> Requires 60 credits at level 7.

## 15. Personal Development Planning

The School actively supports University policies in the implementation of PDP across both undergraduate and postgraduate programmes. At the postgraduate level within this taught Masters programme, students will be initially introduced to PDP during induction week when they will receive a range of seminars explaining the central processes of self-management, independent learning and reflective practice. Following induction, they are expected to actively engage with elements of PDP in order to pass key pieces of coursework. Career planning is supported through the University Careers Unit, visits to the pharmaceutical industry and seminars given by external practitioners.

## 16. Admissions criteria \*

(including agreed tariffs for entry with advanced standing)

*\*Correct as at date of approval. For latest information, please consult the University's website.*

Students must hold one of the following:

- 1) A 1<sup>st</sup> or 2<sup>nd</sup> class honours degree of a UK university or its equivalent in chemistry, pharmacy, biology, forensic science, bio/medical sciences or a related subject.
- 2) A qualification or experience deemed to be equivalent to the above.

Those applicants seeking entry with appropriate experiences will be required to demonstrate the suitability of this experience both on application and at interview.

International students should have an English language qualification, IELTS at 6.5 (no individual mark lower than 6.0), TOEFL at 600 (paper) and 250 (CBE) with a TWE of 4.

**Admission with Advanced Standing:** students may be able to claim exemption from individual modules where they can demonstrate an appropriate level of prior qualification or experience. This will not normally be more than two modules. Applications for accreditation of prior learning, whether experiential or certified, will be considered on an individual basis and applicants should initially make arrangements to discuss their case with the Course Leader at the time of application.

## 17. Key sources of information about the programme

- School of Pharmacy and Biomedical Sciences website

## 18. Curriculum Skills Map

Please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed

Level	Module Code	Module Title	Core (C), Compulsory (COMP) or Option (O)	Programme Learning Outcomes																											
				Knowledge and understanding							Subject-specific Skills							Thinking Skills							Other skills relevant to employability and personal development						
				A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	D6	D7	D8		
LEVEL 7	PJ4011	Research Methods and Principles	COMP						X		X	X	X			X	X	X	X	X	X	X	X	X		X	X	X	X		
	PJ4012	Drug Development and Discovery	COMP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X			
	PJ4013	Fundamentals of Formulation Drug Delivery and Biopharmaceutics	COMP					X		X			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			
	PJ4014	Research Development	COMP		X				X		X	X				X	X	X	X	X	X	X	X	X		X	X	X	X		
	PJ4015	Research Project	COMP		X		X	X	X		X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	PJ4018	Quality and Regulatory Sciences	COMP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	PJ4019	Advanced Medicinal Chemistry	COMP	X	X	X	X		X	X		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

**Note:** Mapping to other external frameworks, e.g. professional/statutory bodies, will be included within Student Course Handbooks

## 19. LEARNING OUTCOMES FOR EXIT AWARDS:

For **each exit award available**, list learning outcomes relating to the knowledge and understanding, subject specific skills, thinking, other skills relevant to employability and personal development that a typical student might be expected to gain as a result of successfully completing each level of a course of study.

For example, for a standard BA/BSc (Hons) award the exit award learning outcomes for CertHE (Level 4) and DipHE (Level 5), BA/BSc (Level 6) should be included; for a postgraduate Masters, this would normally be PGDip and PGCert.

### **Learning outcomes for the award of: Postgraduate Certificate Drug Discovery and Development**

These learning outcomes are taken from the original MSc Drug Discovery and Development outcomes. The numbers have been kept the same to allow clear comparison.

<b>A. Knowledge and Understanding</b>
A2. Evaluate a wide range of practical techniques utilised in the drug discovery process including key characterisation, analytical and experimental techniques used in drug discovery and development including, computer modelling in structure-based drug design A5. Evaluate and critically appraise the challenges encountered in the development of new drugs and the steps being taken by the pharmaceutical industry to address these problems, with specific emphasis on the introduction of new technologies.
<b>B. Subject-specific skills</b>
Students will be able to: B1. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution. B2. Identify and discuss ethical and safety issues surrounding experimentation within the general area of drug discovery. B3. Work accurately, in an organised and safe manner across a range of major experimental techniques used in the design and discovery of new drugs.
<b>C. Thinking Skills</b>
C2. Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback. C3. Work with complex ideas and justify judgements made through effective use of evidence. C4. Ability to identify problems, and to develop ways to solve them effectively.
<b>D. Other skills relevant to employability and personal development</b>
D1. Demonstrate proficiency in technical writing, referencing and presentation D4. Display advanced interpersonal and teamwork skills. D5. Collate and analyse information relevant to a particular problem/proposal and generate a satisfactory written/oral report and conclusion. D8. Identify resources needed to undertake the task (or project) and to schedule and manage the resources

## Learning outcomes for the award of: Postgraduate Diploma Drug Discovery and Development

These learning outcomes are taken from the original MSc Drug Discovery and Development outcomes. The numbers have been kept the same to allow clear comparison.

<b>A. Knowledge and Understanding</b>
A1. Identify and validate drug targets, identification and design of drug molecules, pre-clinical development of drug molecules and formulation to medicines, clinical trials, regulatory affairs and drug licensing. A2. Evaluate a wide range of practical techniques utilised in the drug discovery process including key characterisation, analytical and experimental techniques used in drug discovery and development including, computer modelling in structure-based drug design A3. Apply specialist scientific fields in drug discovery and development to relevant problems. A4. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution. A5. Evaluate and critically appraise the challenges encountered in the development of new drugs and the steps being taken by the pharmaceutical industry to address these problems, with specific emphasis on the introduction of new technologies.
<b>B. Subject-specific skills</b>
B1. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution. B2. Identify and discuss ethical and safety issues surrounding experimentation within the general area of drug discovery. B4. Appraise quality assurance issues relevant to drug products in development and manufacture, taking into consideration quality by design (QbD) approach in drug development and process of analytical technology. B5. Discuss active molecule physicochemical properties and design to predict/evaluate bioavailability drugs.
<b>C. Thinking Skills</b>
C1. Analyse and critically evaluate data in relevant published literature and extract pertinent information from a variety of sources, using this to write a structured argument as a report in scientific article format. C2. Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback. C3. Work with complex ideas and justify judgements made through effective use of evidence.
<b>D. Other skills relevant to employability and personal development</b>
D1. Demonstrate proficiency in technical writing, referencing and presentation D4. Display advanced interpersonal and teamwork skills. D5. Collate and analyse information relevant to a particular problem/proposal and generate a satisfactory written/oral report and conclusion. D6. Apply advanced skills in self-management and professional development. D8. Identify resources needed to undertake the task (or project) and to schedule and manage the resources