



# **MSc Industrial Pharmaceutics**

## **Course Handbook**

2019/20

Course Leader: Dr Abdullah Isreb

University of Central Lancashire



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

All course materials, including lecture notes and other additional materials related to your course and provided to you, whether electronically or in hard copy, as part of your study, are the property of (or licensed to) UCLan and MUST not be distributed, sold, published, made available to others or copied other than for your personal study use unless you have gained written permission to do so from the Dean of School.

This applies to the materials in their entirety and to any part of the materials.

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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 Industrial Pharmaceutics degree 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 on dosage form development and manufacture.

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 Booklets which are produced for each module, detailing information on timetabling, lecture schedule, details of assessments and deadline 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.

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 develop a holistic knowledge of the drug development process, including quality control/assurance and regulatory science.
- To develop a comprehensive understanding of the formulation of a variety of common dosage forms, with particular emphasis on the formulation and manufacture of tablets.
- To extend the student's knowledge of biopharmaceutics, pharmacokinetics and toxicology, emphasising the practical application of these disciplines.
- To enable graduates to identify and solve common formulation problems.
- To develop competence to undertake practical activities which are commonly carried out within industrial formulation laboratories.
- To develop an awareness of current research towards the development of advanced drug delivery systems and the rationale for such research.
- To develop the necessary skills to critically evaluate and discuss scientific literature and to communicate findings to their peers.
- To enable graduates to design and carry out a research project related to pharmaceuticals.

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

## 1.3 Expertise of staff

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 Abdullah Isreb.

Room number: MB032.

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

Extension number: 5818.



### 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.

#### **Allen Building**

Medicine

Dentistry

telephone: 01772 895566

email: [AllenHub@uclan.ac.uk](mailto:AllenHub@uclan.ac.uk)

#### **Harris Building**

Lancashire Law School

Humanities and the Social Sciences

Centre for Excellence in Learning and Teaching

telephone: 01772 891996/891997

email: [HarrisHub@uclan.ac.uk](mailto:HarrisHub@uclan.ac.uk)

#### **Foster Building**

Forensic and Applied Sciences

Pharmacy and Biomedical Sciences

Psychology

Physical Sciences (Mathematics/Chemistry/Physics)

telephone: 01772 891990/891991

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

### **Computing and Technology Building**

Art, Design and Fashion

Computing

Journalism, Media and Performance

Engineering

telephone: 01772 891994/891995

email: [CandTHub@uclan.ac.uk](mailto:CandTHub@uclan.ac.uk)

### **Greenbank Building**

Sport and Wellbeing

Management

Business

telephone: 01772 891992/891993

email: [GreenbankHub@uclan.ac.uk](mailto:GreenbankHub@uclan.ac.uk)

### **Brook Building**

Community, Health and Midwifery

Nursing

Health Sciences

Social Work, Care and Community

telephone: 01772 891992/891993

email: [BrookHub@uclan.ac.uk](mailto:BrookHub@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 external examiner for this course is:

Name: Dr Marta Roldo                      Position: Senior Lecturer

Institution: University of Portsmouth.



## 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 comprising the MSc in Industrial Pharmaceutics degree are shown in Table 1, and the course structure so that the credits can be gained is shown in Figure 1.



Figure 1 Programme outline

Semester 1	Semester 2	Semester 3
Research Methods Principles (10 credits) – <b>PJ4011</b>	Applications of Research Methods (10 credits) – <b>PJ4014</b>	Research Project (60 credits) – <b>PJ4015</b>
Drug Development and Discovery (30 credits) – <b>PJ4012</b>		
Fundamentals of Formulation Drug Delivery and Biopharmaceutics(20 Credits) – <b>PJ4013</b>		
	Nanomedicine and Biotechnology products (20 Credits) – <b>PJ4016</b>	
	Pharmaceutical Technology and Industrial Practice (30 Credits) <b>PJ4017</b>	

## 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 undergraduate 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 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 to that 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 Applications of Research Methods**

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.

### **PJ4016 Nanomedicine & Biotechnology Products**

This module aims to develop a thorough understanding and appreciation of the concepts of advanced drug delivery systems and their current and potential clinical applications. It also helps students to create an educational platform through which the student is able to critically evaluate responsive drug delivery systems, their formulation and manufacture as well as their relevance in the pharmaceutical industry. It aims to improve student's ability to critically appraise literature in the subject area, effectively source appropriate literature to solve problems in drug delivery and generate new ideas, with an ability to analyse the potential of success of a particular biotechnology product or delivery system in the future for solving the current problems.

## **PJ4017 Pharmaceutical Technology & Industrial Practice**

Pharmaceutical Technology and Industrial Practice aims to provide students with an opportunity to develop a comprehensive in-depth understanding and knowledge in the area of pharmaceutical formulation development and its underpinning science and processes. Students will have an insight into the latest technologies and methods for the design and development of various dosage forms for the delivery of therapeutic agents. This module equips students with essential knowledge, practical skills and the intellectual rigor required to function as key members of industrial pharmaceutical teams. 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 challenges of drug formulation and development.

## **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 in both coursework and examination components of any module employing a mix of these two elements.

Students not achieving a passing module mark may be re-assessed in the deficient component(s).

## 2.4 Module Registration Options

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 to:

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 PBS, UCLan is obliged to tell 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**

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

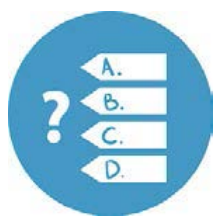
If you have a disability that may affect your studies, please either contact the Disability Advisory Service - [disability@uclan.ac.uk](mailto:disability@uclan.ac.uk) - or let one of the course team know as soon as possible. With your agreement information will be passed on to the Disability Advisory 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**

Although you are not expected to access confidential information during the course, you still 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.



## 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.

For examples, more practicals and placements have been incorporated into the Programme since its first running in 2011.

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)

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*

<b><u>UNIVERSITY OF CENTRAL LANCASHIRE</u></b>
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<b><u>Programme Specification</u></b>
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<p>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.</p>
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<p><b><i>Sources of information on the programme can be found in Section 17</i></b></p>
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<b>1. Awarding Institution / Body</b>	University of Central Lancashire
<b>2. Teaching Institution and Location of Delivery</b>	University of Central Lancashire
<b>3. University School/Centre</b>	School of Pharmacy and Biomedical Sciences



<b>4. External Accreditation</b>	N/A
<b>5. Title of Final Award</b>	M.Sc. Industrial Pharmaceutics
<b>6. Modes of Attendance offered</b>	Full time
<b>7a) UCAS Code</b>	N/A
<b>7b) JACS Code (only required for <u>NEW</u> programmes)</b>	B290
<b>8. Relevant Subject Benchmarking Group(s)</b>	N/A
<b>9. Other external influences</b>	N/A
<b>10. Date of production/revision of this form</b>	<b>September 2017</b>
<b>11. Aims of the Programme</b>	
<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> <li>• To develop a comprehensive understanding of the formulation of a variety of common dosage forms, including the formulation and manufacture of tablets, capsules, semi-solid dosage forms.</li> </ul>	

<ul style="list-style-type: none"> <li>• To extend the student's knowledge of biopharmaceutics, nanomedicines and biological products, pharmacokinetics and toxicology, emphasising the practical application of these disciplines.</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 develop competence to undertake practical activities which are commonly carried out within industrial formulation laboratories and the pharmaceutical industry.</li> </ul>
<ul style="list-style-type: none"> <li>• To develop an awareness of current research towards the development of advanced drug delivery systems and the rationale for such research.</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 enable graduates to design and carry out a research project related to pharmaceutics, developing professional skills such as good laboratory practice, basics of good manufacturing practice, as well as transferable skills.</li> </ul>
<ul style="list-style-type: none"> <li>• To develop comprehensive understanding and knowledge in the area of pharmaceutical formulation development and its underpinning science and processing technologies</li> </ul>
<ul style="list-style-type: none"> <li>• To develop theoretical and practical aspects of advanced analytical methods e.g. process analytical technology (PAT) and quality by design (QbD).</li> </ul>

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

### **A. Knowledge and Understanding**

- A1. Discuss how the fundamental scientific principles underlying formulation science impact the development of a new dosage form.
- A2. Evaluate current developments in formulation science and advanced drug delivery.
- A3. Develop a critical awareness of the drug development process.
- A4. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution.
- A5. Apply advanced skills in interpretation and discussion of data and extrapolate the significance of the results to the pharmaceutical industry/community at large.
- A6. Evaluate and critically appraise the challenges encountered in the formulation/production and use of conventional medicines, nanomedicines and biotechnology products and their use in medical devices.
- A7. Construct a scientifically credible research project and demonstrate the requirements for it to be undertaken in a safe, effective and logical manner.

A8. Prepare a research report, in the appropriate scientific format, which demonstrates an active engagement and familiarity with recent and current research methods, results and publications.

### **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
- 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)
- Data interpretation exercises

### **B. Subject-specific skills**

- B1. Discuss active molecule physicochemical properties and formulation design to the predict/evaluate bioavailability drugs.
- B2. Apply pharmaceuticals theory to routine formulation problems and demonstrate *de novo* integration of scientific principles to solve new formulation challenges.
- B3. Manipulate, interpret and report conclusions on a range of data and problems encountered within pharmaceutical science.
- B4. Use appropriate laboratory equipment to enable a scientific, practical based pharmaceutical research project to be undertaken.
- B5. Critically appraise conventional drug delivery and review the rationale for advanced approaches to drug delivery.
- B6. Evaluate pharmaceutical unit processes and identify critical operational variables for optimal dosage form performance
- B7. Carry out subject related practical work safely and understand safety requirements, including preparing completed CoSHH and risk assessment forms.
- B8. 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.
- B9. 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.

### 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
- 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)
- Data interpretation exercises

### **C. Thinking Skills**

- C1. Use and integrate discipline specific theories, concepts and principles.
- C2. 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.
- C3. Collect and integrate several lines of evidence to develop and test theories, hypotheses and concepts.
- C4. Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback.
- C5. Work with complex ideas and justify judgements made through effective use of evidence.

### **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
- 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)
- 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

D3. Communicate effectively to a relevant scientific audience through a variety of media.

D4. Display advanced interpersonal and teamwork skills.

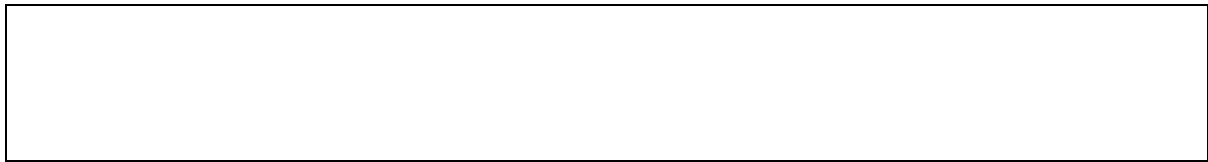
- D5. Collate and analyse information relevant to a particular problem/proposal and generate a satisfactory written/oral report and conclusion.
- D6. Apply advanced skills in self-management and professional development.
- D7. Collect data from primary and secondary sources and use appropriate methods 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
- 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);
- Innovation project
- Practical report
- Major project report
- Literature surveys (formative and summative)
- Data interpretation exercises



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



	PJ4015		60	Requires 120 credits at Level 7.
	PJ4016	Nanomedicine and Biotechnology Products	20	<b>Postgraduate Diploma Industrial Pharmaceutics with Distinction</b>  Requires 120 credits at Level 7
	PJ4017	Pharmaceutical Technology and Industrial Practice	30	with an APM falling in the range 70-100%  <b>Postgraduate Certificate Industrial Pharmaceutics</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 degree with honours of a UK university or its equivalent in chemistry, pharmacy, biology forensic science 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 30 credits. 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.

<b>17. Key sources of information about the programme</b>
<ul style="list-style-type: none"><li>• School of Pharmacy and Biomedical Sciences website</li><li>• Course fact sheet</li></ul>

- School of Pharmacy and Biomedical Sciences website
- Course fact sheet





## 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 Industrial Pharmaceutics**

These learning outcomes are taken from the original MSc Industrial Pharmaceutics outcomes. The numbers have been kept the same to allow clear comparison.

<b>A. Knowledge and Understanding</b>
A1. Discuss how the fundamental scientific principles underlying formulation science impact the development of a new dosage form.
A2. Evaluate current developments in formulation science and advanced drug delivery.
A3. Develop a critical awareness of the drug development process.
<b>B. Subject-specific skills</b>

- B1. Discuss active molecule physicochemical properties and formulation design to the predict/evaluate bioavailability drugs.
- B2. Apply pharmaceuticals theory to routine formulation problems and demonstrate *de novo* integration of scientific principles to solve new formulation challenges.
- B6. Evaluate pharmaceutical unit processes and identify critical operational variables for optimal dosage form performance

### **C. Thinking Skills**

- C1. Use and integrate discipline specific theories, concepts and principles.
- C4. Recognise own academic strengths and weaknesses reflect on performance and progress and respond to feedback.
- C5. Work with complex ideas and justify judgements made through effective use of evidence.

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

- 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.
- 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

## Learning outcomes for the award of: Postgraduate Diploma Industrial Pharmaceutics

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>
<p>A1. Discuss how the fundamental scientific principles underlying formulation science impact the development of a new dosage form.</p> <p>A2. Evaluate current developments in formulation science and advanced drug delivery.</p> <p>A3. Develop a critical awareness of the drug development process.</p> <p>A4. Articulate and appraise the scientific, regulatory and commercial bases underlying the successful drug discovery, development and distribution.</p> <p>A5. Apply advanced skills in interpretation and discussion of data and extrapolate the significance of the results to the pharmaceutical industry/community at large.</p> <p>A6. Evaluate and critically appraise the challenges encountered in the formulation/production and use of conventional medicines, nanomedicines and biotechnology products and their use in medical devices.</p>
<b>B. Subject-specific skills</b>
<p>B1. Discuss active molecule physicochemical properties and formulation design to the predict/evaluate bioavailability drugs.</p> <p>B2. Apply pharmaceutics theory to routine formulation problems and demonstrate <i>de novo</i> integration of scientific principles to solve new formulation challenges.</p> <p>B3. Manipulate, interpret and report conclusions on a range of data and problems encountered within pharmaceutical science.</p> <p>B4. Use appropriate laboratory equipment to enable a scientific, practical based pharmaceutical research project to be undertaken.</p>



B5. Critically appraise conventional drug delivery and review the rationale for advanced approaches to drug delivery.

**C. Thinking Skills**

C1. Use and integrate discipline specific theories, concepts and principles.

C4. Recognise own academic strengths and weaknesses, reflect on performance and progress and respond to feedback.

C5. Work with complex ideas and justify judgements made through effective use of evidence.

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

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.

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