



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

School of Pharmacy and Pharmaceutical Sciences

Pharmacy Student Handbook 2026-2027





School of Pharmacy & Pharmaceutical Sciences

2026/2027

PHARMACY (INTEGRATED) PROGRAMME

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This handbook applies to all students taking the Pharmacy (Integrated) programme taught by the School of Pharmacy & Pharmaceutical Sciences. It provides a guide to what is expected of you on this programme, and the academic and personal support available to you.

The information provided in this handbook is accurate at the time of preparation. Any necessary revisions will be notified to students via email. The current version of the handbook is published in electronic (pdf) format in the undergraduate course notes section of the School's website: <https://pharmacy.tcd.ie/undergraduate/course-notice/coursenotes.php>

In the event of any conflict or inconsistency between the General Regulations published in the University Calendar and information contained in this handbook, the provisions of the General Regulations in the Calendar will prevail.

Alternative formats of the Handbook can be made available on request.



School of Pharmacy & Pharmaceutical Sciences

1. INTRODUCTION

1.1. SCHOOL VISION AND MISSION

Our vision is to provide an environment where excellence in teaching and research is valued and encouraged.

Our mission is to deliver continuous learning in the science and practice of pharmacy, supported by innovative teaching and a culture which is aligned with best practice.

We strive to ensure that our staff and students contribute to society as world class professionals and leaders.

1.2. BACKGROUND

The School of Pharmacy and Pharmaceutical Sciences at Trinity College Dublin has been offering a pharmacy degree since 1977.

The School has world-class research and teaching facilities on the main College campus, in the Panoz Institute. These include purpose-built teaching spaces such as the Boots Unit – comprising a technology enhanced learning space for clinical skills and patient care, a practice area designed to facilitate the development of communication skills, and adaptable small group teaching rooms. The School has further facilities in the collaborative research space provided by the Trinity Biomedical Sciences Institute (TBSI), through which Trinity's leadership position in immunology, bioengineering and cancer is maintained. These facilities drive a step-change in the level and impact of research in these fields.

The main academic focus of the School of Pharmacy and Pharmaceutical Sciences at the undergraduate level is the five-year Pharmacy (Integrated) programme. Structured professional placements are a key element of the new programme and occur throughout the five years. The teaching on this programme includes lectures, problem-based learning, small group teaching, laboratory and dispensing practicals, and clinical and patient care activities to encourage the understanding of aspects of healthcare, drug sources, medicines preparation, analysis, quality control, chemistry, metabolism, safety, efficacy, regulation, etc. Our programme includes an individual research project associated with the fourth year, which gives students an opportunity to develop focused research with one-to-one supervision. There is an opportunity to undertake this research project abroad at international partner universities. A second research project is undertaken during the structured professional placement in the fifth year.

The School offers dynamic and successful postgraduate taught programmes in Pharmaceutical Manufacturing Technology, in Pharmaceutical Sciences, and in Hospital Pharmacy. The School is active in CPD (Continuing Professional Development) and was the first School in TCD to offer modular postgraduate delivery with the Cardiology in Clinical Pharmacy Practice module, which has attracted postgraduate students from across the hospital and community pharmacy sectors.

The School of Pharmacy and Pharmaceutical Sciences is at the forefront of international pharmacy research. Our research activities are broadly described as consisting of three main research areas: 1) Developing Better Drugs; 2) Pharmaceutical Materials, Formulation of Medicines, and Drug Delivery; 3) Clinical Practice and Patient Care.

The Pharmacy (Integrated) programme leading to qualification as a pharmacist is taught over 5 years and satisfies the accreditation requirements of the Pharmaceutical Society of Ireland (PSI), i.e., the statutory



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registration body. Further information on the accreditation process can be found on the PSI website: https://www.thepsi.ie/gns/education/accreditation/Accreditation_Standards.aspx

It also complies with the training standards defined in three pharmaceutically relevant EU Directives: 2005/36/EC as amended, (EU) 2019/6 as amended and 2001/83/EC as amended. Directive 2005/36/EC specifies the educational requirements necessary for the mutual recognition of registered pharmacists within the European Economic Area (EEA) member states. Directives (EU 2019/6 and 2001/83/EC specify the educational requirements necessary to perform the functions in the pharmaceutical industry of the 'Qualified Person', i.e., one who is responsible for the supervision and control of the manufacture of pharmaceutical products for human and veterinary use.

1.3. SCHOOL PURPOSE STATEMENT

We educate and train pharmacists and pharmaceutical scientists; we exercise leadership in the development and advancement of pharmacy and pharmaceutical sciences, through world class teaching, research and engagement; to impact policy and healthcare nationally and internationally.

1.4. M.PHARM. PROGRAMME MISSION AND VISION

The 5-year pharmacy (integrated) programme educates future pharmacists for professional practice in every setting in which their knowledge, skills and expertise can be applied so that they can contribute to patient care and wellbeing through the production, provision and optimal use of medicines and medical devices. The School achieves this mission through enabling all of its staff to develop and deliver a wide variety of high quality teaching and learning opportunities, informed by current evidence and research via a curriculum that is continually renewed and aligned with the profession's competency framework and the Trinity College Dublin Graduate Attributes: to think independently, to communicate effectively, to act responsibly and to learn continuously (see also in this handbook).

As the complexity of health care continues to increase, we offer an integrated curriculum that illustrates the importance of molecular, cellular, physical and chemical processes to an understanding of health and disease and aligns relevant subjects while also promoting a clear understanding of the contribution of each discipline to the science and practice of pharmacy. We ensure our graduates are equipped to provide patients with safe, appropriate and effective evidence-based pharmaceutical care.

We enable students to experience a wide variety of practice, service and research settings and endeavour to equip them with the academic, professional and personal capabilities to incorporate all of the learnings from these experiences to help them develop to their full potential.

Our values of excellence, equity, advocacy, ethics and diversity inform our policies, procedures and actions and we strive to maintain a community of learning that imparts these values to all who are part of it.

Our students and staff collaborate with community and hospital pharmacists, clinical services, patients and their representative bodies, professional, regulatory, research and industrial partners in order to identify and meet the needs of patients, of Irish society and of the world at large to provide treatments that are as beneficial, sustainable and as safe as possible taking into account the knowledge and resources available.



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2. ORGANIZATION, STRUCTURE AND PERSONNEL

2.1. COLLEGE ORGANISATION

For details see: <http://www.tcd.ie/teaching-learning/>

2.2. SCHOOL GOVERNANCE

The School of Pharmacy & Pharmaceutical Sciences is one of the four Schools which make up the Faculty of Health Sciences. The other three are the School of Dental Science, the School of Medicine and the School of Nursing and Midwifery. Information regarding the School governance structure is available at the following link:

<https://www.tcd.ie/secretary/governance/faculty-and-school-governance/>

Head of School (HOS)

Astrid Sasse, Staatsexamen Pharmazie (Berlin), Dr. rer. nat. (Berlin), M.A.

Heads of School are appointed by, and are formally accountable to, the Board. The Head of School is a member of the College Head of Schools Committee.

Director of Teaching and Learning (Undergraduate) (DUTL)

Niamh O'Boyle, B.Sc. (Pharm.) (T.C.D.), Ph.D. (T.C.D.), M.P.S.I, M.R.S.C, F.I.C.I. (2024), F.T.C.D. (2023)

The Director of Teaching and Learning (Undergraduate) has delegated responsibility for the undergraduate affairs of the School and plays a central strategic role with regard to both existing and new teaching programmes. The Director of UGTL is a member of the College Undergraduate Studies Committee.

Director of Teaching and Learning (Postgraduate) (DTLPG)

Eduardo Ruiz-Hernandez, M.Eng., Ph.D

The Director of Teaching and Learning (Postgraduate) has delegated responsibility for the postgraduate affairs of the School and plays a central strategic role with regard to both existing and new research programmes. The Director of PGTL is a member of the College Postgraduate Teaching & Learning Committee.

Director of Research (DOR)

Lorraine O'Driscoll, B.Sc. (Hons; N.U.I), M.Sc. (Res; N.U.I), M.A., Ph.D. (N.U.I.), F.T.C.D. (2012), F.R.S.B (2020), M.R.I.A. (2021)

The Director of Research has delegated responsibility for the development of research and innovation in the School. The Director plays a strategic role in promoting and enabling research in the School, working closely with the Head of School.

Director of Global Engagements (DOGE)

Carsten Ehrhardt, Staatsexamen Pharmazie (Hamburg), Dr. rer. nat. (Saarbrücken), F.T.C.D. (2013)

The Director of Global Initiatives has delegated responsibility for the development and implementation of the international aspects of the School's strategy. Working closely with the European and Global Offices within College, the Director plays a strategic role in developing, promoting, and implementing international opportunities for undergraduate and postgraduate students, post-doctoral fellows and staff within the School.

Director of Equity, Equality, Diversity and Inclusion (DEEDI)

Oliviero Gobbo, M.Sc., PhD (TCD)

The Director of Equity, Equality, Diversity and Inclusion supports the students in promoting equality,



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diversity and inclusion across the pharmacy student experience. The role focuses on ensuring that all students, at undergraduate and postgraduate level, have equitable opportunities in admission, progression and participation. The Director works to promote an inclusive, non-discriminatory, flexible and supportive learning environment where all students feel respected, valued and able to succeed. They help identify and address barriers that may affect students' educational experience and work with students and staff to promote awareness, representation and positive change across the School.

2.3. SCHOOL COMMITTEES, KEY SCHOOL PERSONNEL AND STUDENT REPRESENTATION

(i) School Management Team

The Head of School, DUTL, DTLPG, DOGE, DOR and School Administrative Manager form the School Management Team to ensure that action items are progressed and to discuss any issues that require immediate attention. Occasionally, additional School Executive members are required to attend the meetings.

(ii) School Committee

This Committee includes all staff of the School of Pharmacy, one undergraduate representative and one postgraduate representative. The Committee provides a forum for discussion in a collegial environment on all matters of the School.

(iii) School Executive Committee

This Committee includes HOS, DUTL, DTLPG, DOR, DOGE, DEEDI, Year 5 Coordinator, Chief Technical Officer, School Manager, one undergraduate representative, one postgraduate representative, and one postdoctoral representative.

(iv) Programme Management Committee (PMC)

This is a sub-committee of the School Executive and is responsible for monitoring, reviewing and making recommendations on the development of the Pharmacy (Integrated) programme. This Committee includes the BSc. Pharm. student convenor. Membership includes DTLPG, DUTL, HOS, Programme Coordinator, Practice Educator, Integration Coordinator, Year Coordinators, and MPharm student convenor.

(v) Student Representatives

Students in each of the five years of the programme select representatives to relay the ideas and concerns of their year and to report to their year on developments within the School.

(vi) Pharmacy (Integrated) Programme Student Forum

The student-led forum meets once per year in the second semester. The membership of this informal gathering is all class representatives from the BSc (Pharm), tutors and the Student Forum convenor. No minutes are taken but notes for action points are taken to facilitate feedback. The Student Forum convenor is Dr. Fabio Boylan.

(vii) Athena Swan Self-Assessment Team (SAT)

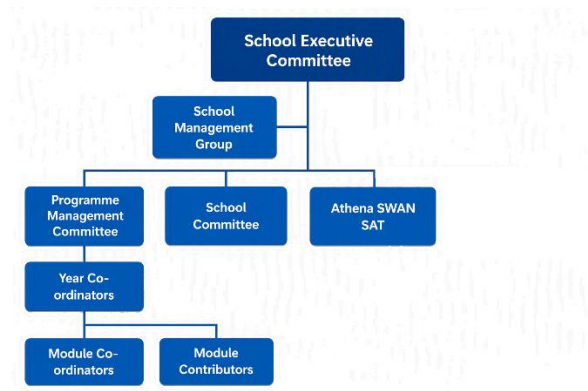
Athena Swan-SAT is a School committee that leads and supports work on gender equality, and has more recently expanded its focus to promote fairness and inclusion across Equality, Diversity and Inclusion (EDI). It works to identify and address barriers to equality and promote a positive, inclusive environment for all students and staff. The School was awarded an Athena Swan Bronze Award in 2022 in recognition of its commitment to gender equality.





School of Pharmacy & Pharmaceutical Sciences

School of Pharmacy and Pharmaceutical Sciences Governance Structure:



Disability Liaison Officer		
Assoc. Prof. Carlos Medina		martinc2@tcd.ie
Sustainability Lead		
Asst. Prof. Simon Smith		smithsn@tcd.ie
Pharmacy (Integrated) Programme Year Coordinators		
Junior Fresh Year	Asst. Prof. Juliette O'Connell	conneju@tcd.ie
Senior Fresh Year	Assoc. Prof. Sheila Ryder	sryder@tcd.ie
Junior Sophister Year	Assoc. Prof. Fabio Boylan	fabio.boylan@tcd.ie
Senior Sophister Year	Prof. Andrew Harkin	aharkin@tcd.ie
M.Pharm Year		
	Assoc. Prof. Cathal Cadogan	cathal.cadogan@tcd.ie
Erasmus/International Contact & Undergraduate Research Liaison Officer		
Prof. Carsten Ehrhardt		ehrharc@tcd.ie
Transition year coordinator	<i>Note: transition year is on hold for 2026/27 academic year</i>	
Assoc. Prof. Fabio Boylan		fabio.boylan@tcd.ie
Trinity Access Programmes (TAP)		
Assoc. Prof. John Walsh		jjwalsh@tcd.ie



School of Pharmacy & Pharmaceutical Sciences

2.4. SCHOOL OF PHARMACY & PHARMACEUTICAL SCIENCES ACADEMIC STAFF

PROFESSOR OF PHARMACEUTICS AND PHARMACEUTICAL TECHNOLOGY

Anne Marie Healy, B.Sc. (Pharm.), Ph.D., M.P.S.I., F.T.C.D. (2010)

PROFESSOR OF PHARMACEUTICAL BIOLOGY, DON PANOZ CHAIR

Athanasios (Sakis) Mantalaris, Ph.D. Faimbe

PROFESSOR OF PHARMACOLOGY AND BIOMEDICINE

Lorraine O'Driscoll, B.Sc. (Hons; N.U.I.), M.Sc. (Res; N.U.I.), M.A., Ph.D. (N.U.I.), F.T.C.D. (2012), F.R.S.B (2020), M.R.I.A. (2021)

PROFESSOR OF PERSONALISED THERAPEUTICS

Nicki Panoskaltsis, M.D. Ph.D. F.R.C.P.

PROFESSOR IN PHARMACEUTICAL CHEMISTRY

John Gilmer, B.A., Ph.D.

PROFESSOR IN PHARMACOLOGY

Andrew Harkin, B.Sc. (N.U.I.), M.A., Ph.D. (N.U.I.), F.T.C.D. (2011)

PROFESSORS IN PHARMACEUTICS AND PHARMACEUTICAL TECHNOLOGY

Carsten Ehrhardt, Staatsexamen Pharmazie (Hamburg), Dr. Rer. Nat. (Saarbrücken), F.T.C.D. (2013) Lidia Tajber, M.Pharm. (Medical University of Silesia), M.A., Ph.D., P.G. Dip. Q.I., F.T.C.D. (2020)

PROFESSOR IN PRACTICE OF PHARMACY

Cristín Ryan, M.Pharm, (RGU), Ph.D. (UCC), F.T.C.D. (2025)

ASSOC. PROFESSORS IN PHARMACOGNOSY

Fabio Boylan, BSc. Pharm (Federal University of Rio de Janeiro), M.Pharm (University of Coimbra), Ph.D. (Federal University of Rio de Janeiro), M.A. (TCD), Honorary Professor (KazNMU)

John J. Walsh, B.A., Ph.D.

ASSOC. PROFESSORS IN PHARMACEUTICAL CHEMISTRY

Astrid Sasse, Staatsexamen Pharmazie (Berlin), Dr. rer. nat. (Berlin), M.A.

Niamh O'Boyle, B.Sc, (Pharm) (TCD), Ph.D. (TCD), M.P.S.I, M.R.S.C, F.T.C.D. (2023), F.I.C.I. (2024)

ASSOC. PROFESSOR IN PHARMACOLOGY

Carlos Medina, M.B. (La Laguna), Ph.D. (A.U. Barcelona)

ASSOC. PROFESSORS IN PRACTICE OF PHARMACY

Cathal Cadogan B.Sc. (Pharm.), Ph.D., PG Dip (Stat), PG Dip (Health Professions Education), M.P.S.I.

Máire O'Dwyer, B.Sc. (Pharm), P.G. Dip. (Stat), Ph.D., M.P.S.I.

Cicely Roche, B.Sc. (Pharm.), M.Sc. (Healthcare Ethics & Law), M.Sc. (Comm Pharm), M.Ed. (Higher Education Teaching and Learning), Ph.D. (Dublin), M.P.S.I. (Part-Time)



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Sheila Ryder, B.Sc. (Pharm.), M.Sc. (Belfast), PG Dip (Stat), M.P.S.I.

ASSOC. PROFESSOR IN PHARMACEUTICS AND PHARMACEUTICAL TECHNOLOGY

Deirdre D'Arcy, M.Pharm. (R.G.U.). Ph.D., P.G. Dip., Clin. Pharm. (Liv. J. Moores), M.P.S.I.

USSHER PROFESSOR IN IMMUNOMETABOLISM

David Finlay, B.A. (MOD), Ph.D.

USSHER ASSOC. PROFESSOR IN NANOPHARMACEUTICAL DRUG DISCOVERY

Maria Jose Santos Martinez, M.B. (La Laguna); M.D. (U.A. Barcelona); Ph.D. (T.C.D.); F.T.C.D. (2024)

USSHER ASSOC. PROFESSOR IN PHARMACEUTICAL CHEMISTRY OF NANOCARRIER DRUG DELIVERY SYSTEMS

Eduardo Ruiz-Hernandez, M.Eng., Ph.D

ASSOC. PROFESSOR IN INDUSTRIAL PHARMACY

Bernard Naughton, M.Pharm., Dip.Clin.Pharm., Ph.D., M.R.Pharm.S

ASST. PROFESSOR IN PRACTICE OF PHARMACY (PRACTICE EDUCATOR)

Eimear Ní Sheachnasaigh, M.Pharm, M.Sc., M.P.S.I

ASST. PROFESSOR IN THERAPEUTICS AND PHARMACY PRACTICE

Juliette O'Connell, B.Sc. (Pharm), M. Pharm., P.G. Cert. (STAT), Ph.D., M.P.S.I.

ASST. PROFESSOR IN PRACTICE OF PHARMACY

Theo Ryan, B.A., B.Sc. (Pharm) (R.C.S.I.), M.Pharm. (R.C.S.I.), P.G. Dip. (Stat), Ph.D., M.I.C.I., M.P.S.I.

Rebecca Parkin B.Sc. (Pharm) (TCD), M.Sc. Community Pharmacy (TCD), M.Sc. Clinical Pharmacy (UCC), Ph.D. (RCSI), M.P.S.I.

ASST. PROFESSOR IN PHARMACEUTICAL CHEMISTRY

Simon Nicholas Smith, *Sch.*, B.A. (mod.), Ph.D., M.R.S.C.

ASST. PROFESSOR IN PHARMACEUTICAL SCIENCES

Oliviero L. Gobbo, M.Sc., Ph.D. (TCD)

TEACHER PRACTITIONER (PART-TIME) BOOTS THE CHEMISTS

Karen Rossi, B.Sc. (Pharm.), M.Sc. (Comm. Pharm.), M.P.S.I.

TEACHER PRACTITIONER (PART-TIME) HICKEY'S PHARMACY

Ivana Forsythe, M. Pharm., M.P.S.I.

ADJ. PROFESSOR IN PHARMACEUTICAL CHEMISTRY

Mary J. Meegan, B.Sc. (N.U.I), M.A., Ph.D. (N.U.I), C.Chem., M.R.S.C., F.T.C.D. (2011)



School of Pharmacy & Pharmaceutical Sciences

2.5. SCHOOL OF PHARMACY & PHARMACEUTICAL SCIENCES PROFESSIONAL AND TECHNICAL STAFF

SCHOOL MANAGER Ms. Helen Thornbury	helen.thornbury@tcd.ie
--	--

SCHOOL PURCHASE ORDER ADMINISTRATOR Ms. Sakie Doyle	doyles59@tcd.ie
---	--

RESEARCH IMPACT OFFICER Ms. Miriam Fitzpatrick	fitzpm10@tcd.ie
--	--

SCHOOL OFFICE	pharmacy@tcd.ie
----------------------	--

UNDERGRADUATE STUDENT ADMINISTRATION

Fresher Years (JF & SF)	Mr. Daniel McCormick	dmccorm2@tcd.ie
------------------------------------	----------------------	--

Sophister Years (JS & SS)	Ms. Helen Byrne Jacob	hjacob@tcd.ie
Fifth Year		

TECHNICAL STAFF

Dr. Carolina Garciarena	Chief Technical Officer 1	garciarc@tcd.ie
Mr. Brian Talbot	Chief Technical Officer Specialist	talbotb@tcd.ie
Ms. Rhona Prendergast	Senior Technical Officer	rprndgst@tcd.ie
Mr. Trevor Woods	Senior Technical Officer	woodst@tcd.ie
Dr. Gavin Mc Manus	Senior Technical Officer	mcmanug@tcd.ie
Ms. Maureen Brunt	Senior Lab Attendant	bruntm@tcd.ie
Mr. Brian Mahon	Senior Lab Attendant	bmahon@tcd.ie
Ms. Irene Pelow	Senior Lab Attendant	pelowi@tcd.ie



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3. STUDENT SUPPORTS AND SERVICES

Trinity has a wide range of supports and services (administrative, academic, health and wellbeing) designed to facilitate your progress in Trinity and to make your College experience as rewarding as possible. Some of the key resources are highlighted below in this section.

However, the Student Life Supports and Services webpage: <https://www.tcd.ie/students/supports-services/> is a centralized point of access and information for the full range of resources. A significant amount of useful information has also been collated on the Tutorial Service website (<https://www.tcd.ie/seniortutor/>). Further information is available on each service's website.

Your Tutor

All registered full-degree undergraduate students are allocated a Tutor when starting in College. Your Tutor is a member of academic staff who is appointed to look after the general welfare and development of all students in their care.

You should see your Tutor whenever you have a question or are worried or concerned about any aspect of College life or your personal life, in particular if it is affecting your academic work. Everything you say to your Tutor is in strict confidence. Unless you give them permission to do so, they will not give any information to anybody else, whether inside College or outside (not to your parents/family for example). Your Tutor can help you only if they know you are facing difficulties, so if you are worried about anything go and see your Tutor before things get out of hand. Whilst your Tutor may not be able to solve the underlying problem, they can help you find the best way to limit the impact of your situation on your College work. Tutors can help with academic advice, changing course, withdrawing from College, exam regulations, financial assistance and personal advice.

Your tutors' details can be found on the TCD Portal (<https://my.tcd.ie>)

Further information is available from the Senior Tutor's Office ([Senior Tutor and Tutorial Service](#))

Postgraduate Advisory Service

The Postgraduate Advisory Service offers free, independent, and confidential support, guidance and advocacy to registered postgraduate students. They are here to provide support on any matter that may impact upon your time as a postgraduate at Trinity.

Some of the most common issues students come to PAS to discuss include: study-related stress or worry; concerns about academic progress; supervisor-relationship concerns; extensions and going off-books; queries regarding regulations and academic appeals; bullying; plagiarism and disciplinary cases, financial assistance.



School of Pharmacy & Pharmaceutical Sciences

Student 2 Student (S2S)

The S2S service is provided by student volunteers from students' own programme – in your case, Pharmacy students. From the moment you arrive in College right the way through to your end of year exams, S2S is here to make sure your first year is fun, engaging and a great foundation for the rest of your time in Trinity. You will meet (online) your two S2S mentors in Freshers' Week and they'll make sure you know other people in your course before your classes even start. They'll keep in regular touch with you throughout your first year and invite you to events on and off campus (as well as online). They will also give you useful information about your course and what to look out for. Mentors are students who have been through first year and know exactly what it feels like, so you never have to worry about asking them a question or talking to them about anything that's worrying you.

S2S also offers trained Peer Supporters if you want to talk confidentially to another student or just to meet a friendly face for coffee and a chat.

S2S is supported by the Senior Tutor's Office and the Student Counselling Service:

Tel. 01 896 2438

student2student@tcd.ie

Student Counselling Service

The Student Counselling Service is a confidential, professional service available free of charge to every Trinity College student. It offers help in coping with any personal or emotional problems which may impact on your studies or progress in the university. While Trinity implements its phased reopening, the SCS continues to offer services by telephone and video call. They are unable to take walk-ins. Email to request an appointment. Emergency consults are available weekdays.

3rd Floor, 7-9 South Leinster Street,

Tel: 896 1407

student-counselling@tcd.ie

Equity, Equality, Diversity and Inclusion

The Equity, Equality, Diversity and Inclusion (EEDI) team supports students in creating a fair, inclusive and welcoming learning environment where everyone feels respected and valued. They work to identify and reduce barriers to participation and progression, ensuring students have an equitable and supportive experience throughout their studies. Students can engage with EEDI initiatives, share their experiences and raise concerns to help shape a more inclusive Trinity community.

Room 2054, Arts Building

Trinity College

Tel: 01 896 4034

EQUALITY@tcd.ie



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disAbility Service

The disAbility Service has a remit that is broader than its name might suggest. It aims to provide appropriate advice, support and information to help students with disabilities, illnesses, impairments or specific learning difficulties that may affect their College experience.

Printing House Square, Pearse Street, Dublin 2

Tel: 896 3111

Text: 087 113 3185

askds@tcd.ie

Student Learning Development

Learning at University requires a different approach and set of skills to learning at second level. Student Learning Development provides learning supports to help students reach their academic potential. It runs workshops, has extensive online resources and provides individual consultations on a wide range of topics, including study skills, examinations, presentations, self-management, and academic writing.

3rd Floor, 7-9 South Leinster Street

Tel: 896 1407

student.learning@tcd.ie

College Health Service

Appointments may be made in person or by telephone. This service is free to most students.

The Printing House, College Health Service

Tel: 01 896 1591 / 01 896 8555 / 01 896 1556

Academic Registry

The Academic Registry is the core administrative service within Trinity, managing key aspects of application and admission, fees and payments, annual student registration, assessments, progression and graduation.

First floor, Watts Building (on the same corridor as the Joly, MacNeill and Maxwell lecture theatres)

Tel. 896 4500

academic.registry@tcd.ie

Graduate Studies

Graduate Studies is a subdivision of the Academic Registry. Since the fifth year of the Pharmacy (Integrated) programme is considered a postgraduate year, the Graduate Studies team have responsibility for key aspects of its administration.

Watts Building, East End

Dean.gradsecretary@tcd.ie



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Mature Student Office

The Mature Student Office provides advice and support to undergraduate mature students (officially considered to be > 23 years of age on 1st January in the year of application). Its facilities include a Resource Centre at Foster Place with PC and internet access, which can be booked by registered mature students for private or group study.

Room M36, Goldsmith Hall

Tel: 896 1386

Mature.student.officer@tcd.ie

Chaplains

The Chaplains run a Bereavement Support Group for those who have experienced loss. (Please contact the Chaplains.) The Chaplains will also help you make contact with other religious communities in Dublin. Free simple lunch on Tuesdays during term time between 12.30 and 14.00 h.

House 27

chaplaincy@tcd.ie

Steve Brunn Anglican Chaplain brunns@tcd.ie 01896 1402	Alan O'Sullivan Catholic Chaplain aeosulli@tcd.ie 01896 1260	Peter Sexton Catholic Chaplain sextonpe@tcd.ie 01896 1260
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Niteline

A confidential help-line for students run by students is available during term-time, by freephone between 9 pm and 2.30 am 7 nights a week during term time at **1800 793 793**.

Academic Skills for Successful Learning

This is an online resource offering e-learning modules in Blackboard Learn on: writing skills; referencing and understanding plagiarism; reading and note making and critical thinking skills. It comprises a wide variety of interactive activities which you complete before taking a module assessment to see how much you learned.

Available 24 hours a day, 7 days a week. Log in via <http://mymodule.tcd.ie/>.

Trinity Careers Service

The College Careers Service provides career guidance support to all students and recent graduates.

Email: careers@tcd.ie

Telephone: **+353 1 896 1721**



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4. CO-CURRICULAR ACTIVITIES

Trinity recognizes that academic activities are only one part of students' development at third level, and co-curricular activities such as sport, volunteering and participation in clubs/societies also contribute significantly to students' personal development.

Sports and DUCAC

Trinity has a full range of sports facilities on and off campus, and all students are encouraged to participate. The 6,500 square metre Sports Centre has a 25 metre, 6 lane swimming pool with a floating floor, a large fitness theatre with over 60 exercise stations, an 11-metre-high climbing wall, a fitness studio and a spin studio, sauna and steam room and two large sports halls. Off campus there are extensive playing fields at Santry and the Trinity Boat Club has its boathouse on the River Liffey at Islandbridge.

There are approximately 50 sports clubs in Trinity College to suit a wide range of interests, and these are under the overall governance of Dublin University Central Athletic Club (DUCAC).

**The Sports Centre is located at the East End of College, at the corner of Pearse Street and Westland Row
Tel. 01 896 1812**

Email: sport@tcd.ie

Clubs and Societies

Trinity has approximately 120 individual clubs and societies, managed by the Central Societies Committee. These span a broad spectrum, including recreational and social activities, languages, and advocacy, and include the Pharmacy Students' Association - DUPSA.

**Central Societies Committee, First Floor, House 6 (Front Square)
Tel: 896 1827**

Email: info@csc.tcd.ie

Most clubs and societies also have their own webpages.

5. STUDENTS' UNIONS

5.1. TCD STUDENTS' UNION (TCDSU)

The Students' Union is a representative body of students, for undergraduates. It is run by five full-time sabbatical officers who are elected annually in February, namely the President, Education Officer, Welfare Officer, Communications Officer and the Ents (Entertainment) Officer. Within the School, the class representatives (elected annually by each class near the start of the academic year) are the key link between the student body and the sabbatical officers. Full details of the Students' Union and its activities, including representation of undergraduates within the College organizational structure, can be found at their website: <https://www.tcdsu.org/>

5.2. GRADUATE STUDENTS' UNION (GSU)

The Graduate Students' Union is the main representative body for postgraduate students (such as students in the fifth year of the Pharmacy (Integrated) programme) at Trinity. In a similar way to the undergraduate Students' Union, class representatives connect the student body to the officers. Full details of the Graduate Students' Union and its activities, including representation of postgraduates within the College organizational



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structure, can be found at: <https://www.tcdsu.org/>

6. SAFETY WITHIN THE SCHOOL

6.1. EMERGENCY PROCEDURES

In the event of an emergency, dial Security Services on **extension 1999** (or +353 1 896 1999 from a mobile phone).

Security Services provide a 24-hour service to the college community, 365 days a year. They are the liaison to the Fire, Garda and Ambulance services and all staff and students should call telephone extension 1999 (+353 1 896 1999) in case of an emergency.

https://www.tcd.ie/about/policies/emergency_procedures.php

Should you require any emergency or rescue services on campus, you must contact Security Services. This includes chemical spills, personal injury or first aid assistance.

It is recommended that all students save at least one personal emergency contact in their phone, listed under ICE (In Case of Emergency).

6.2. SCHOOL SAFETY OFFICERS

School Safety Officer	Dr. Carolina Garcarena	carolina.garciarena@tcd.ie
Biological Safety Officer	Assoc. Prof. Maria José Santos Martinez	santosmm@tcd.ie
Chemical Safety Officer	Assoc. Prof. John Walsh	jjwalsh@tcd.ie
Radiological Protection Supervisor	Prof. Lidia Tajber	ltajber@tcd.ie

6.3. GENERAL SAFETY INFORMATION

- (i) Students are encouraged to bring any concerns regarding safety to the attention of both the School (see Safety Officers above) and the **College Safety Officer, College Head of Safety Ms. Katharine Murray, ext. 1914** (email: katharine.murray@tcd.ie).
- (ii) All undergraduate students presenting in each years' practical classes are advised by the Staff Supervisor about general safety issues such as fire hazards, smoking, eating, protective clothing, etc. and first aid facilities.
- (iii) **Health and Safety Manual:** It is the obligation of every student to familiarise him/herself with the content of the safety manual. [The Health and Safety Manual is available on the School's website](#). All students are required to read the School Health and Safety Manual and abide by the Manual's rules. A declaration form stating this must be completed by all students.
- (iv) The Pharmacy (Integrated) programme consists of lectures, laboratory classes, seminars, study visits, tutorials and some work experience. Laboratories by their nature require those working in them to be highly aware of the safety implications of that particular working environment.

The School wishes to establish and maintain a working environment in which the physical and mental well-being of staff and students is maintained at the highest levels practicable, and to provide a basis whereby problems of safety that arise in the working environment are solved in co-operation with staff and students and their representative organisations.



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6.4. NEIGHBOUR PRINCIPLE

Staff and students are obliged to operate the 'neighbour principle'. This involves:

1. Taking reasonable care for their own safety and health and that of others who may be affected by their acts or omissions while at work;
2. Co-operating with the College to such an extent as will enable the College to comply with the provisions of legislation and to meet its general duties on safety, welfare and health;
3. Not intentionally interfering with or misusing any means, appliance, equipment or other aid provided for securing the health, safety or welfare of the College community;
4. The use of any clothing, equipment or appliance required for the purpose of securing his/her health, safety and welfare at work;
5. Reporting to the College management any defects in plant, equipment or procedures which are a danger to safety, health or welfare.

N.B. In the interests of safety, any student who fails to obey regulations or instructions from academic or technical staff, including demonstrators, may be excluded from the laboratory.

6.5. IMPORTANT SAFETY PRECAUTIONS

PLEASE READ CAREFULLY

1. Smoking in College buildings is not allowed.
2. Hallways and passageways must be kept clear.
3. The location of fire exits should always be noted.
4. The location of fire extinguishers and their mode of use should be noted.
5. The location of the first aid cabinet in each laboratory should be noted.
6. Dress code when working in the laboratories:
 - White lab coats must always be worn and closed
 - Safety spectacles must be worn when appropriate
 - Appropriate masks may need to be worn when working with certain types of equipment and /or chemicals
 - No open-toed shoes or sandals may be worn while in the laboratory.
 - Long hair must be tied back and kept from covering the face.
7. Use of mobile/camera phones, iPods, radios and all other electronic equipment unrelated to practical work is prohibited while working in laboratories.
8. In the event of an accident taking place in the laboratory involving injury, no matter how trivial it may seem, the proper procedure is to:
 - Call the 'First-Aider' associated with the laboratory to give first-aid if appropriate.
 - Phone the College Health Service (Ext. 1556) for advice and refer for medical evaluation if he/she is ambulatory and not in distress or otherwise seriously injured.
 - If the victim is known to be or likely to be seriously injured always call the College emergency number (1999) for help.
 - **Never transport the victim to hospital in a private car or taxi.**



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- Report all accidents to a School of Pharmacy & Pharmaceutical Sciences Safety Officer.
- 9. Laboratory work must be performed where at all possible only during normal working hours. No laboratory work of any kind should be undertaken after hours unless at least two persons are present.
- 10. Eating and drinking in the laboratories is strictly forbidden, this includes chewing gum.
- 11. Any suspicious persons / packages / floods etc. must be immediately reported to the College Emergency Number (1999) at Front Gate.
- 12. Undergraduate students should not be in the premises after hours for laboratory work. For further information, please refer to Section 2.8 of the School Safety Manual.

7. GENERAL ADMINISTRATIVE INFORMATION

7.1. DATA PROTECTION

Trinity takes its data protection responsibilities seriously and has a dedicated data protection office:

Data Protection Office

Secretary's Office

Trinity College Dublin

Dublin 2

Ireland

TCD data protection website: <https://www.tcd.ie/dataprotection/>

dataprotection@tcd.ie

7.2. UNIVERSITY POLICIES AND PROCEDURES

The University has a wide range of policies and procedures that apply to the School of Pharmacy and Pharmaceutical Sciences and its students. University policies can be found at this link: <https://www.tcd.ie/about/policies/>

Some policies and procedures of relevance are:

- [College Calendar](#) (containing College Regulations)
- [Academic policies and procedures](#)
- [Student complaints procedure](#)
- [Dignity and Respect policy](#) (via [Dignity, Respect and Consent Service](#))

7.3. FEEDBACK AND EVALUATION

The School welcomes feedback from students and evaluates all modules annually. At a formal level, this is achieved through the Student Forum, the Programme Management Committee (see Section 2.3) and end-of-year anonymous student surveys. Informal feedback is also welcome on an ongoing basis.



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The School participates fully in the University's feedback and evaluation processes, more details of which can be found at:

- <https://www.tcd.ie/teaching-learning/quality/quality-assurance/evaluation.php>
- <https://www.tcd.ie/teaching-learning/academic-policies/> (see link to Student Partnership Policy)
- <https://www.tcd.ie/teaching-learning/academic-policies/> (see link to Focus Group Policy)

It is also fully committed to the principles of the Student Partnership Policy, which can be found at: <https://www.tcd.ie/teaching-learning/academic-policies/> (see link to Student Partnership Policy)

7.4. KEY DATES

The structure of the College academic year is shown below, including key dates for the academic year 2026-27. In particular, you should take note of the weeks allocated to the formal University assessment and reassessment sessions managed by the University.

Where important academic and administrative deadlines/dates are specific to the School, you will normally be notified by School and/or College staff. However more general information on key dates within the academic year can be found in the Almanack linked from the [College Calendar website](#).

Academic Calendar Week	Week beginning	2026/27 Academic Year Calendar		Term / Semester
		UG continuing years / PG all years	UG new first years	
1	31-Aug-26	Marking/Results 2025/26		← Michaelmas Term begins/Semester 1 begins
2	07-Sep-26	Marking/Results and Orientation (PG, Visiting, Erasmus)		
3	14-Sep-26	Teaching and Learning	Orientation (JF UG)	← Michaelmas teaching term begins
4	21-Sep-26	Teaching and Learning	Teaching and Learning	
5	28-Sep-26	Teaching and Learning	Teaching and Learning	
6	05-Oct-26	Teaching and Learning	Teaching and Learning	
7	12-Oct-26	Teaching and Learning	Teaching and Learning	
8	19-Oct-26	Teaching and Learning	Teaching and Learning	
9	26-Oct-26	Study/Review (Monday, Public Holiday)	Study/Review (Monday, Public Holiday)	
10	02-Nov-26	Teaching and Learning	Teaching and Learning	
11	09-Nov-26	Teaching and Learning	Teaching and Learning	
12	16-Nov-26	Teaching and Learning	Teaching and Learning	
13	23-Nov-26	Teaching and Learning	Teaching and Learning	
14	30-Nov-26	Teaching and Learning	Teaching and Learning	
15	07-Dec-26	Revision / Assessment*	Revision / Assessment*	
16	14-Dec-26	Assessment*	Assessment*	← Michaelmas Term ends Sunday 20 December 2026/Semester 1 ends
17	21-Dec-26	Assessment* / Christmas	Assessment* / Christmas	
18	28-Dec-26	Christmas Period - College closed 24 December 2026 to 3 January 2027 inclusive	Christmas Period - College closed 24 December 2026 to 3 January 2027 inclusive	
19	04-Jan-27	Foundation Scholarship Examinations	Foundation Scholarship Examinations	
20	11-Jan-27	Marking***	Marking***	
21	18-Jan-27	Teaching and Learning	Teaching and Learning	← Hilary Term begins/Semester 2 begins; Hilary teaching term begins
22	25-Jan-27	Teaching and Learning	Teaching and Learning	
23	01-Feb-27	Teaching and Learning (Monday, Public Holiday)	Teaching and Learning (Monday, Public Holiday)	
24	08-Feb-27	Teaching and Learning	Teaching and Learning	
25	15-Feb-27	Teaching and Learning	Teaching and Learning	
26	22-Feb-27	Teaching and Learning	Teaching and Learning	
27	01-Mar-27	Study/Review	Study/Review	



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28	08-Mar-27	Teaching and Learning	Teaching and Learning	
29	15-Mar-27	Teaching and Learning (Wednesday, Public Holiday)	Teaching and Learning (Wednesday, Public Holiday)	
30	22-Mar-27	Teaching and Learning (Friday, Good Friday)	Teaching and Learning (Friday, Good Friday)	
31	29-Mar-27	Teaching and Learning (Monday, Easter Monday)	Teaching and Learning (Monday, Easter Monday)	
32	05-Apr-27	Teaching and Learning	Teaching and Learning	
33	12-Apr-27	Revision	Revision	
34	19-Apr-27	Assessment**	Assessment**	←Hilary Term ends Sunday 25 April 2027
35	26-Apr-27	Trinity Week (Monday, Trinity Monday) / Assessment**	Trinity Week (Monday, Trinity Monday) / Assessment**	←Trinity Term begins
36	03-May-27	Marking/Results (Monday, Public Holiday)	Marking/Results (Monday, Public Holiday)	
37	10-May-27	Marking/Results	Marking/Results	
38	17-May-27	Marking/Results	Marking/Results	
39	24-May-27	Research	Research	
40	31-May-27	Research	Research	←Trinity Term ends Sunday 6 June 2027/Semester 2 ends
41	07-Jun-27	Research (Monday, Public Holiday)	Research (Monday, Public Holiday)	
42	14-Jun-27	Research	Research	
43	21-Jun-27	Research	Research	
44	28-Jun-27	Research	Research	
45	05-Jul-27	Research	Research	
46	12-Jul-27	Research	Research	
47	19-Jul-27	Research	Research	
48	26-Jul-27	Research	Research	
49	02-Aug-27	Research (Monday, Public Holiday)	Research (Monday, Public Holiday)	
50	09-Aug-27	Research	Research	
51	16-Aug-27	Research	Research	
52	23-Aug-27	Reassessment 2026/27 - Semesters 1 & 2	Reassessment 2026/27 - Semesters 1 & 2	

* Semester 1 assessment session: December 11 to 22, 2026 inclusive (No assessment after Dec 22nd)

** Semester 2 assessment session: April 19 to 30, 2027 inclusive

*** Marking of Semester 1 assessments will continue into January and early February. Provisional Semester 1 results will be made available to students during the week commencing February 8, 2027

IMPORTANT: Please note that the re-assessment session for Junior Sophister students takes place earlier than the normal re-assessment session (dates to be confirmed). Additional important assessments (e.g., term tests) may also take place outside the examination weeks shown above.

7.5. TIMETABLE

Your timetable is available online via the TCD Portal (<https://my.tcd.ie>). To facilitate students, timetable information has also been collated by the School and made available in the “[Current Students](#)” section of the School website.

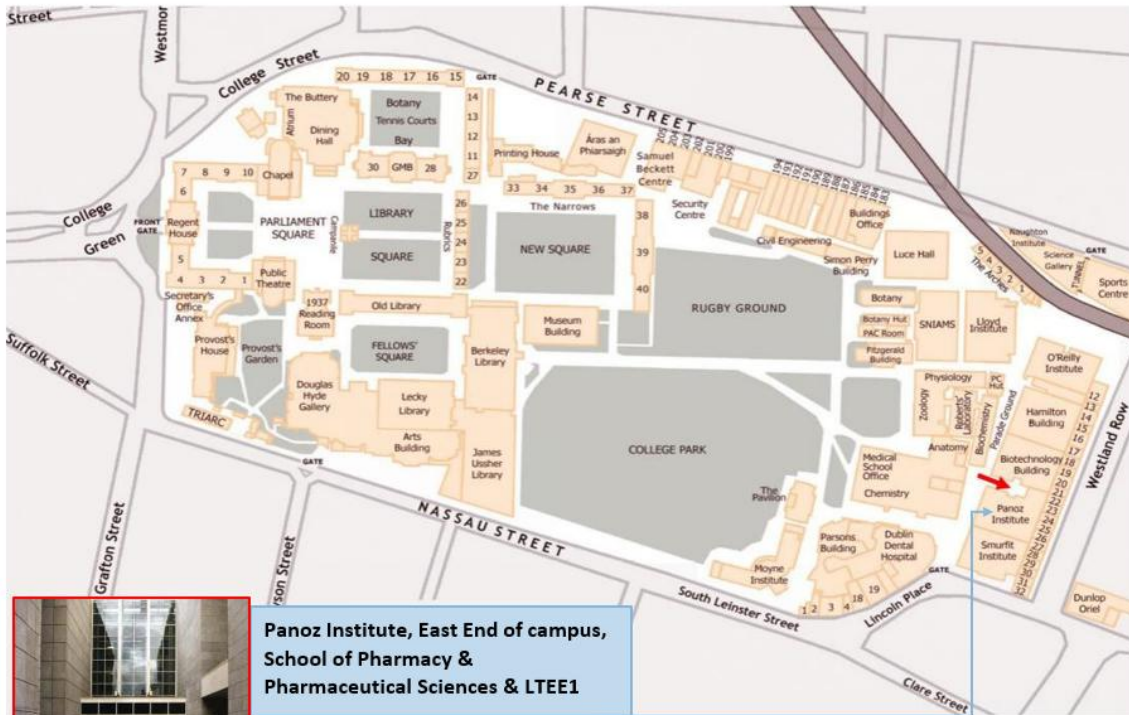
Please note that timetables are subject to change. Students will be notified of amendments as they arise.

7.6. KEY LOCATIONS

A map has been provided below showing key locations within the campus, including the Panoz Institute. A more comprehensive set of maps and directions, including a searchable interactive map of College locations, can be found at <http://www.tcd.ie/Maps/>



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8. UNIVERSITY STUDY

The Pharmacy (Integrated) programme is accredited by the Pharmaceutical Society of Ireland and is also recognised for "free movement" purposes under the various European Union Directives on Pharmacy which lay down the subjects to be studied. The minimum number of study hours for a Pharmacy course form part of national and European accreditation criteria. There are **two types of study** hours set out in this booklet.

1. **Supervised study** which consists of the lecture and laboratory practical courses, tutorials, workshops, seminars, study visits and specified work experience. It can also include laboratory report preparation. **School regulations require you to attend all scheduled classes and you may be refused permission to take your written examinations if your attendance is deemed non-satisfactory.** (See [University Calendar \(2026-27\), Part II \(Undergraduate Studies\), B1 General Regulations and Information, II Academic Progress, Non-satisfactory attendance, §§24-25](#))
2. **Guided study** comprises directed but unsupervised study you must do outside the formal course. It can consist of suggested reading of text book references, published articles in scientific and medical journals, use of electronic data bases (e.g., Micromedex Healthcare Series), exercises in problem solving, reading and extension of your lecture notes, revision for term tests and formal University assessment sessions. The amount of guided study on average involves 2- 3 hours per lecture and 1 hour for each hour of practical work. The hours specified are very much minimum hours of guided study expected of you over the five years of the course.

Independent study, note-taking at lectures and the writing of laboratory reports etc., are important ways of developing your learning abilities and capacity for study. For pharmacists in particular, the ability to learn continuously is essential because of the necessity for continuing professional development as a practising pharmacist.

If you are concerned about study technique at University level, you should discuss this with your tutor and avail of the courses made available each year in College. **It is vital that you learn how to use the library efficiently**, particularly the electronic databases of relevance to Pharmacy and Pharmaceutical Sciences. **The School of Pharmacy and Pharmaceutical Sciences has a designated Subject Librarian** (*Aoife O'Connor* (oconna53@tcd.ie), <https://libguides.tcd.ie/pharmacy-pharmaceutical-sciences/guide>) **who can provide guidance, classes and workshops.**

Continuous assessment marks will be allocated based on attendance at practicals, performance and practical write- ups. Laboratory notebooks/manuals/reports must be presented for assessment by the date specified in the manual or by College staff.

IMPORTANT

Late submissions will not be assessed unless a valid reason is provided, and students will be deemed not to have satisfied the School's examination requirements. Penalties may also be applied for late submissions. See the Late Submission Policy on the School website.



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8.1. ACADEMIC INTEGRITY AND PLAGIARISM

There is a well-established academic convention that work performed and published by other people is acknowledged fully if it is being used in any written work submitted for assessment. This convention applies to all academic work (theses, research papers, textbooks etc.) but in your case it applies to all material used in assessments, lab books and written examinations. College takes breaches of its regulations on plagiarism very seriously and you must read the next section very carefully.

To support students in understanding what plagiarism is and how they can avoid it, an online central repository to consolidate all information and resources on academic integrity was created. The central repository is hosted by the Library and is located at <https://libguides.tcd.ie/academic-integrity>

It includes the following:

- (i) The College Calendar entry on plagiarism for undergraduate and postgraduate students;
- (ii) The matrix explaining the different levels of plagiarism outlined in the Calendar entry and the sanctions applied;
- (iii) Information on what plagiarism is and how to avoid it;
- (iv) 'Ready, Steady, Write', an online tutorial on plagiarism which must be completed by all students;
- (v) The text of a declaration which must be inserted into all cover sheets accompanying all assessed course work.

When submitting assessed work, cover sheets containing the following declaration must be completed and handed in together with the assignment:

"I have read and understood the academic integrity provisions in the General Regulations of the University Calendar for the current year, found at <http://www.tcd.ie/calendar>.

I have also read and understood (i) the programme-level permissions regarding the use of GenAI in this assessment task, outlined in the programme handbook that relates to this assessment, and/or (ii) any module-level permissions that relate to this specific module, which are outlined in the module descriptions in the Blackboard VLE.

Where I have used the output of GenAI in my work, I have acknowledged its use in my work and understood the guidance, located at: <https://libguides.tcd.ie/gen-ai>.

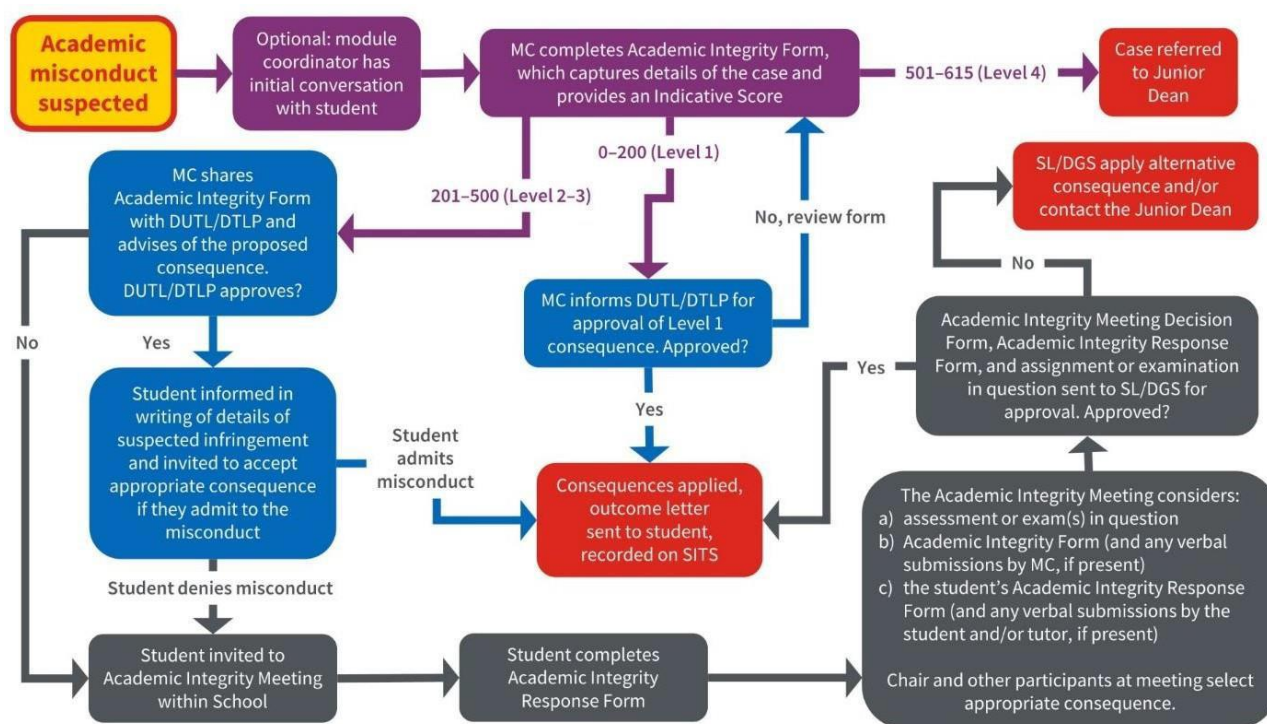
I have also read and understood the Academic Integrity guide located at <https://libguides.tcd.ie/academic-integrity> and completed the 'Ready Steady Write' Tutorial on avoiding plagiarism, located at <https://libguides.tcd.ie/academic-integrity/ready-steady-write>."

(Students should contact their module co-ordinator if they are unsure about the GenAI permissions that relate to this assessment)

See University Calendar (2026-27) Part II (Undergraduate Studies), B1 General Regulations and Information, II Academic Progress, Plagiarism, §§96-105, University Calendar (2026-27) Part III (Graduate Studies and Higher Degrees), Section 1 - General Academic Regulations for Graduate Studies and Higher Degrees, Plagiarism, §§49-56, (<https://www.tcd.ie/calendar/>), and the Academic Integrity website: <https://www.tcd.ie/academic-affairs/academic-policies/academic-integrity/>. The procedure for Academic Misconduct is illustrated below.



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8.2. USE OF GENERATIVE ARTIFICIAL INTELLIGENCE (Gen AI) IN TEACHING AND LEARNING IN THE PHARMACY PROGRAMME

It is recognized that AI and GenAI bring opportunities and challenges to teaching and learning, and supports and guidance are evolving in this rapidly changing area.

Aligned with the [College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research](#) (2026), the use of GenAI is permitted unless otherwise stated. Where the output of GenAI is used to inform a student's document or work output, this usage should be acknowledged and appropriately cited, as per [Library guidelines on acknowledging and reference GenAI](#).

From an academic integrity perspective, if a student generates content from a GenAI tool and submits it as his/her/their own work, it is considered plagiarism, which is defined as academic misconduct in accordance with College Academic Integrity Policy.

If individual modules have further restrictions or permit greater allowances in the use of GenAI, those restrictions or allowances are stated in the module descriptions below and in the Blackboard VLE. In such circumstances, it is the module permissions regarding the use of GenAI which are deemed to be definitive for use in that module.

Before using GenAI, students should ensure that its use is not prohibited within that module.

Note also that some uses of GenAI are unlawful, and confidential or sensitive information or material to which you do not own the copyright and which is not publicly available, should not be input (e.g. as part of a prompt) to a GenAI platform or model.

Students are also reminded that they have committed to a Code of Conduct which outlines the defined standards and principles by which they must abide in the academic, clinical and professional environment.



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9. PHARMACY (INTEGRATED) PROGRAMME

9.1. OVERVIEW: PROGRAMME ARCHITECTURE AND AWARDS

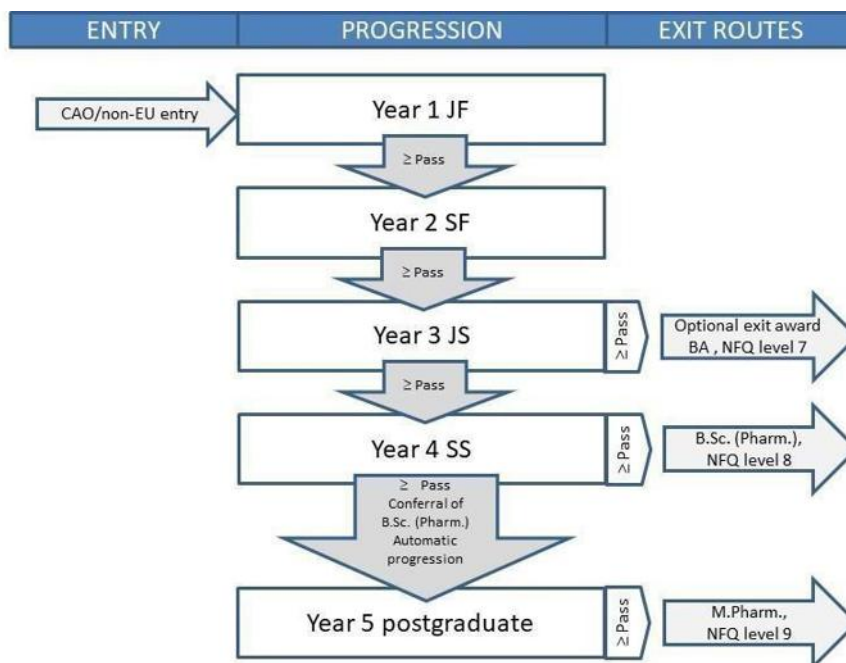
The four-year B.Sc. (Pharm.) degree forms part of the integrated 5-year programme of studies. The five-year Pharmacy (Integrated) programme provides practical learning in workplace settings in years 2, 4 and 5 of the course.

Pharmacy is the study of all aspects of drugs, both natural and synthetic in origin, including their chemistry, their uses in medicines, and how they work within the body. Pharmacists work in a variety of settings – community pharmacies, hospitals, long-term care facilities, and within the pharmaceutical industry; to name just a few. In many respects, their role as a key healthcare professional is to help people achieve the best results from their medications.

While this degree is an essential requirement if you wish to practise as a community or hospital pharmacist, Pharmacy at Trinity opens a wide variety of professional opportunities in both industry and the healthcare sector. A strong interest in science is important to fully enjoy the course.

The curriculum consists of supportive learning content based on core scientific, healthcare and professional elements, evolving into learning of knowledge, skills, attitudes and behaviours enabling the development of the student in professionally applying scientific and healthcare knowledge and skills in any pharmacy practice setting.

The Pharmacy syllabus has been designed to provide you with an all-round education in the pharmaceutical sciences and in the practice of pharmacy. The five-year Pharmacy (Integrated) programme comprises a variety of approaches to teaching Pharmacy by friendly, dedicated, enthusiastic and approachable staff: Lectures, seminars, tutorials, workshops, small-group teaching, problem-based learning, site-visits, computer-assisted learning, web discussion boards, wikis, online group assignments, communication skills, career planning, clinical case studies, interprofessional learning, laboratory and dispensing practicals and research projects.





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The development of the student as an active learner is core to the curriculum. The degree of active learning increases through years 1 to 5. From the beginning of year 1, active and reflective learning is encouraged and supported. This is primarily evident through the commencement of a reflective CPD (continued professional development) e-portfolio in year 1, along with the introduction of CCF-Live. CCF-Live continues through years 1-3 of the programme, enabling the students' development of critical reflection skills relating to their learning needs for CCF competency demonstration. The maintenance of a reflective CPD e-portfolio is continued in all years of the Pharmacy (Integrated) programme.

	Semester 1	Semester 2	
Year 1 60 ECTS	PHU11109 BYU11P01 PHU11PG1 PHU11102 PHU11104 PHU11106 PHU11101	PHU11B11 PHU11103 PHU11104 PHU11106 PHU11101	OSCE 1
Year 2 60 ECTS	PHU22111 PHU22101 PHU22104 PHU22106 PHU22110 [Elective]	PHU22102 PHU22101 PHU22104 PHU22106 PHU22110 PHU22118	OSCE 2_1 OSCE 2_2
Year 3 60 ECTS	PHU33112 PHU33110 PHU33104 PHU33106	PHU33103 PHU33109 PHU33111 PHU33104 PHU33106	OSCE 3
Year 4 60 ECTS	PHU44101 PHU44202 PHU44303 CA Level 3 (MIN)	PHU44102 PHU44106 PHU44112	OSCE 4
Year 5 90 ECTS	PHP55101 PHP55103 PHP55104 PHP55106 PHP55108	PHP55100 PHP55200 PHP55300 PHP55400 PHP55500	OSCE 5_1 OSCE 5_PRE
			B.A. (exit only) B.Sc. (Pharm) M. Pharm.

Notes:

- Each semester consists of 11 teaching weeks with one reading week within the semester -see [academic year structure](#) for details of reading weeks, revision and examination periods.
- Modules highlighted in pink span both semesters.



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3. Placement modules are highlighted in green. In year 2, a 2-week placement is nested in PHU22106. In years 4 and 5, the entire placement modules are spent in the placement provider. The year 4 placement is 4 months and the year 5 placement is 8 months. CA MIN/RDY relate to required levels of competency attainment on placement.
4. Modules are assessed by final examinations and continuous assessment, such as written assignments, essays, lab reports, OSCEs (objective structured clinical examinations), etc. which contribute to the overall mark in a module.

Further information on the Irish National Framework of Qualifications (NFQ) is available at: <https://www.qqi.ie/>

Those students who carry on to successfully complete year four of the programme will be awarded the B.Sc. (Pharm.) and may progress into a postgraduate fifth year which leads to the award of a M.Pharm. and entitlement to apply for registration as a pharmacist. Students who have been found unfit to practise may be prevented from progressing to the fifth (M.Pharm.) year of the Pharmacy (Integrated) programme. There will be a postgraduate fee associated with the fifth year of the new programme, payable by the student.

9.2. GRADUATE ATTRIBUTES

A core objective of the Pharmacy (Integrated) programme is to produce graduates who have attained all competencies in the Pharmaceutical Society of Ireland's Core Competency Framework for Pharmacists (CCF), available at https://www.thepsi.ie/gns/Pharmacy_Practice/core-competency-framework.aspx. The CCF contains five domains (Personal, Professional, Organization and Management Skills, Pharmacy Care and Public Health) which in turn contain the competencies required of pharmacists and suggests behaviours illustrating those competencies.

As well as attaining these specific profession-specific competencies, the School aspires to all its graduates attaining Trinity's Graduate Attributes, namely:

- To think independently
- To communicate effectively
- To develop continuously
- To act responsibly.

Further information on Trinity's Graduate Attributes and the knowledge, skills and behaviours in which they are manifest can be found at <https://www.tcd.ie/courses/undergraduate/your-trinity-education/>.

9.3. SCHOOL EDUCATION STRATEGIES

In order to ensure the effective delivery of the Pharmacy (Integrated) programme, the School has developed a Teaching and Learning Strategy and an Assessment Strategy. These are included in this handbook.

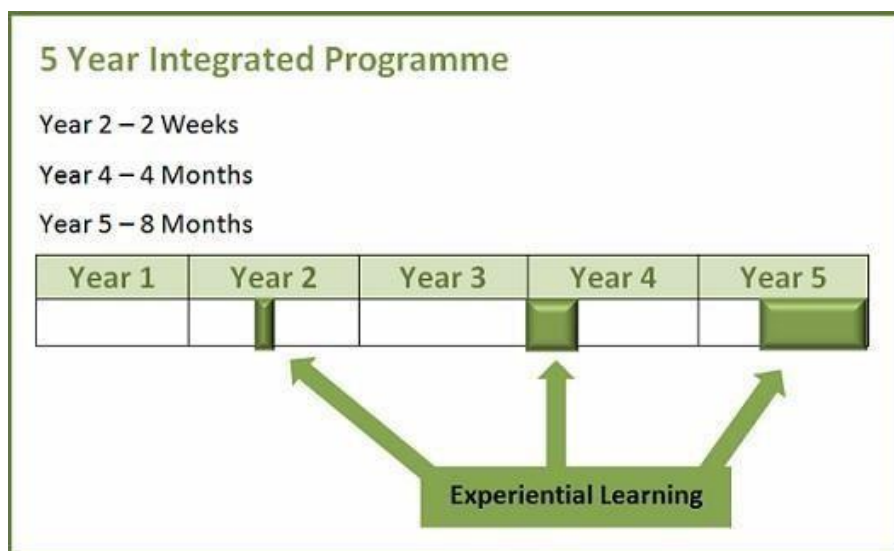
9.4. PROFESSIONAL PLACEMENTS

Several episodes of workplace-based activity are distributed through the programme, in community, hospital and industrial settings. Some of these comprise short visits. However, three (known as the principal professional placements) entail extended periods in the workplace:

- Two weeks during the second year of the programme (second semester)
- Four months at the start of fourth year (first semester)
- Eight months at the end of the fifth year (second semester and summer)



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These three principal professional placements are managed by the Affiliation for Pharmacy Practice Experiential Learning (APPEL), a unique collaboration between Schools of Pharmacy in Ireland which identifies and arranges placements and placement activities for all pharmacy undergraduates.

The key contact in relation to these placements are Trinity's Practice Educators, Asst. Prof. Eimear Ní Sheachnasaigh and Muireann Counihan, who hold a joint role in APPEL and the School. You will be provided with further information on APPEL, the principal professional placements, and shorter periods of experiential learning as you progress through the Pharmacy (Integrated) programme.

9.5. EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

The European Credit Transfer and Accumulation System (ECTS) is an academic credit system based on the estimated student workload required to achieve the objectives of a module or programme of study. It is designed to enable academic recognition for periods of study, to facilitate student mobility and credit accumulation and transfer. The ECTS is the recommended credit system for higher education in Ireland and across the European Higher Education Area.

The ECTS weighting for a module is a measure of the student input or workload required for that module, based on factors such as the number of contact hours, the number and length of written or verbally presented assessment exercises, class preparation and private study time, laboratory classes, examinations, clinical attendance, professional training placements, and so on as appropriate. There is no intrinsic relationship between the credit volume of a module and its level of difficulty.

The European norm for full-time study over one academic year is 60 credits. 1 credit represents 20-25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations. The first four years of the Pharmacy (Integrated) programme are each one academic year in duration and are associated with 60 ECTS credits. Like most other taught postgraduate courses, the fifth year of the Pharmacy (Integrated) programme is a full calendar year (12 months) in duration and is associated with 90 ECTS credits.



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ECTS credits are awarded to a student only upon successful completion of the programme year. Progression from one year to the next is determined by the programme regulations. Students who fail a year of their programme will not obtain credit for that year even if they have passed certain components. Exceptions to this rule are one-year and part- year visiting students, who are awarded credit for individual modules successfully completed.

9.6. INFECTIOUS DISEASE POLICY

[Please also refer to University Calendar 2026-2027](#)

The Faculty of Health Sciences is responsible for educating and training health care workers who will work in areas requiring serious responsibilities and trust. Training includes clinical and other professional practice placements which are often physically, intellectually, emotionally and ethically demanding. In the health sciences the interests of the patient take precedence over those of the practitioner. Students who, for any reason, are unable to safely participate in clinical or other professional placements and, therefore, could cause harm to themselves or to others in such situations, are required to disclose such reasons to the head of school or his/her nominee. The School and College Fitness to Practice procedures will be applied where concerns are raised in relation to a student's fitness to participate in clinical or other placements.

All health care professionals have a duty of care to the public. In the interests of reducing the risk of the transmission of infectious disease from patients to students, or students to patients, all new entrants to pharmacy are required to complete mandatory Health Screening through the College Health Service. The School of Pharmacy and Pharmaceutical Sciences will schedule your initial appointment with College Health Service and will notify you of the date and time in due course. Information on the Health Screening requirements is available here:

<https://www.tcd.ie/students/orientation/assets/pdf/Health%20Screening%20Requirements%202026-27.pdf>

All costs for the mandatory health screening and vaccinations must be borne by the student and the cost for standard screening including Hep B vaccinations and titre tests for 2026-27 will be €330. Students will receive this charge on their invoice in their mytcd.ie portal after they have registered for the 2026-27 academic year, along with instructions and information on how to make payment/s.

Students will also be advised to seek vaccination against influenza each year for the duration of their course of studies. Students who fail to complete the above requirements will be made withdrawn from their course of study and a re-admission fee may apply.

Further information is available here:

<https://www.tcd.ie/students/orientation/undergraduates/health-screenings.php>

If you have any queries, please contact the School Manager at helen.thornbury@tcd.ie



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9.7. GARDA VETTING

Students in pharmacy are required to undergo vetting by An Garda Síochána, through the National Vetting Bureau, or other relevant police force. If, because of the outcome of these vetting procedures, a student is deemed unsuitable to attend clinical or other professional placements he/she may be required to withdraw from his/her course of study.

Students returning to study after a period off-books need to undergo re-vetting.

Further details and procedures are available from the following link:
<https://www.tcd.ie/students/orientation/undergraduates/garda-vetting.php>

Please note that the School does not process Garda vetting requests as the process is undertaken entirely by Academic Registry.

Approval for placement based on Garda vetting disclosures are sent via the School to APPEL.

9.8. FITNESS TO PRACTISE AND CODE OF CONDUCT

Students undertaking the Pharmacy (Integrated) programme are expected to abide by the Code of Conduct for Pharmacy students which may be found on the School website (see <https://www.tcd.ie/pharmacy/school-policies/> and in this Student Handbook).

Students should also note the School's procedures for dealing with Fitness to Practise issues (School website, see <https://www.tcd.ie/pharmacy/school-policies/> and summary in this Student Handbook) and the general College Regulations on Fitness to Practise, University Calendar (2026-27) Part II (Undergraduate Studies), B1 General Regulations and Information, II Academic Progress, §28, <http://www.tcd.ie/calendar/>

9.9. ERASMUS/SUMMER RESEARCH PLACEMENTS

Our summer research placement programme (coordinated by Prof. Carsten Ehrhardt), including ERASMUS, encourages pharmacy students to perform a research project over the summer at another University, as part of their undergraduate degree programme.

The following universities currently participate in ERASMUS exchanges:

- University of Vienna – Austria
- University of Split – Croatia
- University of Angers – France
- University of Caen – France
- University of Lyon – France
- University of Montpellier – France
- University of Paris-Saclay – France
- University of Greifswald – Germany
- Ludwig Maximilian University of Munich – Germany
- La Sapienza, University of Rome – Italy
- University of Pavia – Italy
- University of Utrecht – The Netherlands

The School has also signed academic exchange agreements (covering the exchange of undergraduate and postgraduate students, as well as academic staff) with the School of Pharmacy at:

- University of Southern California, Los Angeles – USA
- University of Health Sciences and Pharmacy in St. Louis – USA
- University of Colorado Denver – USA



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- University of Iowa – USA
- University of Connecticut – USA
- Takasaki University of Health and Welfare – Japan
- Macquarie University – Australia

9.10. LEARNING OUTCOMES FOR THE PHARMACY (INTEGRATED) PROGRAMME

The learning outcomes of the Pharmacy (Integrated) programme curriculum are identified separately at the undergraduate and postgraduate level as follows:

The aim of the undergraduate part of the Pharmacy (Integrated) programme leading to the B.Sc. (Pharm.) award is to provide students with education in the pharmaceutical sciences and the practice of pharmacy in all its forms. Specific programme outcomes are that the graduate should be able to:

1. Demonstrate professionalism, leadership, communication and collaborative working skills and the competence to make decisions in the best interests of the patient and society with due regard to the Core Competency Framework for pharmacists (CCF).
2. Evidence a commitment to life-long learning, to the need for continuing education and professional development, and an ability to engage with change and innovation.
3. Explain how medicines are developed, formulated, manufactured, tested, brought to the market and used in evidence-based practice.
4. Apply principles of quality, safety, efficacy, sustainability and duty of care to practice contexts in pharmacy and pharmaceutical sciences.
5. Exercise appropriate judgement in a number of complex planning, design, technical, organisational and/or management functions related to pharmacy and pharmaceutical sciences, integrating pharmaceutical and clinical knowledge.
6. Undertake research and/or professional activity at an appropriately advanced level, accepting accountability for all related decision making.

On successful completion of the Masters year of the Pharmacy (Integrated) programme leading to the M.Pharm award, the graduate should have satisfied the statutory educational requirements for registration as a pharmacist, having achieved the following additional outcomes:

1. Demonstrate a critical awareness of local and global challenges and insights relevant to the professional and scientific aspects of pharmacy, and of tools and techniques of enquiry at the forefront of the field to address these.
2. Engage in person-centred pharmacy practice at a level of competence commensurate with the CCF.
3. Practise with professional and personal integrity and discipline of mind, together with an understanding of and commitment to the ethos of professionalism.
4. Demonstrate a commitment to ongoing professional development and life-wide learning, pertaining to current and emerging scientific and professional developments in the relevant practice setting.



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9.11. ATTENDANCE AND COURSE WORK

Students must attend for appropriate academic instruction in each term of each academic year and must satisfy the Head of the School as to their academic progress in each term in order to proceed with their year. The School may, from time to time, draw up regulations determining the required attendance of students at the various forms of instruction.

To rise with their class students must (a) attend satisfactorily the lectures, seminars, tutorials etc. given in the modules of their course each term as required by the University Council and the School of Pharmacy and Pharmaceutical Sciences regulations, (b) perform and complete all laboratory work to the satisfaction of the Head of the School, (c) attend and complete to a satisfactory standard all visits and teaching exercises at Practice sites and the prescribed periods of work experience and (d) pass the prescribed examinations (including practical tests and continuous assessment components).

Please also see '**Examination & Progression Regulations**' in this handbook.

Non-satisfactory attendance

At the end of the teaching term, students who have not satisfied the School requirements with regard to attendance may be returned to the Senior Lecturer as non-satisfactory for that term. In accordance with the regulations laid down by the University Council, students with non-satisfactory attendance may be subject to local school-level consequences. Records of non-satisfactory attendance may be retained and entered into the Log of Concern. Students with non-satisfactory attendance may be required by the Senior Lecturer to repeat the year in full.

N.B. PLEASE NOTE EXAMINATION REGULATIONS AND DETAILS ON COURSE MODULES MAY BE SUBJECT TO AMENDMENT.

9.12. EXTERNAL EXAMINERS

As part of the University's quality assurance mechanisms, external examiners have been appointed for the Pharmacy (Integrated) programme. Further details on the role of external examiners can be found on the Quality Office website at: <https://www.tcd.ie/teaching-learning/quality/quality-assurance/examiners.php>

The external examiners for 2026-2027 are as follows:

- **Dr. Sharon Haughey**; Queen's University Belfast; Co-developed practice modules and PRE
- **Assoc. Prof. Vânia Moreira**; Universidade de Coimbra, Portugal; Pharmaceutical Chemistry
- **Dr. Fiona Hughes**; Queen's University Belfast; Y5 extern
- **Prof. Regina Scherliess**, Christian-Albrechts-Universität Kiel, Pharmaceutics
- **Prof. Robin Plevin**; Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, Pharmacology
- **Prof. Pavel Mucaji**; Comenius University, Bratislava, Slovakia; Pharmacognosy
- **Prof. Afonso Miguel das Neves Cavaco**; University of Lisbon; Practice of Pharmacy



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9.13. EXEMPTIONS – MATURE, GRADUATE AND TRANSFER STUDENTS

Mature, graduate or transfer students may apply for exemptions from coursework and lectures. They do so by applying to the appropriate module coordinator, either directly or through their College Tutor. The module coordinator will make a recommendation to the Director of Teaching & Learning (Undergraduate).

All applications for exemption must be made **within four calendar weeks of the start of Michaelmas Teaching Term** and must be approved by the Director of Teaching & Learning (Undergraduate).

All students must present for written examinations in all modules. In the case of those who have been granted an exemption from practicals, their theory mark is returned for the module.

N.B. PLEASE NOTE EXAMINATION REGULATIONS AND DETAILS ON COURSE MODULES MAY BE SUBJECT TO AMENDMENT.

9.14. MODULE CODES AND TITLES OF THE PHARMACY (INTEGRATED) PROGRAMME

Definition of the ECTS:

"The European Credit Transfer and Accumulation System (ECTS) is a student-centred system based on the student workload required to achieve the objectives of a programme of study." Ref: ECTS Users' Guide (Feb 2005) EU Commission, DG for Education and Culture". ECTS equivalent for each year of the course is 60 credits.

<https://www.tcd.ie/academic-affairs/academic-regulations/ug-module-sizes-and-capstone/>

JUNIOR FRESH (Year 1)

Module Code	Module Title	ECTS	Semester
PHU11PG1	Physiology for Pharmacy	5	1
BYU11P01	From Molecules to Cells	5	1
PHU11BI1	Biochemistry	5	2
PHU11101	Organic and Inorganic Chemistry for Pharmacy	10	1 & 2
PHU11102	Physical Pharmacy I	5	1
PHU11103	Pharmaceutical Analysis I	5	2
PHU11104	Introduction to Pharmaceutics and Formulation, including Mathematical Methods and Pharmaceutical Calculations	10	1 & 2
PHU11106	Practice of Pharmacy I	10	1 & 2
PHU11109	General Principles of Pharmacology	5	1

SENIOR FRESH (Year 2)

Module Code	Module Title	ECTS	Semester
	Elective Module (Student Choice)	5	1
PHU22101	Properties & Analysis of Materials used in Medicines	10	1 & 2
PHU22102	Physical Pharmacy II, Drug Transport and Kinetics	5	2
PHU22104	Formulation and Pharmaceutical Technology	10	1 & 2
PHU22106	Practice of Pharmacy II	10	1 & 2
PHU22118	Pharmaceutical Biochemistry and Biotechnology	5	2
PHU22110	Molecular & Chemotherapeutic Pharmacology and Clinical Therapeutics	10	1 & 2
PHU22111	Blood, Cardiovascular & Renal Pharmacology and Clinical Therapeutics	5	1

JUNIOR SOPHISTER (Year 3)

Module Code	Module Title	ECTS	Semester
PHU33103	Natural Sources of Drugs and Substances used in Medicines	10	2
PHU33104	Sterile Products and Advanced Pharmaceutical Biotechnology	10	1 & 2
PHU33106	Practice of Pharmacy III	10	1 & 2
PHU33109	Endocrine & Reproductive Pharmacology and Clinical Therapeutics	5	2
PHU33110	Respiratory & Gastrointestinal Systems and Clinical Therapeutics	10	1
PHU33111	Malignant Disease, Immune & Ocular Systems and Clinical Therapeutics	10	2
PHU33112	Neuropharmacology and Clinical Therapeutics	5	1



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SENIOR SOPHISTER (Year 4)

Module Code	Module Title	ECTS	Semester
PHU44101	Professional Development and Communication-Service Development	5	1
PHU44202	Medicines Optimisation in Practice	5	1
PHU44303	Developing Competency through Experiential Learning	20	1
PHU44102	Advanced Pharmaceutical Chemistry, Drug Discovery, and Design	5	2
PHU44106	Evidence Informing Practice	10	2
PHU44112	Senior Sophister Capstone Research Project	15	2

YEAR 5

Module Code	Module Title	ECTS	Semester
PHP55101	Industrial Pharmacy	5	
PHP55103	Complementary and Alternative Medicine: Context, Legislation, Standards and Practice	5	
PHP55104	Advanced Pharmaceutics	5	
PHP55106	Practice of Pharmacy and Integrated Pharmacy Skills	10	
PHP55108	Addiction Pharmacy	5	
PHP55110	Health Inequalities and Inclusion Health	5	
PHP55220	Medication Safety, Open Communication and Learning from Practice	5	
PHP55330	Pharmacists Advancing Practice	5	
PHP55400	Pharmacy Practice Research Project	30	
PHP55500	Experiential Learning & Professional Registration Examination	15	

9.15. FOUNDATION SCHOLARSHIP EXAMINATION

University Calendar (2026-27) (Undergraduate Studies), Awards, Foundation and Non-Foundation Scholarships

N.B. This examination will be held in January, before the commencement of Hilary Teaching Term. Candidates are examined in their course work up to the end of Michaelmas Term of the Senior Fresh year, together with such additional reading as may be required by the Head of the School of Pharmacy & Pharmaceutical Sciences.

The Scholarship Examination for the Pharmacy course consists of three examination papers. Papers 1 and 2 will identify students who can consistently demonstrate exceptional knowledge and understanding of key subjects of the Senior Fresh curriculum. Paper 3 is designed for candidates to demonstrate a high level of skill in integrating knowledge across different subject areas on one common theme and to reflect and demonstrate rigorous and informed critical thought.

Paper 1 – Pharmaceutical Sciences 1

Topics will be drawn from the following modules: Properties & Analysis of Materials used in Medicines (PHU22101) and Physical Pharmacy, Formulation and Pharmaceutical Technology (PHU22104). 3-hour paper. Four questions to be answered from four.

Paper 2 – Pharmaceutical Sciences 2

Topics will be drawn from the following modules: Practice of Pharmacy II (PHU22106), Molecular and Chemotherapeutic Pharmacology & Clinical Therapeutics (PHU22110) and Blood, Cardiovascular & Renal Pharmacology and Clinical Therapeutics (PHU22111). 3-hour paper. Four questions to be answered from four, including a question based on material from more than one module.

Paper 3 – General Paper (Topic: tbc)

Disease/condition management based on a scenario or case: Interdisciplinary understanding and research. 3-hour paper. Candidates will be given selected scientific papers during Michaelmas Term. Candidates will be asked questions relating to, for example (not an exhaustive list):

- the disease/condition and its molecular basis;
- the types of treatment used at present;



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- the nature of relevant active pharmaceutical ingredients and excipients, their presentation and the forms of delivery in use;
- the provision of care for patients with the disease/condition;
- future developments in understanding of the disease/condition, potentially new types and forms of delivery, treatment and the challenges of care.

Recommendation for Scholarship:

The Court of Examiners will evaluate results of all papers for all candidates. In order for students to be proposed for election to scholarship, they must obtain an overall average first class result (70% or higher) in the Scholarship examinations, with a mark of at least 70% in two of the examination papers and a mark of at least 65% in the remaining paper.

Further information: <https://www.tcd.ie/academicregistry/exams/scholarship/>

Key dates:

- Students who wish to undertake the Scholarship examinations are required to submit an online application within a defined period, typically **late September to mid-October**.
- In addition, students must submit an online confirmation of attendance form, typically within a narrow window of time in **mid-November**.

NB: Academic Registry operates very strict deadlines for both application and confirmation of attendance. It is ESSENTIAL to meet BOTH these deadlines in order to be eligible to sit the Scholarship examinations.

Therefore intending candidates are advised to consult the Scholarship section of the Academic Registry website (<https://www.tcd.ie/academicregistry/exams/scholarship/>) at an early stage to ensure you are aware of the relevant dates and do not miss the opportunity to sit the examinations.

- **4 January - 8 January 2027** - Foundation Scholarship examinations (Please note it may be necessary to schedule some examinations in the preceding week.)
- **26th April 2027**, Trinity Monday, - announcement of Election to Scholarship.

9.16. PRIZES*

Please also see: www.tcd.ie/calendar/

JULIE O'NEILL PRIZE IN PHARMACOLOGY AND THERAPEUTICS

The Julie O'Neill Prize in Pharmacology and Therapeutics was established in 2026 and is sponsored by NIBRT – the National Institute for Bioprocessing Research and Training – for a period of ten years (2026-2035). The prize honours Julie O'Neill, a graduate of the School of Pharmacy and Pharmaceutical Sciences, who retired from her role as Chair of the Board of NIBRT in 2026, having served as a board member since 2014 and as chairperson since 2023.

The prize is awarded after the third year to the student who attains the highest overall credit-weighted combined mark in the following modules:

- PHU22110 Molecular and Chemotherapeutic Pharmacology and Clinical Therapeutics



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- PHU22111 Blood, Cardiovascular and Renal Pharmacology and Clinical Therapeutics
- PHU33109 Endocrine and Reproductive Pharmacology and Clinical Therapeutics
- PHU33110 Respiratory and Gastrointestinal Systems and Clinical Therapeutics
- PHU33111 Malignant Disease, Immune and Ocular Systems and Clinical Therapeutics
- PHU33112 Neuropharmacology and Clinical Therapeutics

The prize shall be administered by the Trinity School of Pharmacy and Pharmaceutical Sciences.

Value, €500 and a medal.



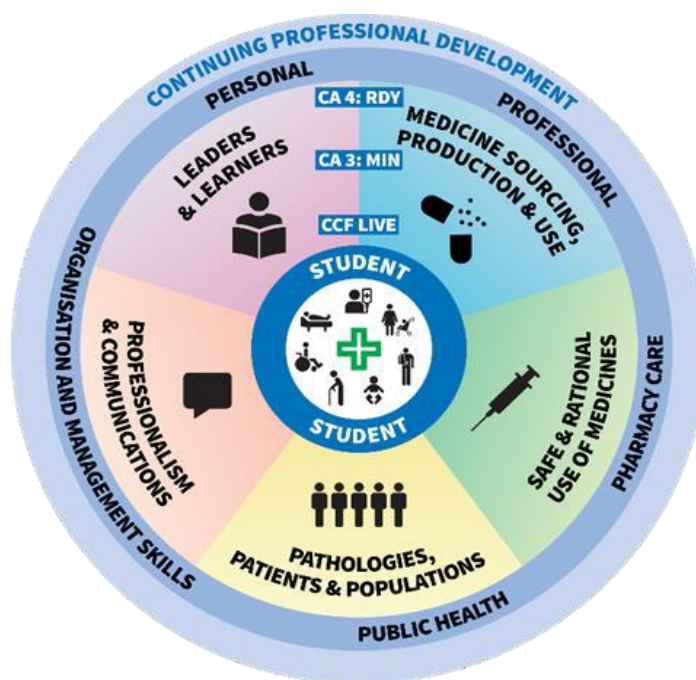
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9.17. INTEGRATIVE TEACHING AND LEARNING IN THE PHARMACY (INTEGRATED) PROGRAMME

The Pharmacy (Integrated) programme is delivered as a series of modules over 5 years, however teaching and learning should not be perceived to be confined within each module. The qualified pharmacist practitioner will be required to draw on many different aspects of their learning when in practice, and thus the pharmacy student is encouraged to develop an integrative approach to their learning. The Pharmacy (Integrated) programme curriculum is designed to foster integrative learning.

- An integration “ladder” of 11 progressive steps has been identified for medical education [1], and each module in the Pharmacy (Integrated) programme has been assigned an integration level. Lower levels correspond to more specific discipline-based teaching, and higher levels correspond to teaching and learning which is increasingly cross-disciplinary, and relates learning content to practice experiences and settings.
- Integrative learning by the student is nurtured and facilitated through defined integrated teaching and assessment as outlined in module descriptors (supported by integrative teaching approaches), and through student reflection on guided integrative learning based on defined integration themes.

For the purpose of integrative learning and teaching in the curriculum, five themes have been defined. These five themes are directly aligned with attainment of competency according to the Pharmaceutical Society of Ireland’s (PSI) core competency framework (CCF). Our pharmacy curriculum is represented using the following diagram, and the curricular themes and their alignment to the CCF are detailed on the following page:



This diagram is a visual representation of the curriculum, which is centered around patients and their pharmaceutical care. The student’s curriculum journey through the five-year programme involves the five curricular themes (see next page). Competence development in the context of the CCF commences with CCF live and proceeds to competence demonstration with CA during the placements in years 4 and 5. The competencies according to the CCF are surrounding the pharmacy programme, illustrating the development of a competent practitioner. However, learning does not cease on qualification as a pharmacist, and use of the reflective learning and continuing professional development skills, which are developed and nurtured in the pharmacy student, are continued post qualification. The five curricular themes are as follows:



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1. Medicines Sourcing, Production and Use

This theme relates to learning about all aspects of the sourcing, production, and safe and effective use of medicines, facilitated by integration of foundation sciences, applied sciences and clinical topics.

Aligned with CCF Domains: 4.1 and 4.2



2. Safe and Rational Use of Medicines

This theme relates to all aspects of the medicines use process.

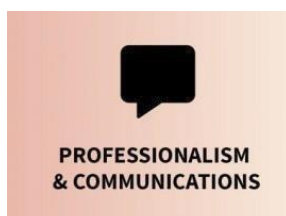
Aligned with CCF Domains: 4.3, 4.4, 4.5, 4.7.



3. Pathologies, Patients and Populations

This theme involves knowledge integration to improve health of patients and for maintenance and promotion of healthy communities.

Aligned with CCF Domains: 4, 5.1, 5.2



4. Professionalism and Communications

This theme relates to all aspects of communications and professional, legal and ethical practice.

Aligned with CCF Domains: 1.3, 1.4, 2.1, 2.2, 2.5, 3.1, 3.2, 3.3.



5. Leaders and Learners

This theme relates to the development of practitioners as self-directed learners, collaboratively using and advancing knowledge at the forefront of pharmaceutical science and healthcare.

Aligned with CCF Domains: 1.1, 1.2, 2.3, 2.4, 2.5, 3.4, 4.6.

Exemplary “integration schematic” diagrams have been produced to illustrate how samples of topics within each theme are covered through a range of modules throughout the 5-year programme. Each integration schematic relates to a sample topic within a theme, details how aspects of learning within a range of modules over the whole programme relate to this topic and suggests how the learning relates to the CCF.

These schematic diagrams are named based on theme number and example number. For example, the integration schematic for the first sample topic in Theme 3 is called Theme 3 Example 1. The theme (3) is “Pathologies, patients and populations” and the sample topic in the integration schematic is “inflammation”.



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This Theme 3 Example 1 integration schematic is provided as an illustrative example on the following page. These schematic diagrams will be made available to students when they undertake the modules which are present in each schematic.

It is emphasised that the integration schematics provided during the course are examples to guide integrative learning, to illustrate how learning can be integrated throughout the course. Provision of these sample integration schematics should assist students in relating and integrating all of their learning across modules. Furthermore, students are guided to relating their learning to the CCF through their reflective learning portfolios (introduced in PHU11106 and continuing thereafter).

- Naturally, as the student progresses through the programme, it will become apparent that there are many ways in which teaching and learning content within a module relates to other modules, within (horizontal integration) and between (vertical integration) different years of the programme.

Therefore, each module descriptor has information relating to integration under three headings:

1. The integration level of the module
2. A list of the integration schematics in which the module is present (e.g. "Theme 3, Example 1"), where applicable.
3. Other aspects which may be considered by the student for vertical and horizontal integrative learning

[1] RM Harden (2000) 'The integration ladder: a tool for curriculum planning and evaluation.' *Medical Education* 34 (7): 551-557 DOI 10.1046/j.1365-2923.2000.00697.x



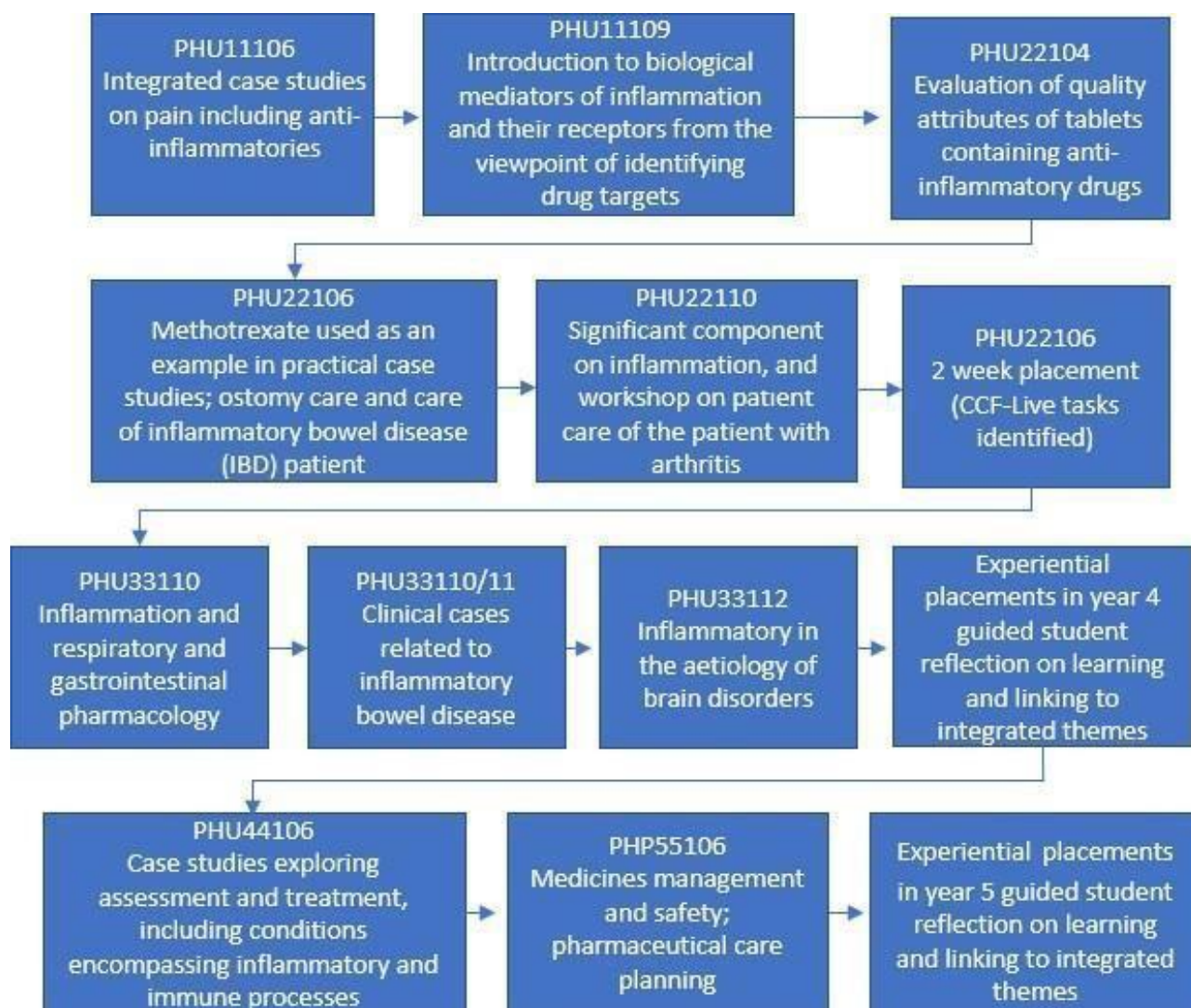
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Integration theme 3 schematic Example 1

Integration theme: Pathologies, patients and populations

CCF Domains/Competencies: 4, 5.1, 5.2

Topic: Inflammation





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10. JUNIOR FRESH (1st Year)

Module details may be subject to corrections/amendments. The School reserves the right to amend the list of available modules and to withdraw and add modules.

- *It is each student's responsibility to be aware of dates, times, locations, etc. of lectures, tutorials, seminars and practical classes.*
- *Reports, continuous assessments and laboratory notebooks must be presented for assessment by the dates specified by the examiner.*
- *Reports, continuous assessments and laboratory notebooks submitted after the specified dates will be treated in accordance with the **B.Sc. (Pharmacy) and M.Pharm. Late Submission Policy** and the College's **Policy on Late Submission of Assessments (Extension Policy)**.*

GENERAL PRE-REQUISITE: O4 or H6 Mathematics, H4 Chemistry or Physics and Chemistry, and H4 in one of Physics, Biology, Mathematics, Applied Mathematics, Geography, Geology, Computer Science or Agricultural Science.



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10.1. JUNIOR FRESH MODULES

Code	Module Coordinator	Module Title	ECTS
PHU11000		Year 1 Admin Module	---
PHU11PG1	Oliviero Gobbo (OG)	Physiology for Pharmacy	5
BYU11P01	Frederick Sheedy (FS)	From Molecules to Cells	5
PHU11BI1	David Finlay (DF)	Biochemistry	5
PHU11101	Niamh O'Boyle (NO'B)	Organic and Inorganic Chemistry for Pharmacy	10
PHU11102	Eduardo Ruiz-Hernández (ERH)	Physical Pharmacy I	5
PHU11103	Fabio Boylan (FB)	Pharmaceutical Analysis I	5
PHU11104	Carsten Ehrhardt (CE)	Introduction to Pharmaceutics and Formulation, including Mathematical Methods and Pharmaceutical Calculations	10
PHU11106	Máire O'Dwyer (MO'D)/Rebecca Parkin (RP)	Practice of Pharmacy I	10
PHU11109	Andrew Harkin (AH)	General Principles of Pharmacology	5

Pass mark = 50% unless specified otherwise



School of Pharmacy & Pharmaceutical Sciences

PHYSIOLOGY FOR PHARMACY



Year 1 (Junior Fresh)

Semester 1

MODULE CODE: PHU11PG1

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Asst. Prof. O. Gobbo (OG), Prof. A. Harkin (AH), Assoc. Prof. C. Medina (CM), Prof. L. O'Driscoll (LOD), Prof. N. Panoskaltsis (NP), Asst. Prof. T. Ryan (TR), Assoc. Prof. MJ Santos-Martinez (MSM), Asst. Prof. S. Smith (SS).

Coordinator: Asst. Prof. O. Gobbo

AIMS: The aim of this module is to enable the student to develop an understanding of human physiology, providing the foundation for studying pathophysiologic processes and mechanism(s) of action of pharmacological and other therapeutic interventions.

LEARNING OUTCOMES: On successful completion of the module the student will be able to:

1. Explain the basics of human physiology.
2. Illustrate the connections between cells, tissues, organs, and overall body function.
3. Detail the physiological processes essential for maintaining homeostasis.
4. Describe the functions of each body system.
5. Explain the mechanisms regulating different organ systems in a healthy human body.
6. Relate the disciplines of pathophysiology, pharmacology, and pharmacotherapeutics.

INTEGRATION

Integration Level: 5 (Temporal Co-ordination)

Present in the following Integration Schematics: N/A

Other aspects which may be considered for integrative learning:

Horizontally within the year

BYU11P01 – basic biological principles are built on PHU11BI1 – basic biochemical principles linking with physiology

PHU11106 – basic understanding of physiology required and are built on PHU11109 – builds basic knowledge for any module in pharmacology

Vertically across years

This module is required for a basic understanding of physiological functions and is built upon in modules PHU22118, PHU22110, PHU22111, PHU33109, PHU33110, PHU33111, PHU33112, PHU44102, PHP55104, PHP55108, PHP55220



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SYLLABUS

Material will be covered on the following topics: Cells, tissues and organs, principles of cellular function, blood, homeostasis, immunity, nervous system, the eye, the ear, skeletal muscles, cardiovascular physiology, respiratory system, digestive system, liver, endocrine regulation, and urinary system.

COURSE OUTLINE

Lectures, tutorial, online activities, and feedback session.

Lectures (23 hours)

		Lecturer
1, 2	From a Cell to an organ	OG
3	Muscle	OG
4-6	Nervous system – the central nervous system (brain and spinal cord) and the peripheral nervous system	AH
7	Endocrine system	LOD
8, 9	Circulatory system	OG
10	Urinary system	OG
11, 12	Gastrointestinal system	CM
13	Sensory systems (hearing, smell, taste, touch, and vision) + teeth	OG
14	Integumentary system	OG
15, 16	Haematopoiesis & Haemostasis	NP/MSM
17	Bone	OG
18, 19	Respiratory system	OG
20, 21	Reproductive system	TR
22-23	Immune system	SS

Feedback Session (1 hr)

DIRECTED READING

Stanfield, Cindy L. *Principles of Human Physiology* 6th Ed. (2017).

Murphy, Weaver, Berg. *Janeway's Immunobiology* 10th Ed. (2022).

ASSESSMENT

Qualifying mark = 40% Pass mark = 50%

Component

Exam paper (2 hours): Short questions and 25 MCQs
Short online mid-semester exam

Contribution to module grade

80%
20%

NB: Students will be expected to draw upon knowledge and skills gained in this module in other clinically focused modules in the current year.



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SUMMARY OF HOURS

Lectures	Tutorials	Contact hours	Continuous assessment	Independent and guided study	TOTAL	ECTS
23	1	24	12	64	100	5

FURTHER INFORMATION

Pass mark, plagiarism.

The pass mark for examinations and other assessment components is 50%. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments.

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student who achieves an overall module mark of at least 50% but receives a Qualified Fail (QF) in one or more components must be reassessed in all components in which they have achieved a mark below the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory. Students reported as non-satisfactory may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable.



School of Pharmacy & Pharmaceutical Sciences

FROM MOLECULES TO CELLS



Year 1 (Junior Fresh)
Semester 1

MODULE CODE: BYU11P01
5 ECTS

Staff of the School of Biochemistry and Immunology: Prof. Frederick Sheedy (FS)

Staff of the School of Genetics and Microbiology: [Prof. G.J. Farrar](#) (GF), Dr Mathew Dorman (MD), Dr. Anna Ershova (AE), Dr. Laetitia Chauve (LC), Dr Naomi Chadderton (NC), Dr Sophia Millington Ward (SMW)

Coordinator: Frederick Sheedy (FSHEEDY@tcd.ie)

Biology Course Coordinator: Mirela Dardac (mdardac@tcd.ie)

Laboratory Manager: Audrey Carroll (aucarrol@tcd.ie)

AIMS: This module aims to provide an introduction to molecular and cellular biology, and will therefore include key topics in Cell Biology, Genetics, and Microbiology. A description of the possible origin of life, from the abiotic world to single-celled and multicellular organisms will be given, and the ultrastructure of the prokaryotic and eukaryotic cells will be covered in detail. Students will then be introduced to basic concepts in Genetics, how the information contained in DNA (genes) is expressed, replicated and inherited. Finally, the sheer diversity of life forms, from viruses to prokaryotic and eukaryotic microorganisms, to more complex plant and animal life forms will be described.

Students will also study cell and virus structure, cell growth and viral replication, agents of infectious diseases, and host immunity.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Provide an account of the cellular basis of life: from its origins in the abiotic world, to the evolution of unicellular and multicellular organisms.
2. Describe the diversity of life forms: including viruses, prokaryotes (bacteria), archaea, and eukaryotes (unicellular organisms, animals and plants).
3. Describe how the information contained in DNA (genes) directs the construction and growth of an organism, and how this information is replicated and transmitted from one generation to the next (inheritance; genetics).
4. Employ a range of laboratory techniques, demonstrating the development of practical scientific skills, knowledge of experimental design and the interpretation of results.
5. Apply the scientific method as a fundamental approach to experiment-based investigations, critical analysis of data and problem solving.



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INTEGRATION

Integration Level: 4 (Nesting)

Other aspects which may be considered for integrative learning:

This module is an entry-level foundation module relevant to concurrent and future learning in biology, physiology, pathology, and pharmacology.

SYLLABUS

Material will be covered on the following topics: the cellular basis of life, the diversity of cells, principles of inheritance, structure and function of DNA.

MODULE OUTLINE

Twenty-one lectures, four laboratory sessions, one data analysis practical activity

Lectures

		Lecturer
1, 2	Origins of Life	FS
3-5	Cellular basis of life	FS
6	The tree of life	MD
7	Bacteria	MD
8	The Archaea	MD
9	Fungi and Protists	MD
10	Viruses	MD
11	Interplay between microbes	MD
12	Introduction to Genetics	LC
13	Mendelian Genetics	LC
14	Linkage & recombination 1	LC
15	The chemical nature of the Gene	LC
16	Quantitative genetics	LC
17	DNA - structure & function	NC
18-19	Information flow in the cell - the Central Dogma	NC, SMW
20	Mutation & its consequences	SMW
21	Exam prep	NC

Laboratory Classes

Microscopy: The diversity of life (3h)	MD
Liquid handling and spectrophotometry (3h)	FS
Bacteria Growth & Survival (3h)	AE
Bacteria Growth & Survival (1h)	AE

Data Analysis Activity

Genetics (3h)	JF
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DIRECTED READING

Module text: **Campbell Biology**, 12th Edition (Published by Pearson)

ASSESSMENT

Two components, pass mark 50% in each component, qualifying mark is 40%.



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Component	Contribution to module grade
Continuous Assessment	40%
Exam	60%

The end of module examination will be in-person and will be Multiple Choice Format, 1.5 hours allowed, **NO** negative marking will apply.

The paper will be divided into two sections, corresponding to the two sections of the lecture course. There will be 18 compulsory questions in each section.

SUMMARY OF HOURS

Lectures	Practicals	Contact hours	Assessment(s)	Independent and guided study	TOTAL	ECTS
21	13	34	6	60	100	5

FURTHER INFORMATION

Plagiarism

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

A penalty of 10% deduction in the final mark for every week or part of week late.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark of less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements regarding attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

The module is compensatable.



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BIOCHEMISTRY



Year 1 (Junior Fresh)
Semester 2

MODULE CODE: PHU11BI1
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. D. Finlay (DF)

External contributors: Assoc. Prof. A. Khan (AK), Assoc. Prof. K. Mok (KM), Assoc. Prof. G. Davey (GD), Others tbc

Coordinator: Prof. D. Finlay (DF)

AIMS: This module provides current basic biochemical concepts of cell function, and describes, by way of example, the importance of several protein for cellular functions.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Describe the components of the cell.
2. Detail how protein structure leads to protein function.
3. Describe how cells grow and divide.
4. Discuss how cells extract and transduce energy.
5. Describe Alcohol metabolism.
6. Discuss the role of vitamins and iron in cells.

INTEGRATION

Integration Level: 3 (Harmonisation)

Present in the following Integration Schematics: N/A

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU11PG1 – Physiology linking to basic biochemical principles
BYU11P01 – Basic biological processes linking to biochemical principles

PHU11101 – Organic chemistry linking to biochemical structures of molecules

PHU11109 – Builds basic knowledge for any module in pharmacology
Vertically across years

This module is required for a basic understanding of biochemical processes and is built upon in modules PHU22118, PHU33103



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SYLLABUS

Material will be covered on the following topics: Protein structure and function, enzyme kinetics, membranes and transporters, carbohydrate metabolism, cell division and cell cycle, alcohol and vitamin metabolism, and bioinformatics.

COURSE OUTLINE

Lectures and a computer-aided-learning exercise.

Lectures (21 hours)

		Lecturer
1	Introduction	DF
2-5	Protein structure and function	KM
6-8	Enzyme Kinetics	AK
9, 10	Cell division and cell cycle	tbc
13	Membranes and transporters	tbc
14-16	Carbohydrate metabolism	tbc
17, 18	Alcohol metabolism	GD
19-21	Amino acid and Lipid metabolism	tbc
22	Vitamins and Iron	tbc

Tutorial (3 hr)

Bioinformatics tutorial	DF
Multiple choice exam tutorial	tbc

DIRECTED READING

Berg, JM, et al. (2015). *Biochemistry*, 8th edition. WH Freeman & Co.
Supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark = 50% Qualifying mark = 40%

Component	Contribution to module grade
1. Written examination: [2 hours]	
Multiple Choice Questions ~40 MCQ (40% of module mark)	75%
Negative marking will be applied.	
One essay question (35% of module mark)	
2. Bioinformatics exercise: continuous assessment	25%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g. in PHU22101, PHU22118).



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SUMMARY OF HOURS

Lectures	Tutorials	Contact hours	Assignment	Independent and guided study	TOTAL	ECTS
22	3	25	10	65	100	5

FURTHER INFORMATION

Pass mark, plagiarism.

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark of 40% in one of the components, and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for the Michaelmas term. Students reported as non-satisfactory may be refused permission to take the annual examination and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable.



ORGANIC AND INORGANIC CHEMISTRY FOR PHARMACY



Year 1 (Junior Fresh)

Semester 1 and 2

MODULE CODE: PHU11101

10 ECTS

Staff of the School of Pharmacy and Pharmaceutical Sciences: Assoc. Prof. N. O'Boyle (NO'B), Assoc. Prof. J. Walsh (JW), Prof. J. Gilmer (JG), Adj. Prof. M.J. Meegan (MJM), Assoc. Prof. S. Ryder (SR), Assoc. Prof. M. O'Dwyer (MOD), Assoc. Prof. F. Boylan (FB), Asst. Prof. T. Ryan (TR), Asst. Prof. E McGowan (EMG), Asst. Prof. S. N. Smith (SNS).

Staff of the School of Medicine: Asst. Prof. J. Conlon (JC), C. Whelan (CW).

External contributor: L. Dowling (LD)

Coordinator: Assoc. Prof. N. O'Boyle

AIMS: To provide an appropriate foundation in organic, inorganic and analytical chemistry leading to an understanding of the chemical properties of drug substances. All material will provide a foundation for modules in medicinal chemistry in the Sophister years.

PRE-REQUISITES: Please see the general pre-requisites.

LEARNING OUTCOMES: On successful completion of the module the student will be able to:

1. Describe structure, bonding, nomenclature, and isomerism for organic drugs.
2. Identify functional groups in drugs, explain how functional groups impart properties to drugs, predict drug- receptor interactions, and describe the drug discovery process.
3. Explain and predict reactions of organic drugs, including addition, substitution and elimination reactions.
4. Describe the atomic structure, metal coordination bonding, geometry and role of inorganic compounds and heavy metal toxicity in pharmacy.
5. Apply the concept of volumetric analysis to quantification of active ingredients in pharmaceutical preparations.
6. Perform organic synthesis procedures and volumetric analysis.
7. Relate pharmacy year 1 topics to the role of the pharmacist in an interprofessional setting.

INTEGRATION

Integration Level: 3 (Harmonisation)

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU11102 – Links with concepts of acidity and basicity

PHU11103 – Links with analysis of pharmaceutical materials, application of analytical techniques e.g.



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spectroscopy and chromatography

PHU11104 – Shares calculation examples; calculations evaluated in OSCE

Vertically across years

PHU22101 – Links with pharmaceutical and bioorganic chemistry of materials used in medicines; applications of analytical techniques to pharmaceutical materials and drug stereochemistry

PHU22102 – Links with redox chemistry

PHU22118 – Links with study of the chemical and biochemical characteristics of proteins and carbohydrates

PHU33110 – Links with medicinal chemistry of drugs for respiratory and gastrointestinal disorders

PHU33111 – Links with medicinal chemistry of drugs for malignant, immune and ocular disorders

PHU44102 – Provides a foundation for advanced concepts in drug discovery and development

SYLLABUS

The course is designed to provide the student with a broad understanding of the underlying principles of organic, inorganic and analytical chemistry required by pharmacy students. It will place appropriate emphasis on the chemical reaction mechanisms important to drug synthesis and relationship of molecular structure to drug activity. The course also includes an integrative learning exercise with a thematic focus on pain, supporting development of integrative learning skills to contextualize scientific, therapeutic and (inter) professional learning content.

COURSE OUTLINE

Lectures, tutorials, practical laboratory classes, case studies and interprofessional learning (IPL).

LECTURES

PART 1: INTRODUCTORY ORGANIC CHEMISTRY (Semester 1)

		Lecturer
1-4	Module introduction. Introduction to organic chemistry, including bonding, and the IUPAC system for nomenclature of organic molecules.	NO'B
5-6	Introduction to stereochemistry, isomers, Newman projections, the <i>E-Z</i> system, Cahn-Ingold-Prelog rules	NO'B
7-8	Functional groups in drug molecules, mechanisms for simple organic and bioorganic reactions of relevance to drug molecules; reaction pathways; writing equations for chemical reactions	JW
9-11	Addition reactions to alkenes and carbonyls, nucleophilic aliphatic substitution and elimination	JW
12-14	Elimination reactions from alkyl halides together with a basic introduction to electrophilic aromatic substitution reactions	JW
15-17	Aspirin and paracetamol preparation	JW
18-20	Chemical properties of important functional groups in drug molecules of use in predicting drug properties and chemical reactivity	JW
21	Preparation, structures and properties of bioorganic materials (peptides, sugars and lipids)	JW
22	Review of introductory chemistry of organic compounds	JW



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PART 2: ATOMIC STRUCTURE AND PROPERTIES AND INORGANIC CHEMISTRY (Semester 2)

1, 2	Module introduction (semester 2). Introduction to inorganic chemistry, atomic electron orbitals, electron configuration, trends in the periodic table, ionic compounds.	NO'B
3	Elements of groups 1, 2, and 7: chemistry and relevance to pharmacy	NO'B
4, 5	Bonding and chemistry of transition metal elements in living organisms	JG
6	Oxides of carbon and nitrogen relevant to pharmacy and medicine	JG
7	Heavy metal toxicity - cadmium, lead, mercury	JG
8, 9	Introduction to redox chemistry in pharmaceutical analysis and analysis of metals	NO'B
10, 11	The concept of the pharmacophore; drug-receptor interactions.	NO'B
12, 13	The drug discovery process	MJM
13, 14	The natural world as a source of drugs	FB
15	Classification of drugs by mechanism, chemical class, physiological effects	MJM
16, 17	The relationship between structure, metabolism and disposition	MJM

TUTORIALS

Tutorials will be run in organic chemistry, inorganic chemistry and drug discovery.

PRACTICAL LABORATORY CLASSES:

The practical laboratory course is designed to introduce the students to standard analytical and synthetic laboratory procedures and provide the basic practical skills required for Good Laboratory Practice (GLP) with the objective to develop the skills required in the synthesis, purification and titrimetric analysis of drugs. Pre-laboratory practical sessions will introduce the students to the theory and techniques of the practical.

PART 1. Michaelmas Term: Practical organic chemistry of drugs (3 hr. per practical; SNS)

1. Ester hydrolysis
2. Condensation reactions
3. Paracetamol preparation and specifications

PART 2. Hilary Term: Quantification of drugs in pharmaceutical preparations (3 hr. per practical; SNS)

1. Acid-Base titrimetry: Determination of calcium carbonate in paediatric chalk
2. Redox titrimetry: Quantitative determination of iron in medicinal products
3. Compleximetric analysis: Determination of zinc in mouthwash

Case Studies (JW, SR, TR, MOD, MJM) and Interprofessional Learning (IPL) (JW, SR, EMG, LD, JC, CW)

The case study will afford an appreciation of the treatment of pain and inflammation through integrative learning. Students will work together in small groups to prepare and deliver presentations on specific case studies based on drugs used in the treatment of pain and inflammatory conditions. These studies will require students to draw on their knowledge of material presented in other JF modules.

IPL will introduce students to the professional remit of the pharmacist in an interprofessional setting, in the context of a clinical pain control team.



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DIRECTED READING/Recommended textbooks

Title	Author(s)	Edition	Year
Organic Chemistry: A Short Course	Hart, Craine, Hart & Hadad	13th	2020
Introduction to Medicinal Chemistry	Patrick, GL	7th	2023
Inorganic Chemistry in Biology	Wilkins, PC & Wilkins, RG	1st	1997
Foye's Principles of Medicinal Chemistry	Williams, DA	8th	2019
British Pharmacopoeia (BP; online via TCD library)			
Supplementary references as recommended by academic staff.			

Case studies:

British National Formulary (BNF). Available online via TCD library.

Health Products Regulatory Authority website. www.hpra.ie

ASSESSMENT

The pass mark for this module is 50%.

For all components of this module: Pass mark = 50%; Qualifying mark = 40%

Component	Contribution to module grade
1. Written examination (end of semester 1): 2 hours. Section I: 6 short questions (50% of marks) Section II: 20 multiple choice questions (50% of marks)	40%
2. Multiple-choice assessment (semester 2): 1.5 hours 30 multiple choice questions (100% of marks)	20%
3. Continuous practical assessment (semester 1 and semester 2) Semester 1 lab continuous assessment: 12.5% Semester 2 Practical test: 12.5%	25%
4. Case studies and interprofessional learning (semester 2)	15%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g., in PHU22101, PHU33110, PHU33111, and PHU44102).

SUMMARY OF HOURS

Lectures	Practicals	Tutorials/ Pre-lab	IPL/Case Studies	Total contact	Assignments & Assessment	Independent and guided study	TOTAL	ECTS
38	18	10	6	72	18	110	200	10



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FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for all examinations and other assessment components in this module is 50%. See 'Assessment' above.

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Missed classes/practicals

In common with other modules for the pharmacy degree, attendance at all scheduled classes and practicals for this module is compulsory. A student who is unable to attend a class for any reason must notify their tutor of the reason for absence without delay, and present certification as appropriate.

Late work

See policy on late submission of coursework.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark (40%) in one or more components, and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable (only if all qualifying marks are met).



School of Pharmacy & Pharmaceutical Sciences

PHYSICAL PHARMACY I



Year 1 (Junior Fresh)
Semester 1

MODULE CODE: PHU11102
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. E. Ruiz-Hernandez (ERH), Prof. A.M. Healy (AMH), Prof L. Tajber (LT)

Coordinator: Assoc. Prof. E. Ruiz-Hernandez

AIMS: This module aims to explain physicochemical properties of substances used in Pharmacy.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Explain basic concepts of thermochemistry and thermodynamics.
2. Discuss the characteristics and behaviour of acids and bases.
3. Describe the physicochemical characteristics of solutions and discuss solubility and factors affecting solubility.
4. Describe the concept and theory of surface and interfacial phenomena, and their application to pharmaceutical systems.
5. Demonstrate a competence in related practical laboratory and quantitative skills.

INTEGRATION

Integration Level: 6 (Sharing)

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU11101 – Complements this module, focusing particularly on the Physical Chemistry components relevant to the Pharmaceutical Sciences, e.g. solubility, stability, interfacial phenomena and adsorption

PHU11104 – Provides a basis for understanding issues related to pharmaceutical formulation and compounding

Vertically across years

PHU22102, PHU22104 – Principles of Physical Pharmacy are fundamental to an understanding of these modules

PHU44102 – An understanding of solubility and interfacial phenomena feeds directly into this module



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SYLLABUS

Material will be covered on the following topics: properties of gases, liquids, solids; solubility; aqueous equilibria, solutions and their properties; thermodynamics; ionisation; interfaces and surfaces.

COURSE OUTLINE

Lectures, tutorials and practical laboratory classes.

LECTURES		
		Lecturer
1, 2	Gases, their properties and behaviour	ERH
3, 4	Thermochemistry: chemical energy	ERH
5	Liquids, solids and phase changes	ERH
6	Solutions and their properties	ERH
7-9	Aqueous equilibria: acids and bases	ERH
10-13	Solubility in pharmaceutical systems	LT
14	Partition and distribution phenomena	LT
15-18	Interfaces and surfaces	AMH

PRACTICAL CLASSES

Separation of ions by selective precipitation (3 hours)	ERH
Determination of the critical micelle concentration of sodium lauryl sulphate (2 hours)	AMH

DIRECTED READING

McMurry-Fay, *Chemistry*, 7th Ed

Sinko, Patrick J., *Martin's Physical Pharmacy and Pharmaceutical Sciences*, 7th Ed., Lippincott Williams and Wilkins (2016)

Florence, A.T. and Attwood, D., *Physicochemical Principles of Pharmacy*, 6th Ed., Pharmaceutical Press (2015)

Aulton's *Pharmaceutics: The Design and Manufacture of Medicines*, KMG Taylor, ME Aulton (Eds.) Elsevier (2018)

Supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark = 50% unless specified otherwise. Each component must be passed independently. All continuous assessment reports must be presented for evaluation by the specified date(s).

Component	Contribution to module grade
Written examination: 2h, short questions and longer questions that may have multiple sections. Pass mark: 50%, qualifying mark: 40%	85%
Continuous assessment component: [2 reports] Pass mark: 50%, qualifying mark: 40%	15%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other modules in the current year and wherever relevant in all subsequent years of the programme (e.g., in PHU22102).



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SUMMARY OF HOURS

Lectures	Practicals	Teaching sessions	Practical reports	Independent and guided study	TOTAL	ECTS
18	5	23	9	68	100	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/practicals

In common with other modules for the pharmacy degree, attendance at all scheduled classes and practicals, and engagement with the proposed materials for this module are compulsory. A student who is unable to do these for any reason must notify his/her tutor of the reason without delay, and present certification as appropriate in the case of absence to face-to-face classes.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark (40%) in one or more components, and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance, engagement and/or coursework may be reported to the Senior Lecturer as non-satisfactory. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable, if all qualifying marks are met.



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PHARMACEUTICAL ANALYSIS I



Year 1 (Junior Fresh)
Semester 2

MODULE CODE: PHU11103
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. F. Boylan (FB), Asst. Prof. Simon Smith (SNS), Assoc. Prof. J. Walsh (JW)

Coordinator: Assoc. Prof. F. Boylan

AIMS: This module is designed to introduce the concepts of quality, together with appropriate regulatory frameworks and guidance, and the application of analytical techniques to pharmaceutical materials - natural or synthetic. This module is preparatory for PHU22101 in the Senior Fresh year.

PRE-REQUISITES: Please see the general pre-requisites.

LEARNING OUTCOMES: On successful completion of this module the student will be able to:

1. Describe the purpose and scope of pharmaceutical analysis
2. Explain the structure and purpose of a pharmacopoeial monograph
3. Interpret and explain basic spectroscopic data
4. Interpret simple chromatographic data
5. Determine system suitability parameters
6. Develop simple pharmacopoeial chromatographic assays
7. Perform and interpret both qualitative and quantitative analysis on the active pharmaceutical ingredients in commonly prescribed medicines
8. Define identity of crude herbal drug material by reference to their chemical, chromatographic, macroscopic and microscopic characteristics

INTEGRATION

Integration Level: 3 (Harmonisation)

Present in the following Integration Schematics:

This foundational analysis module is relevant to many modules within the year and across the programme

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU11101 – Organic and inorganic chemistry for Pharmacy PHU11102 – Physical Pharmacy 1

PHU11104 – Introduction to Pharmaceutics and Formulation



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Vertically across years

PHU22101 – Properties of materials used in medicines PHU33103 – Naturally occurring active principles
PHP55101 – Industrial Pharmacy

SYLLABUS

Material will be covered on the following topics: Scope of pharmaceutical analysis, botany, concepts of identity, purity, potency; assay design; atomic and molecular spectroscopy; chromatography; pharmacopoeia.

COURSE OUTLINE

Lectures and practical laboratory classes.

LECTURES (19 hours)

		Lecturer
1	Scope of pharmaceutical analysis, pharmaceutical materials, and context. The concepts of identity, potency and purity	SNS
2, 3	Introduction to atomic spectroscopy	SNS
4-6	Introduction to separation science and chromatography	JW
7, 8	Introduction to UV-VIS spectroscopy	SNS
9-11	Introduction to column and gas chromatography	JW
12	Herbal drugs, pharmacopoeial definitions and methods	FB
13	Cell inclusions and vacuolar contents used in Pharmacy	FB
14	Herbal cell types and tissues used for quality control	FB
15	Herbal drugs of pharmacopoeial importance	FB
16	Quality control of herbal drugs	FB
17-18	Theory and methodology of HPLC	JW

Practical Classes (12 hours – 2 to 3 hours each)

Introduction to Thin Layer Chromatography – 3 hours
Introduction to Gas Chromatography Theory – 2 hours
Plant Cell Inclusions and Plant Cell Tissues – 2 hours
Pharmacopoeia Drugs: Leaves, Barks, Roots – 3 hours
Quality Control of a Herbal Drug – 2 hours

Tutorials (2 hours)

Herbal Drugs	FB
Spectroscopy	SNS

DIRECTED READING

Chromatographic Methods A Braithwaite and FJ Smith. 5th Ed. Blackie Academic & Professional, London (1996)
Pharmaceutical Analysis: a textbook for pharmacy students and pharmaceutical chemistry. Watson, David G., 4^e (2016) ICHQ6A, Preamble and Scope
European Pharmacopoeia, General Notices



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General Chemistry-Atoms first, McMurry-Fay, 2nd Ed. 2014 (free online version available via OpenStax <https://openstax.org/details/books/chemistry-atoms-first-2e>)

Stern's Introductory Plant Biology. Bidlack, J. et al., McGraw-Hill, 13th Ed. 2013.

Plant Anatomy. An Applied Approach. Cutler, Botha and Stevenson. Blackwell Publishing, 2008.

ASSESSMENT

Pass mark of the module = 50%

Each component has a pass mark of 50% and a qualifying mark of 40%.

Component	Contribution to module grade
Written theory paper: 2 hours Four essay questions equally weighted at 25%. (Question 1 consists of 5 parts) All questions are mandatory.	80%
Continuous assessment of practical classes	20%

SUMMARY OF HOURS

Lectures	Practicals	Tutorials	Total contact	Practical reports	Guided study	TOTAL	ECTS
18	12	2	32	5	63	100	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components, and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark



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and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable.

Compensation is allowed across the course/year to a max of 10 ECTS once the module mark is at least 45% or higher and the credit weighted average for the year is at least 50%.



INTRODUCTION TO PHARMACEUTICS AND FORMULATION, INCLUDING MATHEMATICAL METHODS AND PHARMACEUTICAL CALCULATIONS



Year 1 (Junior Fresh)
Semesters 1 and 2

MODULE CODE: PHU11104
10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. C. Ehrhardt (CE), Prof. A.M. Healy (AMH), Assoc. Prof. S. Ryder (SR), Assoc. Prof. A. Sasse (AS), Prof. L. Tajber (LT)

External contributors: Mr. G. Hanley (GH), Dr. B. Redmond (BR)

Coordinator: Prof. C. Ehrhardt

AIMS: To provide an introductory course in Pharmaceutics, so that students may understand the importance and relevance of the subject area to their studies for a Degree in Pharmacy and in subsequent practice, and to be better able to participate in and benefit from work experience in community or another branch of Pharmacy. Moreover, to explain basic techniques in Applied Mathematics of relevance to Pharmacy and Pharmaceutical Calculations.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Articulate the importance of Pharmaceutics for their studies in Pharmacy and subsequent practice
2. Select and use appropriate common reference textbooks in hard copy and electronic format and describe the content thereof
3. Recall the basic principles of formulation, with particular reference to simple liquid preparations such as solutions and suspensions, topical products such as gels and pastes and solid dosage forms such as capsules and suppositories
4. Prepare simple extemporaneous preparations such as solutions, suspensions, gels, pastes, capsules and suppositories, and show competency in performing common pharmaceutical calculations of relevance in pharmaceutical formulation and compounding
5. Discriminate between pharmaceutical grades of water
6. Appreciate the importance of proper packaging and labelling of medicines
7. Apply mathematical methods of differential and integral calculus, logs and exponents, and descriptive statistics to practical examples.
8. Perform calculations relevant to Pharmaceutical Practice

INTEGRATION

Integration Level: 10 (Interdisciplinary)

Present in the following Integration Schematics (*inter alia*): Theme 1: Example 2

Other aspects which may be considered for integrative learning:



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Horizontally within the year

PHU11101 – Enhances understanding of PHU11101A lectures and titration practicals PHU11102 – Essential to understanding of topics taught in this module

PHU11103 – Supports calculations important for Pharmaceutical Analysis

PHU11106 – Proficiency in pharmaceutical calculations is required. Also, links extemporaneous compounding to supply on prescription (labelling, packaging, counselling requirements, etc.)

Vertically across years

PHU22101, PHU22102, PHU22104, PHU22106 – Fundamental to these modules

PHU33104, PHU33106, PHU33110, PHU33111 – A proficiency in Pharmaceutics and Pharmaceutical Calculations is required.

PHU44102 – An understanding of quantitative aspects of medicinal chemistry

SYLLABUS

Material will be covered on the following topics: Pharmaceutical calculations; formulation; liquid and solid pharmaceutical preparations; hydrogels; packaging, prescription compounding; formulation calculations, differential and Integral calculus, differential equations, algebra, descriptive statistics, practical mathematics for pharmacy.

COURSE OUTLINE

Lectures, tutorials and practical laboratory classes.

PHU11104A: Introductory Mathematical Methods

Lectures in Unit PHU11104A (15 hours)

		Lecturer
1-15	Differential and Integral Calculus (polynomial, trigonometric, exponential and logarithmic functions; 1st order differential equations); Algebra; Descriptive Statistics; Practical mathematics for Pharmacy.	BR

Tutorials in Unit PHU11104B (9 hours)

Mathematical Methods (4 x 1 h)	BR
Pharmaceutical calculations (2 h)	AS
Pharmaceutical calculations (1 h)	LT
Pharmaceutical calculations (2 h)	SR



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PHU11104B: Introduction to Pharmaceutics and Formulation

Lectures in Unit PHU11104B (18 hours)

		Lecturer
1	Introduction to Pharmaceutics and pharmaceutical calculations, incl. reference books	CE
2-6, 7	Pharmaceutical calculations Introduction to oral liquid formulations; water – potable and purified	CE/AMH
8	Methods of water purification; water for injections	AMH
9, 10	Design and preparation of solutions for oral administration	AMH
11,12	Design and preparation of suspensions	AMH
13	Discussion of reference books, including Pharmacopoeia and Martindale	CE
14,15	Introduction to hydrogels, formulation and production	CE
16-18	Rectal dosage forms, suppository formulation, production and quality Control	CE

19	Soft capsules, formulation, production and quality control	CE
20-22	Hard capsules, formulation, production and quality control	CE
23	Packaging of medicines	GH

Practical Classes in Unit PHU11104B (17 hours)

Pharmaceutical solutions, suspensions and hydrogels (7 h)	CE/AMH
Solid dosage forms – capsules, suppositories and pessaries (7 h)	CE/AMH
Practical examination preparation (3 h)	CE/AMH

Tutorials in Unit PHU11104B (3 hours)

Pharmaceutical formulation and calculation (3 h)	CE
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DIRECTED READING

European Pharmacopoeia British Pharmacopoeia Martindale

Aulton's Pharmaceutics:

- The Design and Manufacture of Medicines, 6th Ed., KMG Taylor, ME Aulton (Eds.) Elsevier (2021)
- Pharmaceutical Compounding and Dispensing, 2nd Ed., JF Marriott *et al.* (Eds.) Pharmaceutical Press (2010)
- Introduction to Pharmaceutical Calculations, 4th Ed., JA Rees, I Smith, J Watson, Pharmaceutical Press (2015)

Supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark = 50% for the written exams, practical test and continuous assessment, with exception of the PHU11104-5 calculation test for which 70% is required.



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<i>Component</i>	<i>Contribution to module grade</i>
PHU11104-1. Written examination. Mathematics. 1 hour; 2 questions (no choice)	30%
PHU11104-2. Written examination. Pharmaceutics. 2 hours; multiple choice and short answer questions (all compulsory)	35%
PHU11104-3. Practical test. Pharmaceutics. 2.5 hours; 3 questions (closed book, no choice)	35%
PHU11104-4. Mid-term mathematics test: 1 hour; 3 questions (no choice)	
PHU11104-5. Calculation test: 1 hour; 10 questions (no choice)	

NB: Students are expected to satisfy the examiners in all components of PHU11104, i.e. no compensation within the module is possible.

Students are required to attain a pass mark of at least 50% in the written exams, practical test and continuous assessment, with exception of the PHU11104-5 calculation test for which 70% is required. If a student fails the PHU11104-4 mid-term Mathematics test and/or the PHU11104-5 Pharmaceutical Calculations test, they must present for further tests, until they obtain a pass mark. If a student attains a qualified fail (QF), they must be reassessed in all components below the pass mark.

Students will be expected to draw upon knowledge and skills gained in this module both in other Pharmaceutics focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g. in PHU11102, PHU22104, PHU33104 and PHP55104).

SUMMARY OF HOURS

Lectures	Practicals/ Workshops/ Seminars	Tutorials	Independent and guided study	TOTAL	ECTS
38	17	12	125	200	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module



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is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark (i.e. 50% and 70%, respectively) in one or more components, and must be reassessed in the component(s) below the relevant qualifying fail mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is not compensatable and neither are components of the module, i.e. all components have to be passed.



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PRACTICE OF PHARMACY I



Year 1 (Junior Fresh)

Semesters 1 and 2

MODULE CODE: PHU11106

10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. F. Boylan (FB), Adj. Asst. Prof. I. Forsythe, Adj. Assoc. Prof. N. McMahon (NMCM), Asst. Prof. E. Ní Sheachnasaigh (ENÍS), Asst. Prof. J. O'Connell (JO'C), Assoc. Prof. M. O'Dwyer (MO'D), Adj. Asst. Prof. K. Rossi (KR), Asst. Prof. T. Ryan (TR), Assoc. Prof. S. Ryder (SR), Assoc. Prof. A. Sasse (AS), Asst. Prof. R. Parkin (RP).

External contributors: Faculty of Health Sciences Assistant Professor in Interprofessional Learning (IPL), Subject Librarian (SL), Student Learning Development (SLD), Pharmaceutical Society of Ireland (PSI).

Coordinators: Assoc. Prof. M. O'Dwyer (MO'D)/Asst. Prof. R. Parkin (RP)

AIMS: This module aims to introduce students to all aspects of pharmacy practice, including clinical skills, professionalism and ethics, social and administrative pharmacy, communication skills, dispensing and patient care. It is also designed to increase students' awareness of pharmacists' roles within the healthcare system and to inculcate a professional approach to pharmacy practice.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Describe pharmaceutical care, health promotion, the characteristics of community and hospital pharmacy practice in Ireland, typical care paths in these settings, the healthcare professionals involved and the organization of the health services.
2. Describe the sequence of events in drug development, marketing, identify the regulatory bodies that are relevant to pharmacy, pharmacists and pharmaceuticals, and provide an overview of the regulation of product authorisation, drug distribution and supply in Ireland.
3. Identify the characteristics of a profession, outline the principles of the Code of Conduct for Pharmacists and the Code of Conduct for Pharmacy Students, describe and apply the provisions of legislation addressed in the module, and make appropriate professional decisions in keeping with these codes and legislation.
4. Identify relevant medicine supply schemes when presented with a prescription, provide advice to a patient or prescriber on how these schemes operate, and dispense mock prescriptions or respond to patients' needs in a legal, safe and professional manner using suitable information resources.
5. Describe the communication process and the structuring of explanations and counselling to patients and demonstrate appropriate communication skills.
6. Undertake and interpret basic pharmaceutical calculations.
7. Systematically collect, interpret and apply knowledge about patients, their conditions and their medicines, in order to provide and justify treatment recommendations and patient counselling, in a diverse range of patient case studies.
8. Identify and critically reflect upon the domains, competencies and behaviours in the Pharmaceutical Society of Ireland's Core Competency Framework for Pharmacists that are associated with individual pharmacy activities.
9. In a reflective and cyclical manner, undertake self-appraisal, generate a personal profile of competence and learning needs, prepare a personal development plan, undertake and document development activities and evaluate the outcomes, recording evidence of competence/knowledge that has been gained.



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INTEGRATION

Integration Level: 4 (Nesting)

Present in the following Integration Schematics:

Theme 1: Example 1, Example 2, Example 4

Theme 3: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU11101- Links with PHU11101 module to underpin the integration of applications to practice with core scientific concepts (in particular, PHU11101 case studies and interprofessional learning).

PHU11104 – Links extemporaneous compounding to supply on prescription (labelling, packaging, counselling requirements etc.)

PHU11109 – Links to basic principles in pharmacokinetics and pharmacology.

Vertically across years

PHU22106, PHU33106 – Common themes (dispensing, clinical skills, counselling) revisited with progressive complexity.

SYLLABUS

Material will be covered on the following topics: the roles and responsibilities of pharmacists, the institutions of pharmacy and the organisation of the health service, the structure and operation of community and hospital practices, the manufacture and supply of medicines, the law relating to medicines and pharmacy practice, medicine supply schemes and prescription dispensing, communication skills, professionalism and the implications of being a professional, ethics, clinical skills and complementary/alternative therapies.

COURSE OUTLINE

Lectures, practical classes, workshops, tutorials, pharmacy visit, guided study.

Note: Due to timetabling constraints, the sequence of classes may differ from that below.

Lectures (22 hours)

		Lecturer
1	Introduction; Pharmacists, pharmacy, professions, pharmaceuticals	MO'D/RP
2	Competencies, reflective practice and continuing professional development (CPD) eportfolio	SR
3	Communication skills	KR
4	Introduction to professionalism and ethics; Code of Conduct for Pharmacists; Code of Conduct for Pharmacy Students	IF
5	The health service and health policy	IF



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6-8	Pharmacists' roles and responsibilities; community pharmacy; legislation and guidance regulating pharmacists and pharmacies	IF
9	Hospital pharmacy	NMcM
10	Health and illness; patient care	MO'D/RP
11	Pharmaceutical care using prescription and non-prescription medicines	MO'D/RP
12	Regulation of pharmacy and pharmacists in Ireland	PSI
13-14	Community drugs schemes	MO'D/RP
15-17	Legislation, PSI Code of Conduct and guidance (being a safe practitioner)	JO'C

18-19	Introduction to complementary and alternative medicine (CAM)	FB
20	Introduction to objective structured clinical examination (OSCE)	SR
21	Introduction to interprofessional education	IPL
22	APPEL: Second year placement information	ENÍS

Practical classes / Workshops (26 hours)

Professionalism and ethics in pharmacy practice (2 h)	IF
Library and information skills (1 h)	SL
Approaches to learning (1 h)	SLD
Academic writing and presentation skills (1 h)	SLD
Health promotion - yoga (1.5 h)	AS
Practical 1.1: Communication skills (2 h)	KR
Practical 1.2: Clinical skills - Responding to requests for prescription only medicines (POMs) (1.5 h)	MO'D/RP
Practical 1.3: Clinical skills - Responding to requests for over the counter (OTC) medicines (1.5 h)	MO'D/RP
Code of Conduct Commitment Ceremony (1 h)	IF/MO'D/RP
Practical 1.4: Clinical skills - Responding to symptoms in the pharmacy: Headaches (1.5 h)	MO'D/RP
Practical 1.5: Dispensing and Patient Care - Introduction to pharmacy software (1.5 h)	SR/IF
Practical 1.6: Dispensing and Patient Care - Introduction to prescriptions, use of reference sources, medicine supply schemes (1.5 h)	MO'D/RP/IF
Practical 1.7: Dispensing and Patient Care - Care for sprains and strains (1.5 h)	KR/IF
Practical 1.8: Dispensing and Patient Care- Type 2 Diabetes (1.5 h)	IF/MO'D/RP
Practical 1.9: Dispensing and Patient Care- Analgesic combinations (1.5 h)	TR/IF/MO'D/RP
Practical 1.10: Preparation for OSCE (2 h)	SR/MO'D/KR/TR/ RP
Practical 1.11: Mock practical test (1.5 h)	MO'D/RP
APPEL and the Core Competency Framework (1 h)	ENÍS

Tutorials (4 hours)

Preparation for Practical 1.6, Dispensing and Patient Care (1 h)	MO'D/RP
Feedback on Practical 1.6, Dispensing and Patient Care (1 h)	MO'D/RP
Feedback on Practicals 1.7, 1.8 and 1.9, Dispensing and Patient Care (1 h)	KR/IF/TR
Feedback on mock practical test and Q&A before practical test (1 h)	MO'D/RP



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Experiential learning (1.5 hours)

Community pharmacy visit (Boots Pharmacy): pharmacy layout and organisation; staff roles and responsibilities; clinical activities (dispensary, pharmacy counter, consultation room) (1.5 h) <i>Note that workplace-based experiential learning is subject to the prevailing public health situation.</i>	KR
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Timetabled tests and examinations (4 hours)

For full details of these and other assessments within this module, see 'Assessment' below

PHU11106-3: Assessment by OSCE 10 min assessment within 30 min timeslot during semester 2 teaching term	SR/others
PHU11106-2: Pharmacy practice practical test 1.5 h test at end of semester 2 teaching term	MO'D/RP/others
PHU11106-1: Written examination ("theory paper") 2 h examination in College examination session at end of semester 2	Multiple staff

ARTIFICIAL INTELLIGENCE

A statement on the potential use of generative artificial intelligence (Gen AI) in the Pharmacy programme as a whole has been provided elsewhere in this handbook. The PHU11106 module team and other pharmacy practice staff have carefully considered the issue of whether to permit the use of Gen AI for assessments in this module. We recognize there are many ways in which students may consider Gen AI can support their learning, and students who wish to do so are free to use Gen AI for private study and components that do not contribute to the assessment of PHU11106. There may also be instances where staff direct students to use Gen AI in specific learning exercises within PHU11106. In all such use, it is important that you bear in mind the challenges, limitations and transparency requirements outlined in the [College Statement on Gen AI](#), available at the [Gen AI Hub](#).

However, unless specifically directed to do so, **the use of Gen AI is not permitted for any of the PHU11106 assessments tabulated above**, including pre-practical work that will ultimately feed into worksheets or other assessment components. This is because identifying, interpreting, appraising, integrating, applying and reflecting upon relevant information from appropriate sources (building from first principles if necessary) are core skills required by pharmacists. It is only after developing these skills through independent work that pharmacists can truly validate and critically appraise information they may encounter in practice, including that generated via AI. Hence, it is essential that students develop and demonstrate the knowledge, judgement, and skills required for independent fulfilment of the learning outcomes, without reliance upon or support from Gen AI.

Where concerns arise about a student's use (or possible use) of Gen AI for any part of an assessment in PHU11106, the College Academic Integrity Policy and related procedures may be employed.

DIRECTED READING

British National Formulary (available online through TCD library)

Summaries of Product Characteristics (SmPCs) on the Health Products Regulatory Authority website (<https://www.hpra.ie/>) or European Medicines Agency website (<https://www.ema.europa.eu/en/medicines>)
Pharmaceutical Society of Ireland Code of Conduct for Pharmacists



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Pharmaceutical Society of Ireland guidance documents Code of Conduct for Pharmacy Students

PCRS Handbook online: Information and Administrative Arrangements for Pharmacists Legislation relevant to the course

Community Pharmacy: Symptoms, Diagnosis and Treatment (5th edition), Paul Rutter

Symptoms in the Pharmacy: A guide to the Management of Common Illness (8th edition), Alison Blenkinsopp, Paul Paxton, John Blenkinsopp

Minor Illness or Major Disease (6th edition), Brian Addison, Alyson Brown, Ruth Edwards, Gwen Gray

ASSESSMENT

Pass mark = 50% unless specified otherwise. Each component must be passed independently; hence components' qualifying mark criteria are the same as the pass mark criteria; there are no separate, lower qualifying marks.

Component	Contribution to module grade
PHU11106-1: Closed-book, written examination (end of Semester 2): 2 hours. Three long answer questions (each of which may have multiple parts), no choice.	70%
PHU11106-2: Open-book pharmacy practice practical test; 1.5 hours duration (2 questions, no choice; each will contain multiple parts); must obtain minimum of 60% overall . - Level 1 error: Zero marks for the question in which the error is made and automatic failure of the entire test with the overall test mark also returned as zero, irrespective of performance in other elements of the test. - Level 2 error: Zero marks for the question in which the error is made. - Level 3 error: Deduction of 41% of the maximum marks available for the question in which the error is made. - Level 4 error: Deduction of 20% of the maximum marks available for the question in which the error is made. - Level 5 error: Deduction of 10% of the maximum marks available for the question in which the error is made. - Level 6 error: Deduction of 5% of the maximum marks available for the question in which the error is made.	20%
PHU11106-3: Objective structured clinical examination (OSCE) and associated preparatory work (pass mark of 60%)	10%
PHU11106-4: Professionalism and ethics coursework [satisfactory/unsatisfactory]	---
PHU11106-5: Dispensing and patient care coursework [satisfactory/unsatisfactory]	---
PHU11106-6: Reflective continuing professional development e-portfolio (minimum of 5 cycles using Irish Institute of Pharmacy style template in e-portfolio, meeting criteria outlined in course materials) [satisfactory/unsatisfactory].	---

NB: Students will be expected to draw upon knowledge and skills gained in module PHU11106 both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g., in the clinical pharmacy assessments linked to pharmacology and therapeutics components, Practice of Pharmacy theory papers, clinical skills exercises, dispensing and patient care



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evaluations, practical tests, competency assessments, OSCEs and the professional registration examination). Similarly, there is an expectation that students will draw upon and integrate knowledge and skills from other JF modules in their work for PHU11106.

SUMMARY OF HOURS

Lectures	Practicals/ workshops / workplace visit	Tutorials	Teaching contact hours	Assessment contact hours	Other assignments	Independent and guided study	TOTAL	ECTS
22	27.5	4	53.5	4	22.5	160	240	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and assessments is 50% except where otherwise indicated. See 'Assessment' above.

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

Continuous assessment exercises for this module must be presented for evaluation by the specified dates. They must be presented to a designated member of staff in the manner requested (e.g., in person/by email/through the virtual learning environment or other designated interface), and signed in on the form for this purpose where applicable. Work submitted late will be treated in accordance with the School's late submission policy (which is available within this handbook). In particular, students should note the provisions within that policy that if a deadline extension is required it should be sought before the deadline has been reached, and any work submitted after feedback on the finished assessment has been provided to members of the class will be capped at the pass mark even if an extended submission deadline has not yet been reached.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify their tutor of the reason for absence without delay, and present certification as appropriate. However, all continuous assessment components must be completed even if the student is absent for a valid reason. It is the student's responsibility to obtain details of the assessment for the missed class from the relevant staff member without delay, and to complete it on a self-study basis. If a deadline extension is required, it must be formally sought by the student in accordance with the School's late submission policy. The extended deadline for submission of the completed assessment to the relevant staff member will normally be five days from the student's return to College (return date notified to staff member by tutor, based on certification as appropriate). Any work submitted after feedback on the finished assessment has been provided to members of the class will be capped at the pass mark even if an extended submission deadline has not yet been reached.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. If a student attains a qualified fail, they must be reassessed in all components below the PASS mark (not the qualifying mark), i.e., a student may be returned as a 'qualified fail' (QF) and refused permission to progress with the year cohort until the examiners have been satisfied in all components of the module. This may necessitate



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sitting a reassessment examination and/or repetition/(re)submission of one or more continuous assessment components (including submission of one or more alternative exercises that have been set to replace failed/missed continuous assessment components). In such circumstances, while the marks attained in a supplemental theory examination, practical test or the live test element of the OSCE will not be capped, penalties may be applied to other continuous assessment exercises, with the effect that marks for these will not normally exceed the pass mark. This is separate from any penalties imposed for level 1 to level 6 errors in the pharmacy practice practical test (See 'Assessment' above).

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to undertake semester 2 examinations/assessments and may be required by the Senior Lecturer to repeat the year.

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities, etc.).

Compensation

This module is not compensatable.



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GENERAL PRINCIPLES OF PHARMACOLOGY



Year 1 (Junior Fresh)
Semester 1

MODULE CODE: PHU11109
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. A. Harkin (AH)

Coordinator: Prof. A. Harkin

AIMS: This module aims to introduce the student to the basic principles of pharmacology, drug development and experimental techniques used in pharmacology.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. State the variety of targets to which drugs bind in the body and illustrate their transduction and cell signaling mechanisms.
2. Define agonist (full, partial and inverse), antagonist (competitive and non-competitive) and recall selected examples of each.
3. Describe receptor binding experiments and define the receptor binding parameters BMAX and KD
4. Construct dose response curves and calculate drug potency of both agonists and antagonists.
5. Illustrate the principles of drug absorption, distribution, metabolism and excretion and define the terms, pKa, bioavailability, volume of distribution, clearance, half-life, and Kel.
6. Illustrate the organisation and mode of neurotransmission within the sympathetic, para sympathetic, enteric and somatic nervous systems.
7. Describe the mechanisms of action and clinical uses of cholinergic and adrenergic drugs within the peripheral nervous system.
8. Define the key steps associated with excitatory and inhibitory neurotransmission in the brain and provide selected examples of drugs which influence these steps.
9. Describe the various stages of drug discovery, development and the clinical trials process.

INTEGRATION

Integration Level: 3 (Harmonisation)

Present in the following Integration Schematics:

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU11101 – Links with drug receptor interactions and drug discovery process



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PHU11106 – Builds on physicochemical parameters in relation to drug absorption and distribution in pharmacokinetics and pharmacokinetic modelling.

BYU11P01, PHU11BI1, PHU11109 – complements and builds on cell and molecular biology, biochemistry and physiology for understanding, mechanisms of disease, drug action and safety in the body

Vertically across years

PHU22110, PHU22111, PHU33109, PHU33110, PHU33111, PHU33112, PHU44112 – Lays foundation for all subsequent modules which include Pharmacology.

PHU22104 – Development of competence in practical laboratory skills

PHU22118 – Introduction to drug discovery and development with reference to bio-therapeutics
PHU33110, PHU33111, PHU33103 – Introduction to drug targets including nuclear receptors, cholinergic and adrenergic receptors and pharmacology of drugs obtained from natural sources.

SYLLABUS

Material will be covered on the following topics: targets of drug action; dose response, drug metabolism, pharmacokinetics, and neurotransmission.

COURSE OUTLINE

Lectures, tutorials, and practical laboratory classes including computer-simulated experiments.

Lectures		AH
1	Introduction to Pharmacology	
2	Targets of drug action.	
3	Receptors (ligand gated ion channels)	
4	Receptors (G protein coupled, kinase linked and intracellular receptors)	
5, 6	Dose response; agonism and antagonism	
7	Overview of pharmacokinetic processes; absorption and distribution	
8	Drug metabolism and excretion	
9	Pharmacokinetic modelling	
10	Neurotransmission	
11	Autonomic nervous system	
12	Cholinergic transmission	
13	Cholinergic agents; anticholinesterases	
14	Muscarinic blockers; ganglionic blockers	
15	Adrenergic transmission	
16	Direct/indirect sympathomimetics; α -stimulants and blockers	
17	Somatic system and neuromuscular blocking agents	
18	NANC transmitters	
19	Excitatory neurotransmitters in the central nervous system	
20	Inhibitory neurotransmitters in the central nervous system	



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21	Monoaminergic neurotransmission
22	Peptide transmitters
23	Drug design, development and testing

Practical classes (3 hours each)

Introductory Pharmacokinetics Workshop. Computer simulated experiments and data analysis

Dose response – the guinea pig ileum preparation. Computer simulated experiments and data analysis

Quantifying Antagonist Activity – the PA2 scale: Computer simulated experiments and data analysis

Tutorials (1 hour)

Course review

ASSESSMENT

Pass mark = 50% overall

Each component (exam and continuous assessment) has a qualifying mark of 40%. Students must satisfy the examiners in each component of the module independently. A student will be awarded a qualified fail if they achieve an overall module mark of at least 50% but less than the qualifying mark in either exam or continuous assessment components. If a student attains a qualified fail, they must be reassessed in all components below the pass mark.

<i>Component</i>	<i>Contribution to module grade</i>
Written paper (in person, 2 hours) in two sections Section I: Short essay questions (60%) Answer 3 questions out of 5. Each question carries equal marks (20% each)	
Section II: Multiple choice questions (40%) Answer 20 questions Negative marking applies (+2 Correct answer; 0 – unanswered; -1 incorrect answer)	80%
Continuous practical assessment, incl. three assignments (6.66% each)	20%

BIBLIOGRAPHY

- *Rang & Dale's Pharmacology* 10th Edition. James M. Ritter, Rod J. Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan, Emma Robinson, James Fullerton (Elsevier 2023)
- *Brody's Human Pharmacology. Mechanism-Based Therapeutics* (6th Ed.) by Lynn Wecker Elsevier (2018)
- *The Biochemical Basis of Neuropharmacology*, (8th Ed.), J. R. Cooper, F. E. Bloom, R. H. Roth, OUP USA (2002)

SUMMARY OF HOURS



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Lectures	Tutorials	Practicals	Total Contact	Practical Reports	Guided study	TOTAL	ECTS
23	3	9	35	9	66	110	5

Compensation

This module is compensable.



11. SENIOR FRESH (2nd Year)

Module details may be subject to corrections/amendments. The School reserves the right to amend the list of available modules and to withdraw and add modules.

- *It is each student's responsibility to be aware of dates, times, locations, etc. of lectures, tutorials, seminars and practical classes.*
- *Reports, continuous assessments and laboratory notebooks must be presented for assessment by the dates specified by the examiner.*
- *Reports, continuous assessments and laboratory notebooks submitted after the specified dates will be treated in accordance with the **B.Sc. (Pharmacy) and M.Pharm. Late Submission Policy** and the College's **Policy on Late Submission of Assessments (Extension Policy)**.*

PRE-REQUISITE: Successful completion of Junior Fresh (Year 1)



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11.1. SENIOR FRESH MODULES

Code	Module Coordinator	Module Title	ECTS
PHU22000		Year 2 Administration	---
		Elective	5
PHU22101	Simon Nicholas Smith (SNS)	Properties and Analysis of Materials Used in Medicines	10
PHU22102	Eduardo Ruiz-Hernández (ERH)	Physical Pharmacy II, Drug Transport and Kinetics	5
PHU22104	Lidia Tajber (LT)	Formulation and Pharmaceutical Technology	10
PHU22106	Sheila Ryder (SR)	Practice of Pharmacy II	10
PHU22118	Astrid Sasse (AS)	Pharmaceutical Biochemistry and Biotechnology	10
PHU22110	Carlos Medina (CM)	Molecular and Chemotherapeutic Pharmacology and Clinical Therapeutics	10
PHU22111	Maria J. Santos-Martinez (MSM)	Blood, Cardiovascular and Renal Pharmacology and Clinical Therapeutics	5

Pass mark = 50% unless specified otherwise



PROPERTIES AND ANALYSIS OF MATERIALS USED IN MEDICINES



Year 2 (Senior Fresh)

Semesters 1 and 2

MODULE CODE: PHU22101

10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. J. Gilmer (JG), Assoc. Prof. N. O'Boyle (NO'B), Assoc. Prof. A. Sasse (AS), Asst. Prof. S. N. Smith (SNS), Assoc. Prof. Eduardo Ruiz-Hernandez (ERH)

Coordinator: Asst. Prof. S. N. Smith

AIMS: This module aims to develop and consolidate fundamental pharmaceutical and bioorganic chemistry of the materials used in medicines from first year with emphasis on more advanced topics. Stereochemistry is developed in greater depth, the chemistry of some important heterocycles is covered, as is carbohydrate chemistry relevant to pharmacy. The module also aims to reinforce the concepts of quality, and the application of analytical techniques to pharmaceutical materials (this is a continuation of the course given at JF level).

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Describe the characteristics and reactivity of pharmaceutical materials containing conjugated, azo, aromatic and heteroaromatic systems including mechanisms and metabolism, and articulate theories of chemical bonding and its representation.
2. Discuss why shape and ionisation are important in drug efficacy, stability and safety.
3. Describe how stereochemistry is classified, analysed and how it is accommodated in pharmaceutical science and regulations.
4. Explain and illustrate the structure, stereochemistry, chemical reactivity and medical use of carbohydrates.
5. Prepare, purify and characterise substances of pharmaceutical interest and demonstrate competence in obtaining and interpreting analytical data.
6. Discuss the theory and evaluate the application of spectroscopic techniques in pharmaceutical analysis (e.g. UV, Fluorescence, IR, NMR and MS)
7. Interpret and predict spectral data of drug molecules and deduce the structural fragments/functional groups and the molecular structure of a drug from spectral data.

INTEGRATION

Integration Level: 3 (harmonization)

Present in the following Integration Schematics (*inter alia*): not applicable

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU22102 – Many concepts of Physical Pharmacy and Basic Pharmacokinetics are underpinned by a thorough understanding of advanced aspects of organic pharmaceutical chemistry and analysis.



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PHU22104 – Formulation and Pharmaceutical Technology, structural features of drugs influencing their physical properties incl. solubility, stability etc.

PHU22118 – Pharmaceutical Biochemistry and Biotechnology, structure and behaviour of cofactors, influence of stereochemistry on drug efficacy and safety; glycosylation of proteins.

Vertically across years

PHU11101, PHU11102, PHU11103 – Basic understanding of organic, physical and analytical chemistry underpins learning activities

PHU33103 – Naturally occurring anticancer agents.

PHU33110, PHU33111 – Common themes (drug structure, chemistry, structure/activity relationships, methods of drug analysis) revisited with progressive complexity.

PHU44102 – Application of pharmaceutical/medicinal chemistry in drug design, discovery and development of medicines.

PHP55101 – Importance of stability testing of new drugs and pharmaceutical products. PHP55104 – Advanced polymers for drug delivery of anticancer drugs, design of antisense drugs.

SYLLABUS

Material will be covered on the following topics: Pharmaceutical chemistry of aromatic materials, chiral compounds and carbohydrates. Theory and application of pharmaceutical spectroscopy (UV, Fluorescence, IR, NMR and MS).

COURSE OUTLINE

Lectures, tutorials, practical laboratory classes, and computer-assisted learning (CAL).

Lectures (40 hours)

Section 1 Pharmaceutical chemistry of aromatic materials, stereochemistry, carbohydrates (MT 20 hrs)

		Lecturer
1	Review of bonding and electronic structure of unsaturated molecules, conjugation and stability	JG
2	MO Theory and its application to saturated and aromatic compounds	JG
3	Electrophilic aromatic substitution, aromatic metabolism in drug clearance and cancer	JG
4	Directing effects in electrophilic substitution	JG
5	Azo compounds, the diazonium reaction, azocoupling, applications in pharmaceutical analysis and drug delivery	JG
6	Nucleophilic substitution, directing effects and substitution effects in drug intermediate synthesis	JG
7	Free radicals, formation, stabilisation and antioxidants/free radical quenching compounds	JG
8	Amine drugs, the concepts of basicity, relationship between pH, lipophilicity and diffusion	JG
9	Acidity in drugs, review of pKa and relationship to electronic structure	JG
10	Pharmaceutical chemistry of amide drugs including, sulfonamide and betalactam anti-biotics	JG



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11	Five membered heterocycles: pyrrole, furan, thiophene, imidazole	JG
12	Six membered heterocycles: pyridine, reactivity, tautomerism	JG
13	Definition and concepts of stereochemistry, nomenclature, single and multiple chiral centres	SNS
14	Sources, production and characterisation of chiral drugs	SNS
15	Pharmacology of chiral drugs	SNS
16	Regulatory aspects of chiral drugs	SNS
17	Introduction and classification of carbohydrates	AS
18	Stereochemistry of carbohydrates	AS
19	Identification reactions, reactivity of carbohydrates	AS
20	Mono- and Disaccharides: structure and physico-chemical characteristics	AS

Section 2: Pharmaceutical spectroscopy (21-25 in MT, 26-40 in HT, total of 20 hrs)

21	UV-Vis Spectroscopy: Electronic transitions, chromophores, conjugation	SNS
22	UV-Vis Spectroscopy: Estimation of UV absorbance, Woodward-Fieser Rules	SNS
23	UV-Vis Spectroscopy: Factors affecting (pH) and special applications	SNS
24	Fluorimetry: Theory and application in pharmaceutical analysis	SNS
25	Green Fluorescent Protein (GFP), Super-Resolved Fluorescence Microscopy	SNS
26	IR Spectroscopy: Introduction, instrumentation & sample prep	AS
27	IR Spectroscopy: Location of bands, factors affecting	AS
28	IR Spectroscopy: Interpretation of spectra	AS
29	Near-IR in pharmaceutical analysis	AS
30	NMR Spectroscopy: Principles and instrumentation	NB
31	Introduction to ¹ H-NMR spectra, resonance frequencies and chemical shift	NB
32	Chemical shift and effects of the chemical environment; Integration of signals	NB
33	Spin-spin coupling and using ¹ H NMR in structure elucidation	NB
34	Spin-spin coupling: more complex cases	NB
35	¹³ C-NMR spectroscopy	NB
36	Mass spectrometry - Introduction and instrumentation	SNS
37	Mass spectrometry - Ionisation techniques & mass analysers	SNS
38	Mass spectrometry - The molecular ion peak, RpDB, nitrogen rule	SNS
39	Mass spectrometry - Fragmentation in EI-MS	SNS
40	Mass spectrometry - Fragmentation in EI-MS	SNS

Practical Classes (22.5 hours)

Semester 1 (3 hrs each, 12 hrs total)

1	Pharmaceutical process chemistry I: Nitration of aromatic substrates	JG
2	Pharmaceutical process chemistry II: Alkylation of aromatic substrates	JG
3	Phenytoin preparation & characterisation	JG
4	Sulfonamide synthesis	JG

Semester 2 (10.5 hrs total)

6	UV Spectroscopy (3 hrs)	SNS/ERH
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7	HPLC-Fluorescence (3 hrs)	SNS/ERH
8	FT-IR & Near-IR Spectroscopy (1.5 hrs)	SNS/ERH
9	NMR (1.5 hrs)	SNS/ERH
10	GC-MS (1.5 hrs)	SNS/ERH

Tutorials (15 hours)

Semester 1:

Selected topics (3x 1 hr)	JG
Stereochemistry (1 hr)	SNS
Carbohydrates (1 hr)	AS
UV Spectroscopy (1 hr)	SNS

Semester 2:

IR Spectroscopy (2 hrs)	AS
NMR Spectroscopy (2 hrs, in small groups)	AS
MS Spectroscopy (2 hrs, in small groups)	AS
Structure Elucidation (2 hrs, in small groups)	AS
Exam prep tutorial (1 hr)	SNS

DIRECTED READING

- Essentials of Organic Chemistry for Students of Pharmacy, Medicinal Chemistry and Biological Chemistry. Dewick. Wiley.
- Mechanisms in Organic Chemistry. Sykes.
- Lampman, Pavia, Introduction to Spectroscopy, 5th Edition, Brooks/Cole CENGAGE Learning 2015.
- Watson, Sparkman, Introduction to Mass Spectrometry, 4th Edition, Wiley, 2007.
- Supplementary references as recommended by academic staff.

ASSESSMENT

The pass mark for this module is 50%. For all components of this module:

Pass mark = 50% Qualifying mark = 40%

<i>Component</i>	<i>Contribution to module grade</i>
1. Written examination: 2 hours, answer 4 questions (out of 5) with subsections, end of MT exam session	40%
2. Written examination: 2 hours, answer all questions, one long question, five short questions, end of HT exam session	30%
3. Continuous Assessment	30%
MT lab continuous assessment, incl. lab reports	10%
HT lab continuous assessment, incl. lab reports	10%
Spectroscopy assignment (submission deadline wk 33)	10%



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NB: Students will be expected to draw upon knowledge and skills gained in this module both in other modules in the current year and wherever relevant in all previous and later years of the programme (e.g., in PHU11101, PHU11102, PHU11103, PHU22102, PHU22118, PHU33103, PHU33110, PHU33111, PHU44102).

SUMMARY OF HOURS

Lectures	Practicals	Tutorials	Contact hours	Assignment(s) & Assessment	Independent and guided study	TOTAL	ECTS
40	22.5	15	77.5	28	117.5	225	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for the written examinations and all other assessment components is 50%. See 'Assessment' above. The continuous assessment component consists of MT/HT labs and the Spectroscopy Assignment (as outlined above), which do not need to be passed individually. The combined mark for this continuous assessment component has a pass mark of 50% and a qualifying mark of 40%. Students should note that College penalties for plagiarism apply to the examination and all continuous assessments. All work submitted online will be checked for plagiarism.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify their tutor of the reason for absence without delay, and present certification as appropriate.

Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardise successful completion of the module.

Students who are unable to attend a practical class for a valid reason may be re-scheduled within term-time. If this is not possible, students may still submit a lab report for one missed practical per term.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if they achieve an overall module mark of at least 50% but less than the qualifying mark in one or more components, or if course work is outstanding, and will then be reassessed in all components below the pass mark of 50% (this applies even to components that are between the qualifying mark and the pass mark). A student who achieves an overall module mark of less than 50% will be reassessed in all components that are below the pass mark of 50%, this applies even to components that are between the qualifying mark and the pass mark.

Non-satisfactory attendance

Students whose attendance is non-satisfactory may be reported to the Senior Lecturer and may be required to repeat the year.



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Compensation

This module is compensatable (however, all qualifying marks within the module must be met).



PHYSICAL PHARMACY II, DRUG TRANSPORT AND KINETICS



Year 2 (Senior Fresh)
Semester 2

MODULE CODE: PHU22102
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. E. Ruiz-Hernandez (ERH), Prof. A.M. Healy (AMH), Assoc. Prof. D. D'Arcy (DD), Assoc. Prof. A. Sasse (AS), Prof. C. Ehrhardt (CE), Asst. Prof. S. N. Smith (SNS)

Coordinator: Assoc. Prof. E. Ruiz-Hernandez

AIMS: To support medicines development and use through a) being able to explain how physicochemical properties of substances used in Pharmacy influence the production, analysis and characteristics of pharmaceutical formulations and drug transport in the body; b) being able to apply kinetic principles to understand drug/formulation stability and the drug's journey through the body after formulation administration.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Explain the principles of reaction rate and stability of pharmaceutical systems
2. Discuss the thermodynamic principles, electrochemical potential and rheological aspects of pharmaceutical systems and products
3. Discuss physicochemical and biological aspects of drug absorption, distribution and transporter interactions
4. Explain the rationale for employing different pharmacokinetic models to interpret biopharmaceutical data
5. Employ appropriate pharmacokinetic equations to calculate basic pharmacokinetic parameters when presented with appropriate data
6. Describe methods used to investigate and determine bioavailability and bioequivalence
7. Demonstrate a competence in related practical laboratory and quantitative skills

INTEGRATION

Integration Level: 6 (Sharing)

Present in the following Integration Schematics: Theme 1: Example 2, Example 3

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU22101 – Theory to analytical methods such as UV spectroscopy

PHU22104 – Complements this module, focusing particularly on the physiochemical properties of actives



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PHU22110 – Refers to pharmacokinetics linked to cardiovascular disease/renal function

Vertically across years PHU11102 – Physical Pharmacy I

PHU11103 – Foundations of pharmaceutical analysis, quantification and UV spectroscopy

PHU11109 – Introduction to Pharmacokinetics is built on the module, concerned with fundamental knowledge of the behaviour of medicines and how they are distributed in the body. It is therefore relevant to substantial parts of the programme in relation to clinical practice and drug delivery

PHU44102 – Tissue distribution and metabolism content relevant to drug transport and pharmacokinetics. Chemical flags and stability

PHU44106 – Provides a basis for understanding issues related to clinical pharmacokinetics, drug metabolism and distribution; biopharmaceutics

PHP55101 – Industrial Pharmacy – Stability testing in an industrial context; generic drug development

PHP55104- Advanced Pharmaceutics -approaches to investigate bioavailability

SYLLABUS

Material will be covered on the following topics: chemical equilibrium, reaction rates and chemical kinetics; thermodynamics, concepts of free energy and entropy; electrochemistry; basic pharmacokinetic principles and models, introduction to biopharmaceutics principles and bioequivalence; oral drug delivery.

COURSE OUTLINE

Lectures and practical laboratory classes.

Note: Due to timetabling constraints, the sequence of classes may differ from that below.

LECTURES		Lecturer
1	Chemical equilibrium	ERH
2, 3	Chemical kinetics	ERH
4, 5	Oral drug delivery	CE
6-9	Rheology	AMH
10-18	Pharmacokinetics	DD
19	Pharmaceutical Stability	SNS
20, 21	Thermodynamics	ERH
22	Electrical behaviour of electrolyte solutions	ERH

PRACTICAL CLASSES (6 hrs.)

Pharm. Chem.: Aspirin hydrolysis (2 h)	ERH
Pharm. Chem.: Ion selective electrodes (2 h)	ERH
Pharmacokinetics (2 h)	DD

DIRECTED READING

McMurry-Fay, *Chemistry*, 7th Ed



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Moynihan and Crean; *The Physicochemical Basis of Pharmaceuticals*; Oxford

Sinko, Patrick J., *Martin's Physical Pharmacy and Pharmaceutical Sciences*, 6th Ed., Lippincott Williams and Wilkins (2010)

Florence, A.T. and Attwood, D., *Physicochemical Principles of Pharmacy*, 5th Ed., Pharmaceutical Press (2011)

Basic Pharmacokinetics, Jambhekar S, Pharmaceutical Press 2012 (2nd ed) **NB e-book** via MyLibrary library database

Concepts in Clinical Pharmacokinetics- 6th Ed., 2018, ASHP. **NB e-book** via library database (see library website)

Supplementary references as recommended by academic staff

ASSESSMENT

Pass mark = 50% unless specified otherwise. Each component must be passed independently. All continuous assessment reports must be presented for evaluation by the specified date(s).

Component	Contribution to module grade
1. Written examination: 2h, short questions/MCQs and longer questions that may have multiple sections. All questions to be answered. Pass mark for this component: 50%, qualified fail mark: 40%	85%
2. Pharm. Chem. continuous assessment component: [1 report, 2 quizzes] Pass mark for this component: 50%, qualified fail mark: 40%	15%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other modules in the current year and wherever relevant in all subsequent years of the programme.

SUMMARY OF HOURS

Lectures	Practicals	Teaching sessions	Practical reports	Independent and guided study	TOTAL	ECTS
22	6	28	6	66	100	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/practicals

In common with other modules for the pharmacy degree, attendance at all scheduled classes and practicals, and engagement with the proposed materials for this module are compulsory. A student who is unable to do



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these for any reason must notify his/her tutor of the reason without delay, and present certification as appropriate in the case of absence to face-to-face classes.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark (40%) in one or more components, and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance, engagement and/or coursework may be reported to the Senior Lecturer as non-satisfactory. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable, if all qualifying marks are met.



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FORMULATION AND PHARMACEUTICAL TECHNOLOGY



Year 2 (Senior Fresh)
Semesters 1 and 2

MODULE CODE: PHU22104
10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. A.M. Healy (AMH), Prof. L. Tajber (LT),
Assoc. Prof. D. D'Arcy (DD)

Coordinator: Prof. L. Tajber

AIMS: To explain more fully physicochemical aspects of substances used in pharmacy and medicine and to provide a continuation course in the formulation of some common pharmaceutical dosage forms, together with aspects of unit operations related to the production of effective medicines.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Discuss the formulation and manufacture of pharmaceutical systems applied topically
2. Discuss the steps and rationale of pharmaceutical preformulation studies
3. Differentiate the various solid-state forms of active pharmaceutical ingredients
4. Explain the mass and heat transfer processes of pharmaceutical importance
5. Discuss the various unit processes used in the manufacture of pharmaceutical materials and formulations and describe the design and operation of various types of equipment used in these processes
6. Outline the importance of particle size, particle size analysis and powder flowability of pharmaceuticals and discuss different techniques to characterise powder size and flow
7. Describe the formulation, production and characterisation of solid dosage forms - tablets
8. Design a simple tablet formulation and suggest a suitable process of tablet manufacturing following the assessment of physicochemical properties of an active pharmaceutical ingredient
9. Demonstrate competence in related formulation skills and in relevant pharmaceutical calculations

INTEGRATION

Integration Level: 8 (Complementary programme)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Example 1, Example 2, Example 3

Theme 3: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU22101 – Methods related to quantification of drug content in formulations, ICH and pharmacopoeial testing of drug substances



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PHU22102 – Fundamentals of drug transport and kinetic aspects of physical processes

PHU22106 - Integration of dispensing and extemporaneous compounding skills – especially related to the area of topical formulations and tablets

PHU22118 – Genetic engineering of active substances

PHU22110 – Pharmacology of drug substances used in PHU22104

Vertically across years

PHU11102 - Understanding issues related to pharmaceutical formulation and compounding

PHU11104, PHU33104 - Progressive complexity of knowledge acquired; Development of competence in practical laboratory skills

PHU44106, PHP55104 - Biopharmaceutics and dissolution testing PHP55101 - Industrial aspects of processes taught in PHU22104

SYLLABUS

Material will be covered on the following topics: physicochemical features of pharmaceutical systems; solid state properties; formulation of topical and oral drug delivery systems; pharmaceutical unit processes; micromeritics; tablets.

COURSE OUTLINE

Lectures, tutorials, practical classes and online activities.

LECTURES (35 hours)

Lecturer

1	Introduction to module	LT
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Unit PHU22104A: EMULSIONS AND TOPICAL FORMULATIONS

2	Terminology and classification of emulsions, emulsion-based drug delivery systems	LT
3	Primary and secondary emulgents, HLB classification, emulsion formulation by HLB method	LT
4	Factors affecting emulsion stability, Pickering emulsions, preparation of emulsions	LT
5	Creams and other topical formulations	LT

Unit PHU22104B: PREFORMULATION STUDIES (SOLID STATE)

6, 7	Pharmaceutical preformulation studies	LT
8, 9	Solid state forms of active pharmaceutical ingredients	LT
10, 11	Characterisation of solid-state phases of pharmaceutical compounds	LT

Unit PHU22104C: PHARMACEUTICAL UNIT PROCESSES

12	Introduction to mass transfer processes, mass transfer in still/stagnant gases, mass transfer in moving fluids, examples of mass transfer operations	AMH
13	Heat transfer by conduction and convection, heat transfer through walls and across pipes and tubes, heat exchange between fluids across a solid boundary	AMH
14	Crystallisation	AMH
15	Filtration	AMH
16-17	Drying	AMH
18-19	Comminution	AMH



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20	Mixing	AMH
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Unit PHU22104D: MICROMERITICS

21	Microscopy as a technique for particle size analysis	AMH
22	Sieving as a technique for particle size analysis	AMH
23	Particle size analysis using laser light scattering techniques - laser diffraction particle size analysis and photon correlation spectroscopy	AMH

24	Surface area measurement techniques; Methods of presentation and interpretation of particle size analysis results	AMH
25	Particulate solids in bulk - fundamental and derived properties	AMH
26	Factors affecting the flow properties of powders; Assessment of powder flow, use of glidants, flow of solids in hoppers	AMH

Unit PHU22104E: TABLETTING

27, 28	Introduction to tableting terminology, types of tablets and formulation of compressed tablets	LT
29	Tablet presses; Direct compression; Dry and moist granulation procedures	LT
30	Coating of tablets and processing problems	LT
31, 32	Formulation of modified release tablets	LT
33	Tablet evaluation	LT
34	Dissolution testing of solid dosage forms	DD
35	Rational decision making in relation to production of tablets; information on assessment	LT

Practical Classes

Unit PHU22104A

Ointments	LT
Waxes, ointments and creams	LT
Creams cont.	LT
HLB principles of cream formulation	LT
Revision and repeat	LT

Tutorials

Tutorial on the theory component of Unit PHU22104A	LT
Tutorial on the practical component of Unit PHU22104A	LT
Tutorials on lectures (as deemed necessary)	LT/AMH

DIRECTED READING

Aulton's Pharmaceutics latest edition

Marriott, J., Wilson, K. Langley, C. A., Belcher, D. *Pharmaceutical Compounding and Dispensing*, 1st or 2nd edition, Pharmaceutical Press, (2006 or 2010)

Supplementary reading

Sinko, P. J. *Martin's Physical Pharmacy and Pharmaceutical Sciences*, 7th edition, Wolters Kluwer, (2017)
Florence, A. T; Attwood, D. *Physicochemical Principles of Pharmacy*, 6th edition, Pharmaceutical Press, (2015)
Winfield, A., Rees, J., Smith, I. *Pharmaceutical Practice*, 4th edition, Elsevier, (2009)

Hickey, A.J., Ganderton, D. *Pharmaceutical Process Engineering, Drugs and the Pharmaceutical Sciences*, vol.



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112, Marcel Dekker (2001)

Richardson, J.F., Harker, J.H. and Backhurst, J.R. *Coulson and Richardson's chemical engineering. Vol. 2, Particle technology and separation processes.* 5th edition, Butterworth-Heinemann, (2002)

Allen, T. *Particle Size Measurement.* 4th or 5th edition, Chapman and Hall, (1990 or 1997)

Lieberman, H.A., Lachman, L. Schwartz, J.B. (eds.) *Pharmaceutical Dosage Forms: Tablets. 2e.* Marcel Dekker (1990) British Pharmacopoeia, current edition

European Pharmacopoeia, current edition United States Pharmacopoeia, current edition

Other resources as recommended

ASSESSMENT

The use of Gen AI to complete or contribute to any part of assessments in this module is prohibited. Pass mark = 50% unless specified otherwise.

Component

Contribution to module grade

Written examination (PHU22104-1): 2 hours closed book exam, this examination consists of 3 long (25% of total examination marks each) and 5 short (5% of total examination marks each) questions (no choice).

55%

This assessment will be carried out in Michaelmas term and covers units PHU22104B, PHU22104C and PHU22104D.

The qualified fail mark for this component is 40%.

The pass mark for this component is 50%.

Practical and theory examination (PHU22104-2): 2 hours open book exam

This assessment will be carried out in Michaelmas term and covers unit PHU22104A.

30%

The qualified fail mark for this component is 50%.

The pass mark for this component is 50%.

Assignment on tablet formulation (PHU22104-3) to be submitted on-line via Blackboard This assessment will be carried out in Hilary term.

15%

The qualified fail mark for this component is 40%.

The pass mark for this component is 50%.

SUMMARY OF HOURS

Lectures	Practicals	Tutorials and pre-lab talks	Contact hours	Assignments and assessments	Independent and guided study	TOTAL	ECTS
35	15	2	52	35	123	210	10

FURTHER INFORMATION

Pass mark, plagiarism



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The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components. If a student attains a qualified fail grade, they must be reassessed in all components below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is not compensatable.



PRACTICE OF PHARMACY II



Year 2 (Senior Fresh)
Semesters 1 and 2

MODULE CODE: PHU22106
10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. F. Boylan (FB), Assoc. Prof. C. Cadogan (CC), Asst. Prof. M. Counihan (MC), Adj. Asst. Prof. I. Forsythe (IF), Asst. Prof. E. Ní Sheachnasaigh (ENÍS), Assoc. Prof. M. O'Dwyer (MO'D), Asst. Prof. R. Parkin (RP), Assoc. Prof. Cicely Roche (CRo), Adj. Asst. Prof. K. Rossi (KR), Asst. Prof. T. Ryan (TR), Assoc. Prof. S. Ryder (SR).

External contributors: Dr. S. Galvin (School of Dental Science; SG), Asst. Prof. E. McGowan (Faculty of Health Sciences Asst. Prof. in Interprofessional Learning; EMcG), hospital pharmacist(s) (Hosp), patient representative (PR), staff of Meagher's Pharmacy (MP), K. O'Connor, Coloplast (KO'C).

Coordinator: Assoc. Prof. S. Ryder

AIMS: This module aims to develop students' appreciation of medication related and non-medication related influences on health and illness, including: nutritional support and its delivery; appliances and dressings; dental care. Students will continue to develop competence to support pharmaceutical care by expanding their knowledge of pharmacy legislation and developing their clinical skills, with emphasis on considering laboratory results and responding to symptoms and prescribed treatment. The module also includes a focus on the practical application of knowledge and skills in an actual or simulated pharmacy practice environment.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Critically discuss the components of adequate nutrition, nutritional needs and supports, the types and uses of ostomy appliances, vascular support hosiery and related materials, common oral and dental conditions and their treatment, the wound healing process and the actions and uses of different dressing types, identifying how pharmacists can address these matters as part of a multidisciplinary team.
2. Outline and apply the provisions of the Medicinal Products (Prescription and Control of Supply) Regulations, other medicinal products legislation including the controls on unlicensed medicines, the Pharmacy Act 2007, and legislative controls stemming from this Act.
3. Systematically collect, interpret and apply knowledge about patients, their conditions and their medicines, in order to prepare a care plan, justify treatment recommendations and provide patient counselling, and to dispense mock prescriptions in accordance with legal, clinical, administrative, ethical and professional requirements in a diverse range of patient case studies [more complex cases than in PHU11106], demonstrating appropriate communication skills and accurate calculations where applicable.
4. Explain pharmacists' role and recognize the role of dental practitioners in optimizing patient care, and communicate effectively and respectfully when addressing patient cases in a multidisciplinary student group.
5. Apply clinical, legal and professional knowledge in a professional and patient-focused manner under supervision in an actual or simulated pharmacy practice setting.
6. Demonstrate sustained commitment to professional development by continuing to maintain a reflective



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e- portfolio comprising cyclical profiles of competence and learning needs, personal development plans, development activities and evidence of the competence/knowledge gained.

INTEGRATION

Integration Level: 11 (transdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Examples 1, Example 2, Example 3, Example 4

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year, for example with PHU22104 (extemporaneous compounding and dispensing) and PHU22110/PHU22111 (shared pharmacology themes).

Vertically across years, for example linking with all other modules in the PHxxx106 sequence where topics are iteratively addressed with progressive complexity (*e.g.*, in dispensing cases).

SYLLABUS

Material will be covered on the following topics: Legislation relating to pharmacy practice; communication skills; nutrition and nutritional supplements; patient factors in drug treatment, clinical laboratory tests, adverse drug reactions; stoma care and ostomy products; vascular support hosiery, surgical hosiery, wound types and healing, wound dressings and bandages; dental health; clinical skills; dispensing and patient care; continuing professional development.

COURSE OUTLINE

Lectures, tutorials, workshops, practical classes, online activities, interprofessional learning, workplace-focused learning.

Note: Due to timetabling constraints, the sequence of classes may differ from that below.

LECTURES (43 hours)		Lecturer
1	Introduction and feedback; competencies, objective structured clinical examinations (OSCEs), reflective practice and continuing professional development (CPD)	SR
2-8	Medicinal Products (Prescription and Control of Supply) Regulations	SR
9	Re-introduction to APPEL and preparation for work experience	ENÍS/MC
10-12	HPRA and Medicinal Products legislation, including exempt medicinal products	SR
13-18	Pharmacy Act and associated legislation	SR
19-20	Vascular support hosiery and surgical hosiery	KR
21-22	Ostomy	KR
23-25	Wound types, healing, wound dressings; bandages	KR
26	Common Conditions Service	KR
27-28	Dental and oral health	KR
29-30	Nutrition, dietetics and oral supplements	CC
31-33	Vitamins	CRo
34-36	Enteral and parenteral feeding and nutrition	CRo
37	Lipids as dietary supplements	TR



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38	Poisonous food constituents and chemoprevention	FB
39	Infectious diseases and their management	TR
40-42	Clinical laboratory tests: Urea and electrolytes (U&E), renal function, full blood count (FBC)	Hosp
43	Adverse drug reactions (ADRs)	CRO

Practical 2.1: Dispensing and Patient Care - Prescription and control of supply regulations (2 h)	SR/IF
Practical 2.2: Dispensing and Patient Care - Emergency supply (2 h)	SR/KR/IF
Practical 2.3: Dispensing and Patient Care - Primary-secondary care interface (2 h)	SR/IF
Practical 2.4: Dispensing and Patient Care - Unlicensed and extemporaneous medicines (2 h)	TR/IF
Practical 2.5: Dispensing and Patient Care - Hospital dispensing (2 h)	CRO/IF
Practical 2.6: Communication skills (2 h)	MP
Ostomy products and vascular support hosiery (2 h)	KR
Stoma experience: patient-facing class (1 h)	KR/KO'C/PR
Practical 2.7: Preparation for OSCE 1 (1 h)	SR/KR/RP/TR/IF
Practical 2.8: Clinical skills - Cardiovascular disease and cardiovascular patients: patient-facing class (2 h)	TR/PR
Discussion of experiential learning and CCF Live 2 (preparation) (1.5 h)	ENÍS/MC
Discussion of experiential learning and CCF Live 2 (debriefing and learning consolidation) (1 h)	ENÍS/MC
Surgical dressings (2 h)	KR
Nutrition and dietetics (1.5 h)	CC
Interprofessional learning with dental science students (1 h)	KR/SR/TR/SG/EMcG
Practical 2.9: Clinical skills - Infectious diseases and their management (1 h)	TR
Practical 2.10: Clinical skills - Responding to symptoms, including lower respiratory tract infections (2 h)	CC
Practical 2.11: Clinical skills - Drug interactions and other drug-related problems (2 h)	CRO
Practical 2.12: Preparation for OSCE 2 (1 h)	SR/KR/MO'D/RP/TR/IF

Tutorials (2 hours)

Building upon prior knowledge (1 h)	SR
Dispensing and patient care (1 h)	SR
Other tutorials may be arranged on request.	

Experiential learning (70 hours)

Principal Professional Placement (70 h)	ENÍS/MC
<i>Note that workplace-based experiential learning is subject to the prevailing public health situation.</i>	

Timetabled tests and examinations (5.5 hours)

For full details of these and other assessments within this module, see 'Assessment' below.	
PHU22106-4: Assessment by OSCE 1 10 min assessment within 30 min timeslot during semester 1 teaching term	SR/others
PHU22106-3: Pharmacy practice practical test 1.5 h test at end of semester 1 teaching term	SR/others
PHU22106-1: Legislation examination 1 h examination in College examination session at end of semester1	SR
PHU22106-4: Assessment by OSCE 2 10 min assessment within 30 min timeslot during semester 2 teaching term	SR/others
PHU22106-2: Non-legislation examination 2 h in College examination session at end of semester 2	Multiple staff



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DIRECTED READING

Legislation relevant to the course.

Supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark criteria are listed individually below. Each component must be passed independently; hence components' qualifying mark criteria are the same as the pass mark criteria; there are no separate, lower qualifying marks.

Students should note that the use of artificial intelligence is not permitted for any of the assessments in PHU22106 unless specifically directed to do so. Further information on this is provided in the *Artificial Intelligence* section below.

Approximate annual assessment dates have been included in the table below, for general guidance only. Specific assessment dates and deadlines will be published by Academic Registry (theory papers only), displayed in the module timetable and/or SF year assessment/assignment overview, or communicated by module staff as appropriate. It is students' responsibility to ensure they are aware of all such dates and deadlines.

<i>Component</i>	<i>Contribution to module grade</i>
PHU22106-1: Closed book examination (legislation), 1 hour 50 MCQs (no choice; negative marking, +1/-0.25) Students must obtain a minimum of 50% for this component, including extra credit if applicable. Mark can be improved by up to 5% (capped at 100% total for the component) through extra credit. This examination takes place at the end of semester 1.	25%
PHU22106-2: Closed book examination (all non-legislation material, irrespective of the semester in which it was taught), 2 h. • Section A (weighting: 60% of marks for paper): 2 long questions (no choice; each may contain multiple parts). • Section B (weighting: 40% of marks for paper): 40 MCQs (no choice; negative marking, +1/- 0.25). Students must obtain at least 40% in Section A and at least 40% in Section B, and at least 50% for the paper overall (both sections combined). This examination takes place at the end of semester 2.	45%



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PHU22106-3: Open book pharmacy practice practical test, 1.5 hours, 2 questions (approx. 45 mins each; no choice; each will contain multiple parts). Must obtain a minimum of 60% overall. • Level 1 error: Zero marks for the question in which the error is made, and automatic failure of the entire test with the overall test mark also returned as zero, irrespective of performance in other elements of the test. • Level 2 error: Zero marks for the question in which the error is made. • Level 3 error: Deduction of 41% of the maximum marks available for the question in which the error is made. • Level 4 error: Deduction of 20% of the maximum marks available for the question in which the error is made. • Level 5 error: Deduction of 10% of the maximum marks available for the question in which the error is made. • Level 6 error: Deduction of 5% of the maximum marks available for the question in which the error is made. This assessment takes place near the end of semester 1.	10%
PHU22106-4: Objective structured clinical examinations (OSCEs). Must obtain a minimum of 60%. There are two OSCEs, held near the end of semester 1 and semester 2.	10%
PHU22106-5: Continuous assessment in professional knowledge, skills and behaviours: Dispensing and patient care, clinical skills, nutrition and interprofessional learning. Must obtain a minimum of 60%. These continuous assessment exercises are undertaken before (preparatory material), during or after the classes with which they are associated, in semester 1 and semester 2. Accordingly, specific deadlines may vary for class groups.	10%
PHU22106-6: Principal Professional Placement activities (CCF Live 2) and reflective continuing professional development e-portfolio (minimum of 5 cycles using Irish Institute of Pharmacy style template in e-portfolio, meeting criteria outlined in course materials) [satisfactory/unsatisfactory]. The placement workbook deadline is soon after completion of the placement, while there are deadlines for submission of CPD cycles at the end of each semester.	----

Note on assessment for Scholarship:

The syllabus for Paper 2 of the Scholarship examinations includes all legislation and non-legislation PHU22106 material covered in Semester 1 (in contrast to the ordinary theory examination held at the end of Semester 1 for all students, which focuses on legislation).

NB: Students will be expected to draw upon knowledge and skills gained in module PHU22106 both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g., in the clinical pharmacy assessments linked to pharmacology and therapeutics components, Practice of Pharmacy theory papers, clinical skills exercises, dispensing and patient care evaluations, practical tests, competency assessments, OSCEs and the professional registration examination). Similarly, there is an expectation that students will draw upon and integrate knowledge and skills from other JF and SF modules in their work for PHU22106.



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SUMMARY OF HOURS

Lectures	Practicals/ workshops/ seminars	Tutorials	Teaching contact hours	Assessment contact hours	Other assignments	Independent and guided study	TOTAL	ECTS
43	31	2	76	5.5	35	123.5	240	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass marks for examinations and assessments are tabulated in 'Assessment' above. Students should note that College policy, procedures and penalties for plagiarism apply to both examinations and continuous assessment. See <https://www.tcd.ie/academic-affairs/academic-integrity/>.

Artificial intelligence

A statement on the potential use of generative artificial intelligence (Gen AI) in the Pharmacy programme as a whole has been provided elsewhere in this handbook. The PHU22106 module team and other pharmacy practice staff have carefully considered the issue of whether to permit the use of Gen AI for assessments in this module. We recognize there are many ways in which students may consider Gen AI can support their learning, and students who wish to do so are free to use Gen AI for private study and components that do not contribute to the assessment of PHU22106. There may also be instances where staff direct students to use Gen AI in specific learning exercises within PHU22106. In all such use, it is important that you bear in mind the challenges, limitations and transparency requirements outlined in the College Statement on Gen AI, available at the [Gen AI Hub](#).

However, unless specifically directed to do so, the use of Gen AI is not permitted for any of the PHU22106 assessments tabulated above, including pre-practical work that will ultimately feed into worksheets or other assessment components. This is because identifying, interpreting, appraising, integrating, applying and reflecting upon relevant information from appropriate sources (building from first principles if necessary) are core skills required by pharmacists. It is only after developing these skills through independent work that pharmacists can truly validate and critically appraise information they may encounter in practice, including that generated via AI. Hence it is essential that students develop and demonstrate the knowledge, judgement and skills required for independent fulfilment of the learning outcomes, without reliance upon or support from Gen AI.

Where concerns arise about a student's use (or possible use) of Gen AI for any part of an assessment in PHU22106, the [College Academic Integrity Policy and related procedures](#) may be employed.

Late work

Continuous assessment exercises for this module must be presented for evaluation by the specified dates. They must be presented to a designated member of staff in the manner requested (*e.g.*, in person/by email/through the virtual learning environment or other designated interface), and signed in on the form for this purpose where applicable. Work submitted late will be treated in accordance with the School's late submission policy (which is available within this handbook) and College policy as applicable. In particular, students should note the provisions within the School policy that if a deadline extension is required it should be sought before the deadline has been reached, and any work submitted after feedback on the finished assessment has been provided to members of the class will be capped at the pass mark even if an extended submission deadline has not yet been reached.

Missed classes/assessments



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In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify their tutor of the reason for absence without delay, and present certification as appropriate. However, all continuous assessment components must be completed even if the student is absent for a valid reason. It is the student's responsibility to obtain details of the assessment for the missed class from the relevant staff member without delay, and to complete it on a self-study basis. If a deadline extension is required, it must be formally sought by the student in accordance with the School's late submission policy. The extended deadline for submission of the completed assessment to the relevant staff member will normally be five days from the student's return to College (return date notified to staff member by tutor, based on certification as appropriate). Any work submitted after feedback on the finished assessment has been provided to members of the class will be capped at the pass mark even if an extended submission deadline has not yet been reached.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student may be returned as a 'qualified fail' (QF) and refused permission to progress with the year cohort until the examiners have been satisfied in all components of the module. This may necessitate sitting a reassessment examination and/or repetition/(re)submission of one or more continuous assessment components (including submission of one or more alternative exercises that have been set to replace failed/missed continuous assessment components). In such circumstances, while the marks attained in supplemental theory examinations, practical tests and OSCEs will not be capped, penalties may be applied to other continuous assessment components, with the effect that marks for such components will not normally exceed the pass mark. This is separate from any penalties imposed for level 1 to level 6 errors in the pharmacy practice practical test. (See 'Assessment' above.)

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory may be refused permission to undertake examinations/assessments and may be required by the Senior Lecturer to repeat the year.

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities *etc.*).

Compensation

This module is not compensatable.



PHARMACEUTICAL BIOCHEMISTRY AND BIOTECHNOLOGY



Year 2 (Senior Fresh)
Semester 2

MODULE CODE: PHU22118
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. D. Finlay (DF), Assoc. Prof. A. Sasse (AS)
External contributors: Prof. A. Bowie (AB), Prof. D. Zisterer (DZ).

Coordinator: Assoc. Prof. A. Sasse (AS)

AIMS: This module will provide students with an overview of the biochemical processes required for protein synthesis within a cell. The module will then provide students with an introduction to Pharmaceutical Biotechnology including genetic engineering, upstream and downstream processing.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Explain the term 'pharmaceutical biotechnology'.
2. Discuss the basic principles of gene transcription and translation.
3. Describe the process of genetic engineering.
4. Describe techniques routinely used for genetically engineered recombinant proteins, their production and purification.
5. Discuss the source, preparation, analysis and use of representative examples of therapeutically important peptides and carbohydrates.
6. Describe how proteins are glycosylated and how glycosylation affects proteins.

INTEGRATION

Integration Level: 6 (Sharing)

Present in the following Integration Schematics:

Theme 1: Example 4

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU22101 – Understanding of organic chemistry and stereochemistry is built on with regards to DNA, peptides and carbohydrates; analysis of peptides and carbohydrates

PHU22104 – Principles of topical and solid state formulations

PHU22110 – Antibiotics links in with carbohydrates (aminoglycosides)



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Vertically across years

PHU11BI1 – Introductory Biochemistry module

PHU33104 – Biotherapeutics

PHU44102 – Mechanism of action of antibiotics is further detailed

PHP55104 – Molecular cloning and engineering of DNA taught in PHU22118 links with advanced drug delivery

SYLLABUS

Material will be covered on the following topics: gene structure and expression; mRNA transcription, protein translation, genetic engineering, upstream and downstream processing; pharmaceutical peptides and carbohydrates; glycoproteins.

COURSE OUTLINE

Lectures, tutorials, and a practical laboratory class.

Lectures (21 hours)

Lecturer

1	Module Intro & Introduction to Pharmaceutical Biotechnology	AS/DF
2	Gene structure and expression – DNA structure	AB
3	Gene structure and expression – DNA Replication	DZ
4, 5	Gene structure and expression – Transcription	AB
6	Gene structure and expression – Translation	DZ
7, 8	Genetic Engineering; the recombinant process	DF
9, 10	Upstream processing	DF
11-14	Downstream processing	DF
15	Amino acid synthesis & stereochemistry	AS
16	Amino acid analysis	AS
17	Pharmaceutical peptide analysis, sequencing methods & peptide mapping	AS
18	Production of pharmaceutical peptides: protecting groups & solid phase synthesis	AS
19	Glycoproteins – biosynthesis and physiological functions	AS
20	Blood groups, blood transfusion	AS
21	Biotechnological production of aminoglycosides	AS

Practical Class (4 hours)

Enzymes: Kinetics of Inhibition (4 h)

DF

Tutorials (4 hours)



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Module and practical introduction (1h)	AS/DF
Revision tutorial (1h)	AS
Revision tutorial (1h)	DF

DIRECTED READING

- Alberts, Johnson, Walter, Lewis; [*Molecular Biology of the Cell*](#); 7th Ed., Garland Publishing Inc, 2022.
- Berg, Tymoczko, Stryer; *Biochemistry*; 9th Edition, WH Freeman & Co., 2019.
- Crommelin, and Sindelar (eds.); *Pharmaceutical Biotechnology: Fundamentals and Applications*; 4th Edition, Informa Healthcare, 2016.
- Lemke and Williams; *Foye's Principles of Medicinal Chemistry*; 8th Edition, Wolters Kluwer, Lippincott Williams & Wilkins, 2020.

Additional supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark = 50%, Qualifying mark = 40% for each component of this module

Component	Contribution to module grade
Semester 2 written examination: [2 hours; 4 essay questions]	80%
Practical assignments and continuous assessment:	20%
• Practical assignment (80%) • In-lab assessment (20%)	

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (*e.g.* in PHU33104).

SUMMARY OF HOURS

Lectures	Practicals	Tutorials	Contact hours	Assignment	Independent and guided study	TOTAL	ECTS
21	4	3	28	4	68	100	5



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FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment. The qualifying mark to allow compensation between components is 40%.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class or practical for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate. Certificates for missing the practical must be submitted to the module coordinator.

Progression and reassessment

A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark of 40% in any component and must be reassessed in that component. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable.



MOLECULAR AND CHEMOTHERAPEUTIC PHARMACOLOGY AND CLINICAL THERAPEUTICS



Year 2 (Senior Fresh)
Semesters 1 and 2

MODULE CODE: PHU22110
10 ECTS

Staff of the School of Pharmacy and Pharmaceutical Sciences: Assoc. Prof. M.J. Santos-Martinez (MSM); Assoc. Prof. C. Medina (CM); Asst. Prof. J. O'Connell (JOC); Assoc. Prof. F. Boylan (FB); Asst. Prof. S. Smith (SS).

Staff of the School of Medicine, Dept of Clinical Microbiology: Ass. Prof. J. Renwick (JR)

Coordinator: Assoc. Prof. C Medina

AIMS: To allow the student to understand how chemical mediators modulate the body's response to injury and infection; to enable the student to appreciate how microbiology impinges on many aspects of Pharmacy; to acquire a knowledge of the mode of action of antibiotics, anti-parasitic drugs and anti-viral agents; to apply this knowledge to therapeutic case studies and problems.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Recall the various chemical mediators of inflammation and their physiology and pathology
2. Identify the mechanism of action of the different classes of anti-inflammatory and immunosuppressant drugs, their clinical use, cautions and side effects.
3. Explain the main types of human ectoparasite infestation and their significance in the context of disease transmission. Advise on and critically assess the products used to treat and protect against ectoparasite infection.
4. Identify the mechanism of action, clinical use and side effects of the different antiviral drugs
5. Identify the mechanism of action, clinical use and side effects of the different groups of antibiotics
6. Identify the mechanism of action of antifungal drugs, their clinical use and side effects
7. Demonstrate competence in the practical laboratory techniques used in the identification of bacteria
8. Apply knowledge to individual patient therapeutic case studies and problems

INTEGRATION

Integration Level: 6 (Sharing)

Present in the following Integration Schematics:

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year



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PHU22101 – Complements knowledge of drugs' structure and quality issues PHU22104 – Is complemented by formulation of drugs in the module PHU22106 - Gives necessary background to clinical practice

PHU22118 – Links with role of biotechnology in drug design

Vertically across years

PGU11006 – learning outcomes from physiology are required to appreciate PHU22110 PHU11109 – Further develops General Principles of Pharmacology to specific areas PHU33111 – Links with immunomodulators in cancer

PHU33110 – Links with the use of anti-inflammatory drugs in the management of gastrointestinal and respiratory diseases

PHU33106 – Provides a building block for Practice of Pharmacy

SYLLABUS

Material will be covered on the following topics: Pharmacology, clinical pharmacology and clinical case studies on chemical mediators and disease; chemotherapy of infestations and infectious disease.

COURSE OUTLINE:

Lectures, feedback sessions, online teaching, practical laboratory classes and continuous assessment activities.

Lectures (36 hours)		Lecturer
1	Module introduction + elearning + CPA	CM, MSM
2	Inflammation and inflammatory mediators	CM
3-5	Immunology	SS
6, 7	COX inhibitors	CM
8, 9	Corticosteroids	CM
10	DMARDS	CM
11	Anti-lymphocyte agents	CM
12	Anti-cytokine drugs	CM
13-16	Antivirals	CM
17-19	Human ectoparasites	FB
20	Antimicrobials: Antimetabolites	JOC
21,22	Cell Wall Inhibitors	JOC
23	Drugs Acting at the Cell Membrane	JOC
24, 25	Inhibitors of DNA/Protein Synthesis	JOC
26	Tuberculosis and Antitubercular Drugs	JOC
27	Protozoal Disease: Malaria	JOC
28	Parasitic Diseases: Toxoplasmosis & Giardiasis	JOC
29	Vaccines	JR
30	Urinary tract infections	JR
31	Gastrointestinal infections	JR
32	Hospital acquired infections	JR
33	Respiratory infections	JR
34	Meningitis/septicaemia	JR



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35	Fungi & antifungal therapies	JR
36	STIs	JR

Practical classes (5 hours)

Videos in Microbiology (self-guided)

Aseptic technique/Nutritional and atmospheric requirements

Differential and selective media

Enumeration of bacteria and their killing by a disinfectant

Antibiotics

Identification of bacteria

Case studies (8 hours)

e-learning clinical case studies and problem solving

CM/MSM

Tutorials (2 hours)

Feedback on e-learning

CM/MSM

DIRECTED READING

Will be indicated, as relevant at each lecture.

ASSESSMENT

Pass mark = 50%

Component

Contribution to module grade

Written examination (3 hours)

- Section A: 3 Long questions, 20 marks each (weighting of 60%)
- Section B: 20 MCQs (negative marking will apply, +2/-0.5, weighting of 40%)

70%

Continuous assessment

- Applied Therapeutics e-learning (5%)
- Continuous practical assessment (15%)

20%

Clinical Pharmacy Assessment

10%

Note that the use of Gen AI to complete or contribute to any part of the assessments in this module is prohibited.

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically



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focused modules in the current year and wherever relevant in all previous years of the programme.

For the Continuous Practical Assessment (Microbiology), the lab books will be assessed for overall quality of the work submitted. There will also be a 2-part Experimental Assignment. Part 1 will involve writing up one of the Practicals in detail, according to instructions to be given. Students will be advised in advance which Practical should be written up. Part 2 will include questions on the Practicals and on the self-guided Videos in Microbiology.

***Clinical Pharmacy Assessment**

(Coordinator Assoc. Prof. M.J. Santos-Martinez)

This assessment will take place in Hilary Term. It is an “open book” examination that includes case studies based on topics covered in all Pharmacology modules (PHU22110, PHU22111). Students are required to demonstrate application of pharmacology and therapeutics knowledge to solve case studies and problems.

Pass mark for this component is 50%. It is a requirement to pass the Clinical Pharmacy Assessment.

SUMMARY OF HOURS

Lectures	Case studies	Tutorials	Contact hours	Practical classes	Independent and guided study	TOTAL	ECTS
36	8	2	43	5	149	200	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for the written examination and all other assessment components is 50%. See ‘Assessment’ above. The continuous assessment component consists of online case studies and lab reports, which do not need to be passed individually. The combined mark for this continuous assessment component has a pass mark of 50% and a qualifying mark of 40%. The written examination has a pass mark of 50% and a qualifying mark of 40%. It is a requirement to pass the Clinical Pharmacy Assessment (pass mark is 50%, no compensation is possible for this component). Students who obtain more than 40% (the qualifying mark) in either the written examination or the continuous assessment component but less than 50% will be considered to have failed that component. However, they may compensate within the module if both the overall module mark and the CPA mark are 50% or above.

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardise successful completion of the module.



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Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components and will then be reassessed in all components below the pass mark of 50% (this applies even to components that are between the qualifying mark and the pass mark). A student who achieves an overall module mark less than 50% will be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students whose attendance is non-satisfactory may be reported to the Senior Lecturer and may be required to repeat the year.

Compensation

This module is compensatable.



BLOOD, CARDIOVASCULAR AND RENAL PHARMACOLOGY AND CLINICAL THERAPEUTICS



Year 2 (Senior Fresh)
Semester 1

MODULE CODE: PHU22111
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences Assoc. Prof. M.J. Santos-Martinez (MSM) and
Asst. Prof Juliette O'Connell' (JO'C)

Coordinator: Assoc. Prof. M.J. Santos-Martinez (MSM)

AIMS: The student will acquire knowledge on pharmacology and clinical therapeutics relevant to the use of drugs and medicines in cardiovascular and renal conditions.

LEARNING OUTCOMES: On successful completion of this module the student will be able to:

1. Describe the aetiology and underlying physiopathology of different forms of cardiovascular disease including thrombosis, hypertension, dysrhythmias, ischemic heart disease and congestive heart failure.
2. Demonstrate knowledge on cardiovascular risk factors, including the role of lipids in atherosclerosis, and how lifestyle behaviour can influence cardiovascular disease.
3. Demonstrate knowledge on kidney's function, aetiology and underlying physiopathology of renal disfunction.
4. Classify drugs used to treat cardiovascular and renal diseases.
5. Describe their mechanism of action, side effects, potential drug interactions and clinical use.
6. Describe the pathophysiology of the different forms of anaemia and their treatment.
7. Apply knowledge to individual patient case studies and therapeutic problems.

INTEGRATION

Integration Level: 7 (Correlation)

Present in the following Integration Schematics:

Theme 2: Example 1

Theme 4: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU22101 - Complements knowledge of drugs' structure and appreciation of the regulatory environment and quality issues



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PHU22104 – Links with physiochemical properties and formulation of drugs in the module PHU22106 – Gives necessary background to clinical practice

Vertically across years

PGU11006 – Takes learning outcomes from physiology as a basis for further learning PHU33106 – Provides a basis for Practice of Pharmacy

SYLLABUS

Material will cover pathophysiology, aetiology and risk factors of cardiovascular diseases, renal diseases and anaemia. The mechanism of action, side effects and interactions of drugs used for the treatment of these conditions and case studies and therapeutic problems.

COURSE OUTLINE

The material will be covered during lectures and continuous assessment activities. Those activities will be focused on the application of knowledge on the different topics covered within the module and followed by face-to-face feedback sessions and a tutorial session at the end of the module

Lectures (19 hours)		Lecturer
1	Module Introduction	MSM
2,3	High Blood Pressure and Antihypertensive agents	JO'C
4,5	Lipid-Modifying Agents	JO'C
6	Ischaemic Heart Disease	JO'C
7,8	Thrombosis and Haemostasis Antiplatelets Agents	MSM
9,10	Anticoagulants	MSM
11	Thrombolytics, Antifibrinolytics & Haemostatic Agents	MSM
12,13	Cardiac Dysrhythmias	JO'C
14,15	Renal Physiology & Pathology	JO'C
16,17	Congestive Heart Failure	JO'C
18	Anaemia	JO'C

Continuous Assessment and CPA		Lecturer
1	Feedback session on e-learning clinical case studies Topic 1 (1h)	MSM/JO'C
2	Feedback session on e-learning clinical case studies Topic 2 and mock CPA (1h)	MSM/JO'C
3-5	Group work (2h)	MSM/JO'C
6	End of module tutorial session (1h)	MSM/JO'C

DIRECTED READING – will be indicated, as relevant at each lecture.

ASSESSMENT

Pass mark = 50% unless specified otherwise.



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Component

Contribution to module grade

Exam paper (2 hours): 2 essay questions and 25 multiple choice questions (negative marking will apply, +1/-0.25). Qualifying mark: 40%	80%
Continuous assessment (e-learning clinical case studies and group work)	20%

Note that the use of Gen AI to complete or contribute to any part of assessments in this module is prohibited

NB: Students will be expected to draw upon knowledge and skills gained in this module in other clinically focused modules in the current year and wherever relevant in all previous years of the programme.

SUMMARY OF HOURS

Lectures	Feedback sessions and Tutorials	Contact hours	Continuous assessment	Independent and guided study	TOTAL	ECTS
18	6	24	20	66	110	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardise successful completion of the module.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components, and must be reassessed in the component(s) below the relevant qualifying fail mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may



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be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable.



12. JUNIOR SOPHISTER (3rd Year)

Module details **may be subject to corrections/amendments**. The School reserves the right to amend the **list of available modules and to withdraw and add modules**.

- *It is each student's responsibility to be aware of dates, times, locations, etc. of lectures, tutorials, seminars and practical classes.*
- *Reports, continuous assessments and laboratory notebooks must be presented for assessment by the dates specified by the examiner.*
- *Reports, continuous assessments and laboratory notebooks submitted after the specified dates will be treated in accordance with the **B.Sc. (Pharmacy) and M.Pharm. Late Submission Policy** and the College's **Policy on Late Submission of Assessments (Extension Policy)**.*

PRE-REQUISITE: Successful completion of Senior Fresh (Year 2)



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12.1. JUNIOR SOPHISTER MODULES

Code	Module Coordinator	Module Title	ECTS
PHU33000		Year 3 Administration	---
PHU33103	John Walsh (JW)	Natural Sources of Drugs and Substances used in Medicines	10
PHU33104	Deirdre D'Arcy (DD)	Sterile Products and Advanced Pharmaceutical Biotechnology	10
PHU33106	Cathal Cadogan (CC)	Practice of Pharmacy III	10
PHU33109	Lorraine O'Driscoll (LOD)	Endocrine & Reproductive Pharmacology and Clinical Therapeutics	5
PHU33110	Carlos Medina (CM)	Respiratory & Gastrointestinal Systems and Clinical Therapeutics	10
PHU33111	Astrid Sasse (AS)	Malignant Disease, Immune & Ocular Systems and Clinical Therapeutics	10
PHU33112	Andrew Harkin (AH)	Neuropharmacology and Clinical Therapeutics	5

Pass mark = 50% unless specified otherwise



NATURAL SOURCES OF DRUGS AND SUBSTANCES USED IN MEDICINES



Year 3 (Junior Sophister)

Semester 2

MODULE CODE: PHU33103

10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. J. Walsh (JW) and Assoc. Prof. F. Boylan (FB)

Coordinator: Assoc. Prof. J. Walsh

AIMS: To provide the student with an understanding of the sources and properties of naturally derived drugs and related pharmaceutical materials used in medicine, and the importance of the natural world in the discovery and development of new medicines.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Identify, describe the sources, general pharmaceutical properties and medicinal uses of key phytochemical groups, especially lipids, alkaloids, terpenes (mono-, sesqui-, di- and tri-terpenes), anthranoids, phenolics, cardiac glycosides and polysaccharides.
2. Describe the biosynthetic pathways employed by plants and fungi to produce compounds of pharmaceutical importance and understand their potential role in sustainable production of natural medicines from complex systems.
3. Discuss the global importance and impact of biodiversity prospecting and biodiversity preservation.
4. Demonstrate the skills required for the isolation of natural products and the use of both analytical and structural techniques to determine their purity and identity.
5. Describe several approaches to screening natural materials for bioactivity and identify when it is appropriate to apply each of these different approaches.
6. Identify toxic and allergenic constituents produced by plants, animals, and microorganisms occurring naturally in the environment and food, identify the risks associated with their occurrence, together with their treatment and/or prevention.
7. Describe the properties of the different classes of naturally occurring anti-cancer agents used in antibody drug conjugate design.
8. Outline the properties and uses of the emerging classes of antibody drug conjugates in cancer chemotherapy.
9. Describe each step involved in the bench to bedside development of commonly prescribed drugs derived from natural sources.
10. Describe the importance of Herb-Drug interaction, identifying the most common mechanisms associated with them and how to prevent or minimise such interactions.

INTEGRATION



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Integration Level: 11 (interdisciplinary)

Present in the following Integration Schematics: N/A

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU33104, PHU33106, PHU33109, PHU33110, PHU33111, PHU33112 – Links to understanding of mechanism of action of drugs, quality control, commonly used disinfectants and antiseptics, mechanism of action of biotech-based drugs used in cancer chemotherapy, pharmacokinetics, clinical studies, drug interactions and safety.

Vertically across years

PHU11101, PHU11103, PHU22118 – Builds upon concepts introduced including; the natural world as a source of drugs, how simple drugs are bio-/synthesised, chromatography and the use of advanced spectroscopic techniques for the identification of natural products.

PHU44102 – Application of pharmaceutical/medicinal chemistry in drug design, discovery and development of medicines.

PHP5103 – Links to the composition and quality control of natural compounds and herbal mixtures used as medicines and nutraceuticals

SYLLABUS

Material will be covered on the following topics: biosynthetic pathways of plants and fungi, biodiversity, natural products, herbal drugs, alkaloids, anthranoids, phenolics, cardiac glycosides, polysaccharides and terpenes, bench to bedside development of commonly prescribed drugs derived from natural sources.

COURSE OUTLINE

Lectures, student-led seminar, practical laboratory classes, workshops and tutorials.

Lectures (33 hours)		Lecturer
1	Module overview	JW
2-5	Biosynthesis of secondary metabolites	JW
6-8	Antibody Drug Conjugates: Targeted Therapies with Nature-derived warheads Nature-derived cytotoxic agents; maytansinoids, auristatins, calicheamicins, camptothecins, pyrrolobenzodiazepines and their use in the clinically approved antibody drug conjugates; Mylotarg®, Adcetris®, Kadcyla®, Besponsa®, Polivy®, Padcev®, Enhertu®, Trodelvy®, Blenrep, Elahere and Tivak®.	JW
9-11	Clinically approved microtubule disrupting agents from natural sources Taxanes, vinca alkaloids, epothilones, podophyllotoxin and colchicine	JW
12-16	Herbal medicines – Quality, Safety and Efficacy Chemical to clinical aspects of herbal substances in use for the treatment of anxiety, insomnia, depression, irritable bowel syndrome, inflammatory conditions and malaria	JW



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17-23	Alkaloid-based Drugs and Nature's toxins Key alkaloid groups, sources, sustainable production and New and emerging therapeutics Nature's toxins including allergens	JW
24-25	Glycosides, including cardiac Glycosides Antioxidants Glycosides I and II	FB
26-27	Plant-derived laxatives Polysaccharides and anthranoids	FB

28-30	Antioxidants Simple and complex phenols and flavonoids	FB
31-32	Screening for potential new drugs from Natural sources. Biodiversity prospecting	FB
33	Herb-drug interactions Herb-drug interactions	FB

Practical Classes / Workshops / Seminars (24 hours)

1. Studies on the Cinchona alkaloids (2 x 3hrs)	JW
2. Examination of caffeine, codeine, galantamine and quinine containing Products and Beverages, by TLC, GCMS, HPLC and qNMR (1 x 3hrs).	JW
3. Isolation of a medicinally important natural product by flash column chromatography (2 x 3 hrs).	JW
4. Workshops on structure elucidation of natural products (2 x 3hrs).	JW
5. Evaluation of the Antioxidant Activity of Biologically Active Flavonoids using the DPPH methodology: An Introduction to Structure Activity Relationships (1 x 3hrs)	FB

DIRECTED READING

European Pharmacopoeia

Trease & Evans' *Pharmacognosy* 16th Ed. WC Evans, Elsevier (2009)

Pharmacognosy & Pharmacobiotechnology. Robbers J, Speedie M, Tyler V., 2nd Ed., Williams & Wilkins (2008)

Medicinal Natural Products 3rd Ed., PM Dewick, John Wiley & Sons (2009)

Reference material uploaded onto Blackboard

***Valeriana officinalis*; Anxiety/sedative properties**

Doyle AM, Reilly J, Murphy N, Kavanagh PV, O'Brien JE, Walsh MS, Walsh JJ *J. Chem. Educ.*, 81, (10), **2004**, p1486 – 1487. *Supporting information-Student handout and Instructor's notes.*

Douglas RH, Muldowney CA, Mohamed R, Keohane F, Shanahan C, Kavanagh PV, Walsh JJ *J. Chem. Educ.*, 84, (5), **2007**, p829 – 831. *Supporting information-Student handout and Instructor's notes.*

***Leucojum aestivum*: Alzheimer's disease**

Halpin C, Reilly C and Walsh JJ *J. Chem. Educ.*, **2010**, 87 (11), pp 1242–1243. *Supporting information-Student handout and Instructor's notes.*



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***Tanacetum parthenium*: Migraine treatment**

Walsh E, Ashe S and Walsh JJ J. *Chem. Educ.* **2012**, 89, 134–137. *Supporting information Student handout and Instructor's notes.*

***Monascus purpurea*: High cholesterol**

Mohd Nazri, M, Samat FD, Kavanagh P and Walsh JJ J. *Chem. Educ.* **2012**, 89, 138–140. *Supporting information-Student handout and Instructor's notes.*

***Cinchona calisaya*: Malaria and chiral catalysis**

Carroll AM, Kavanagh DJ, McGovern FP, Reilly JR, and Walsh JJ J. *Chem. Educ.*, **2012**, 89 (12), p1578-1581. *Supporting information-Student handout and Instructor's notes.*

***Hypericum perforatum*: Depression**

Chrea B, Silkstone-Carter O, O'Brien J and Walsh JJ Manuscript, *J. Chem. Educ.* **2014**, 913, 440-442; DOI <http://dx.doi.org/10.1021/ed300800f>; *Supporting information-Student handout and Instructor's notes.*

***Taxus baccata*: Cancer**

Mohamed, MM, Suttie R, Corcoran DB, Walsh JJ Paclitaxel: From Bench to Bedside.

***Mentha piperita*: Irritable Bowel Syndrome**

Egan M, Connors E, Anwar Z and Walsh JJ Manuscript, **2015**, 92, 10, 1736-1740 *Supporting information-Student handout and Instructor's notes.*

***Artemisia annua*: Malaria**

Walsh JJ, Coughlan D, Heneghan N, Gaynor C, Bell A *Bio Org Med Chem Lett.* **2007**, 17(13):3599-602.

***Antibody drug conjugates*: Cancer chemotherapy**

[Stack GD, Walsh JJ. Pharm Res.](#) **2012** Nov; 29(11):2972-84.

ASSESSMENT

Pass mark = 50% unless specified otherwise.

Component

Contribution to module grade

Written examination: Written paper: 3 hours

3 Sections; 6 questions, 5 to be answered, one from each

Section**

75%

(Qualifying mark: 40%)

Practical Book Reports

25%

****Failure to comply with the instruction will result in a requirement to sit the reassessment examination.**

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme.



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SUMMARY OF HOURS

Lectures	Practicals/ Workshops/Seminars	Contact hours	Assignment(s)	Independent and guided study	TOTAL	ECTS
33	27	60	30	110	200	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

The pass mark for PHU33103 and for each of the components within it is 50%. The qualifying mark (see below) is 50% for the continuous assessment (practical book mark and seminar), and 40% for the theory paper.

In order to pass the module it is compulsory to attain the qualifying mark in every component and to achieve an overall module mark of at least 50%.

A student will be awarded a QF (qualified fail) grade if he/she achieves an overall mark of at least 50% but less than the qualifying mark in one or more components, and must be reassessed in the component(s) below the relevant qualifying mark.

A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

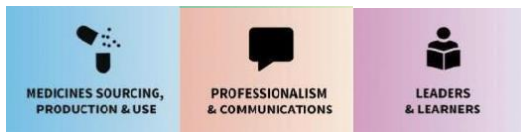
Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable.



STERILE PRODUCTS & ADVANCED PHARMACEUTICAL BIOTECHNOLOGY



Year 3 (Junior Sophister)

MODULE CODE: PHU33104

Semesters 1 and 2

10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. D. D'Arcy (DD), Prof. L. Tajber (LT), Asst. Prof. S. Smith (SS), Prof. C. Ehrhardt (CE), Assoc. Prof. F. Boylan (FB), Dr. Melissa Tutty (MT), Prof. L. O'Driscoll (LOD)

Coordinator: Assoc. Prof. D. D'Arcy

AIMS: To provide a continuation course in formulation and production, concentrating on sterile medicinal products and to enhance the students' understanding of the contribution of biotechnology to the development of therapeutics, outlining how bio-therapeutics are derived in the context of associated safety and quality systems. This course also considers the delivery and pharmacology of key bio-therapeutics, providing an overview of the bio-therapeutics value chain, *i.e.*, the route from discovery to the patients.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Explain the necessity for certain classes of excipients, packaging and labelling requirements with respect to formulation of the major classes of sterile products, such as injections, infusion fluids and eye drops
2. Perform appropriate calculations, labelling and excipient and packaging selection with respect to formulation of the major classes of sterile products, such as injections, infusion fluids and eye drops.
3. Discuss the methods of sterile product production including sterilisation methods and aseptic processing.
4. Outline common tests used and parameters measured in assessing the microbial/particulate quality of a sterile product and its environment, and of the sterilisation method used.
5. Describe the major therapeutic developments, applications and categories of biopharmaceuticals.
6. Recall how therapeutic proteins are formulated.
7. Describe test procedures and acceptance criteria for biotechnological/biological products.

INTEGRATION

Integration Level: 10 (Interdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Example 1, Example 4

Theme 2: Example 1

Theme 4: Example 1

Theme 5: Example 1



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Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU33106 – The high risk nature of sterile product manufacture, production and administration to the patient aligns with the risk management content of PHU33106. Also, the ophthalmic/nasal/aural product focus in PHU33106, and ophthalmic pharmacology in PHU33111 links with product categories in PHU33104.

Vertically across years

PHU11104, PHU22104, (PHU33106 –calculations), PHP55101: Continuing emphasis on pharmaceutical calculations and compounding commenced in these modules in year 1. Also, relevance of formulation types covered in PHU11104, PHU22104 to sterilisation methods and administration routes. Relevant content on manufacturing, quality and regulation is present in the Year 5 Industrial Pharmacy module.

PHU11106, PHU22106: Builds on foundation of medicine production, supply, regulation and clinical use introduced in years 1 and 2.

PHU22118: Advanced pharmaceutical biotechnology builds on Pharmaceutical Biochemistry and Biotechnology; sterilisation /aseptic processing advances downstream production knowledge

PHU22110: Pathogenic mechanisms of micro-organisms underpins sterility requirements

SYLLABUS

Material will be covered on the following topics: formulation, testing, sterilisation of pharmaceutical products; aseptic procedures; radiopharmaceuticals; biotherapeutics; biosimilars, regulatory aspects of biologics.

COURSE OUTLINE

Lectures, tutorials, practical laboratory classes, online coursework, site visit to NIBRT (if feasible).

UNIT A: INTRODUCTION TO FORMULATION, TESTING AND USE OF STERILE PRODUCTS

Lectures (9 hours)		Lecturer
1, 2	Introduction; definitions; products required to be sterile; examples of clinical consequences of contamination, official categories in BP	DD
3, 4	Formulation and packaging of parenteral products	DD
5	Calculation of isotonicity	DD
6-8	Formulation and packaging of ophthalmic products	DD
9	Tutorial	DD

UNIT B: PHARMACEUTICAL PROCESSING FOR STERILE PRODUCTS

Lectures (10 hours)		
10-15	Sterilisation concepts, procedures, validation, monitoring and testing	DD
16	Radiopharmaceuticals	LT
17	Introduction to hospital pharmacy aseptic services	DD/SS
18, 19	Clean room: concepts and principles of disinfection, sources of contamination, design	SS

ADDITIONAL DIRECTED STUDY-UNIT A and B (12 hours-examinable)



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This will involve the student being directed towards specific reference sources and reading material and the following topics are covered by the student outside of direct lectures.

These topics are examinable:

DD

1. **Pyrogens and endotoxins -handout provided**
2. **TOSL Video on formulation**
3. **TOSL Video on sterilisation**



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UNIT C: BIOTHERAPEUTICS

Lectures (13 hours)

20, 21	Biotherapeutics Introduction and production fundamentals	LOD/MT
22, 23	Cell and biotherapeutic product testing	LOD/MT
24-27	Antibody and enzyme production and use	LOD/MT
28, 29	Vaccine production and pharmacology	LOD/MT
30	Tutorial	LOD/MT
31	Formulation	CE
32	Plant Biotechnology	FB

Practical Classes and Online Learning Content (12 hours) UNITS A and B

1. Sterile Products (3 h)	DD
2. Sterile Products (3 h)	DD
3. Sterile Products (3 h)	DD
4. Sterile Products and gas/irradiation (Online coursework session) (3 h)	DD
5. Aseptic procedures –broth transfer trial (Aseptic Suite rotation) (2 h)	SS

SITE VISIT (3 hours) UNIT C

If timing facilitates:

Site visit to the National Institute for Bioprocessing Research and Training (NIBRT)

DIRECTED READING

European Pharmacopoeia/British Pharmacopoeia Martindale

Aulton's Pharmaceuticals. *The Design and Manufacture of Medicines*

Pharmaceutical Practice 5th Ed, Rees, Smith and Watson, Churchill Livingstone (2014)

Pharmaceutical Microbiology: Essentials for quality assurance and quality control. Sandle, T, Elsevier (2016)

(NB Accessible via library as **e-book**)

Hugo and Russell's Pharmaceutical Microbiology, 8th Ed., Denyer S., Hodges N.A. & Gorman S.P. (Eds.), Blackwell, Oxford (2011)

Theobald, A.E. (ed). 1989. *Radiopharmaceuticals using radioactive compounds in pharmaceuticals and medicine*. Ellis Horwood Ltd.

FDA and EU guides to production of sterile products – as indicated in lecture notes.

Crommelin DJA, Sindelar RD, Meibohm B. *Pharmaceutical Biotechnology: Fundamentals and Applications 5th Edition*, 2019. Springer.

Medical Biotechnology, 1st Ed. Pongracz J, Keen M (2008)

Crommelin, et al 'Pharmaceutical evaluation of biosimilars'. *Eur. J Hosp Pharm Sci* 11 (1): 11-17, 2005
Supplementary references as recommended by academic staff, including material provided via Blackboard.



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ASSESSMENT

Pass mark = 50% unless specified otherwise. See also Progression and Reassessment section.

<i>Component</i>	<i>Contribution to module grade</i>
Written examination Unit B-C: 2 hours:	
Unit B 1 case-based essay (40% of paper)	
Unit C 1 case-based essay 40%, 4-6 (approx.) MCQs (10-15% of paper, negative marking, +1/-0.25) and 1-2 (approx.) short answer questions (5-10% of paper). No choice in any section.	70%
Unit A test: 2 hours: 2-3 questions. Questions may include subsections.	25%
Continuous Assessment and online assignments (Unit B):	
Continuous Assessment of coursework and e-quizzes.	5%

SUMMARY OF HOURS

Lectures	Practicals/Site visit*	Tutorials	Contact hours	Assignment(s) and exams	Independent and guided study	TOTAL	ECTS
30	14*	2	46	8	146	200*	10

*(+3h if site visit feasible)

FURTHER INFORMATION

Plagiarism

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

There are submission deadlines for a number of assignments and tests in this module. Students must liaise with the module co-ordinator and academic staff member concerned regarding any late submissions. A penalty may apply as per school policy.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Assessment in this module consists of three components: Unit B-C written examination, Unit A test and continuous assessment. Students must satisfy the examiners in each component of the module independently.

The pass mark for the module is 50%, and the pass mark for each component is 50%. In addition to obtaining



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at least 50% in the module overall, students are expected to obtain at least the qualified fail mark in each of the components: Unit B-C written examination, Unit A test and continuous assessment. The qualified fail mark for the Unit B-C written examination is 40%. The qualified fail mark for the Unit A test and continuous assessment components is the pass mark, 50%. If a student attains a qualified fail, they must be reassessed in all components below the PASS mark.

Students who obtain less than 50% in the module:

A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat the year.

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities. This applies to the NIBRT site visit (if feasible) for this module.

Compensation

This module is not compensatable.



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PRACTICE OF PHARMACY III



Year 3 (Junior Sophister)

Semesters 1 and 2

MODULE CODE: PHU33106

10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. C. Ehrhardt (CE), Assoc. Prof. M. O'Dwyer (MO'D), Adj. Asst. Prof. K. Rossi (KR), Asst. Prof. T. Ryan (TR), Assoc. Prof. S. Ryder (SR), Assoc. Prof. C. Cadogan (CC), Asst. Prof. R. Parkin (RK), Adj. Asst. Prof. E. Deasy (ED), Adj. Asst. Prof. Claire Keane (CK), Adj. Asst. Prof. E. Lillis (EL), Adj. Asst. Prof. N. McMahon (NMCM), Adj. Asst. Prof. A. Walsh (AW), research postgraduate within the School (PG).

External contributors: COPD Ireland (COPD; includes patient), Diabetes Ireland (DI; includes patient), J. Wynne (TCD Careers Service; JWY), Asst. Prof. E. McGowan (Faculty of Health Sciences Asst. Prof. in Interprofessional Learning; EG), staff from TCD Medicine, Nursing and Midwifery, Physiotherapy, Occupational Therapy, Speech and Language Therapy, Human Nutrition and Dietetics (IPL), staff of Tallaght University Hospital Pharmacy Department (TUH), staff of St Vincent's University Hospital Pharmacy Department (SVUH), staff of Meagher's Pharmacy (MP), selected contributors representing a range of pharmacy career paths (EXT), staff of Pharmaceutical Society of Ireland (PSI).

Coordinator: Assoc. Prof. C. Cadogan

AIMS: This module aims to develop students' understanding and knowledge of pharmacy practice, particularly their appreciation of risk management, quality issues impacting upon pharmacy services, how pharmacy practice is integrated with the contributions of other healthcare professionals in multidisciplinary teams, legislation relevant to pharmacy practice, the practical issues associated with supplying and counselling patients on medicines, and veterinary pharmacy. It is also designed to develop students' personal and professional skills and to aid them in planning their careers.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Recognise, outline and critically discuss: the provision of pharmaceutical care to patients with psychological, neurological, gastro-intestinal, respiratory or endocrinology disorders or treatment needs including contraception; risk management processes and their implementation in a pharmacy setting; the comparative anatomy and physiology of selected animal species, the pharmacology of veterinary medicines and the formulation of selected veterinary medicinal products.
2. Outline and apply legislation relating to medicinal products, misuse of drugs, clinical trials, animal remedies, poisons, health and safety, data protection, advertising, family planning and methylated spirits.
3. Systematically collect, interpret and apply knowledge about patients, their conditions and their medicines, in order to undertake effective medication reconciliation, medication usage review and medication review, prepare a care plan, justify treatment recommendations and provide patient counselling, undertake brief interventions and dispense mock prescriptions in accordance with legal, clinical, administrative, ethical and professional requirements in a diverse range of patient case studies [more complex cases, requiring students to draw on a broader knowledge base, than those in preceding modules], demonstrating appropriate communication skills and accurate calculations where applicable.
4. Explain the roles of members of multidisciplinary healthcare teams in the management of selected patient cases, justify the need for effective teamwork and communication in patient care, and demonstrate these attributes when addressing patient cases in a multidisciplinary student group.
5. Discuss career options for pharmacists, develop a curriculum vitae, prepare for interviews and use a self-reflective



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approach to analyse personal motivations, values, interests and skills as a basis for devising a plan to meet personal development goals.

6. Demonstrate proficiency in undertaking pharmaceutical calculations applied to clinical practice
7. Demonstrate sustained commitment to professional development by continuing to maintain a reflective eportfolio comprising cyclical profiles of competence and learning needs, personal development plans, development activities and evidence of the competence/knowledge gained.

INTEGRATION

Integration Level: 10 (Interdisciplinary)

Present in the following Integration Schematics:

Theme 1: Example 1, Example 2, Example 3

Theme 4: Example 1

SYLLABUS

Material will be covered on the following topics: Legislation relating to pharmacy practice; communication skills, clinical interviewing and patient counselling; review and optimization of patients' medicines and their use; risk management; veterinary pharmacy; careers in pharmacy, personal and professional development; clinical skills; dispensing and patient care; continuing professional development.

COURSE OUTLINE

Lectures, tutorials, workshops, practical classes, online activities, interprofessional learning, workplace-focused learning.

Note: Due to timetabling constraints, the sequence of classes may differ from that below.

Lectures (32 hours)		Lecturer
1	Module overview and introduction	CC
2-4	Communication skills and brief interventions	KR
5-10	Misuse of Drugs legislation	SR
11-13	Dispensing procedures, medication errors and risk management	KR
14-16	Medicinal Products legislation	SR
17	Medicines use review and medication review	SR
18	Data protection legislation	RP
19	Clinical trials legislation	TR
20	Poisons legislation	RP
21	Health and safety legislation	TR
22	Family planning legislation. Methylated spirits legislation	SR
23, 24	Animal remedies legislation (1-2)	TR
25	Medication adherence	SR
26	Veterinary pharmacy	CC
27	Formulation of animal remedies	CE
28, 29	Contraception and post-coital contraception	TR
30	Calculations self-assessment	CC
31	Applied pharmaceutical calculations	CC
32	Introduction to inter-professional learning	RP
33	Advancing Pharmacy Practice: Conjunctivitis	KR



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Practical Classes / Workshops / Seminars (40 hours)

Workshop 3.1: Clinical skills – Counselling patients on POMs (2h)	CRo
Communication practical 3.1 (2h)	KR
Communication practical 3.2 (2h)	EL
Pharmaceutical care in neurology and mental health 1: Affective disorders (2h)	SR
Pharmaceutical care in neurology and mental health 2: Epilepsy (2h)	SR
Pharmaceutical care in neurology and mental health 3: Dementias (2h)	SR
Dispensing practical 3.1: Dispensing and Patient Care – Controlled drugs – Part 1 (2h)	CC/KR
Dispensing practical 3.2: Dispensing and Patient Care – Controlled drugs – Part 2 (2h)	CC/KR
Dispensing practical 3.3: Dispensing and Patient Care – Animal remedies (2h)	TR
Dispensing practical 3.4: Dispensing and Patient Care – Additional scenarios (2h)	CC/KR
Workshop 3.3: Clinical skills – Medication reconciliation and medicines use review in practice (2h)	SR
Workshop 3.5: Clinical skills – Medication review and pharmaceutical care planning (2h)	SR
Workshop 3.7: Clinical skills – Supporting patients to comply with their medication (2h)	KR/CC
Pharmacy practice practical test	CC/KR/TR
Workshop 3.8: Clinical skills: Hospital pharmacy practice (2h)	SR/ED/CK/TUH/SVUH
Workshop 3.9: Contraception-related scenarios (2h)	TR
Patient-led session 1: Diabetes	TR
Patient-led session 2: COPD	TR
Interprofessional learning: workshops (2 x 1.5h)	EMcG/MO'D/RP/IPL
Assessment by OSCE	Multiple contributors

Placement-related activities and career development (non-examinable material - for information purposes only)

1. Experiential learning in pharmacy practice settings (preparation for 4th year placement)	ENIS
2. Career planning and curriculum vitae	JWY
3. APPEL matching system (including Curriculum vitae and cover letter) (2hrs)	ENIS
4. Interview techniques and career progression 5-7. Global pharmacy perspectives	JWY/CE

Tutorials (5 hours)

Dispensing and patient care (5 x 1h)	CC/KR/TR
Applied pharmaceutical calculations – drop-in session	CC

DIRECTED READING

Legislation relevant to the course.

Kayne SB (2011). An Introduction to Veterinary Medicine: For Pharmacists and Suitably Qualified Persons, Saltire Books. Supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark = 50% unless specified otherwise. Each component must be passed independently; hence the qualifying mark criteria are the same as the pass mark criteria; there is no separate, lower qualifying mark.



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<i>Component</i>	<i>Contribution to module grade</i>
Examination 1.5 hours. 50 multiple choice questions (legislation material - no choice; negative marking, +1/-0.25) This examination takes place at the end of Semester 1.	50%
Continuous assessment assignment (Semester 1) This assignment will be set by Assoc Prof. Sheila Ryder	10%
Pharmacy practice practical test – (Semester 2) 1.5h examination duration. 3 questions (no choice; each will contain multiple parts).	
Must obtain minimum of 60% overall and no level 1 errors.	
- Level 1 error: Automatic failure of the entire test, irrespective of the marks awarded. Level 2 error: Zero marks for the question in which the error is made. - Level 3 error: Deduction of 41% of the maximum marks available for the question in which the error is made. - Level 4 error: Deduction of 20% of the maximum marks available for the question in which the error is made. - Level 5 error: Deduction of 10% of the maximum marks available for the question in which the error is made. - Level 6 error: Deduction of 5% of the maximum marks available for the question in which the error is made.	15%
Objective structured clinical examinations (OSCEs) – Semester 2	15%
Calculations Assessment - Semester 2 (25 MCQs, 70% pass mark) This examination takes place at the Semester 2 examination session.	10%
CCF Live 3 and reflective continuing professional development e-portfolio (minimum of 3 cycle per semester; 6 in total across the year)	---

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g. in the clinical pharmacy assessments linked to pharmacology and therapeutics components, Practice of Pharmacy theory papers, clinical skills exercises, dispensing and patient care evaluations, practical tests, competency assessments, OSCEs and the professional registration examination).

SUMMARY OF HOURS

Lectures	Practicals/ Workshops/Seminars	Tutorials	Placement/Career development	Contact hours	Independent and guided study	TOTAL	ECTS
33	42	6	8	88	151	240	10



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FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and assessments is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

The use of GenAI

The use of generative artificial intelligence (Gen AI) is not permitted for completing activities in this module because it is essential that students independently develop and demonstrate the knowledge and skills required for independent fulfilment of the learning outcomes. Identifying, interpreting, appraising, integrating and applying relevant information from appropriate sources (e.g. SPCs, guidelines, formularies) are core skills required by pharmacists. It is only after developing these skills through independent work that pharmacists can truly validate and critically appraise information they may encounter in practice, including that generated via AI.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate. However, all continuous assessment components must be completed even if the student is absent for a valid reason. It is the student's responsibility to obtain details of the assessment for the missed class(es) from the relevant staff member without delay, and to complete it on a self-study basis. The deadline for submission of the completed assessment to the relevant staff member is five days from the student's return to College (return date notified to staff member by tutor, based on certification as appropriate) unless otherwise agreed in advance with the relevant staff member. Where feedback on the assessment has already been provided to the class prior to submission, a penalty may be applied (deduction of up to 50% of the maximum marks available for the assessment), with the effect that marks for the assessment will not normally exceed the pass mark. See above for late submissions.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student may be returned as a 'qualified fail' (QF) and refused permission to progress with his/her class until he/she has satisfied the examiners in all components of the module. This may necessitate sitting a reassessment examination and/or repetition/(re)submission of one or more continuous assessment components (including submission of one or more alternative exercises that have been set to replace failed/missed continuous assessment components). In such circumstances, while the marks attained in a supplemental theory examination will not be capped, penalties may be applied to continuous assessment components including supplemental practical tests (deduction of up to 50% of the maximum marks available for the relevant element(s)), with the effect that marks for such elements will not normally exceed the pass mark. This is separate from, and in addition to, any penalties imposed for level 1 to level 6 errors in the pharmacy practice practical test. (See 'Assessment' above.)



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Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities, etc.).

Compensation

This module is not compensatable.



ENDOCRINE & REPRODUCTIVE PHARMACOLOGY AND CLINICAL THERAPEUTICS



Year 3 (Junior Sophister)
Semester 2

MODULE CODE: PHU33109
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. M.J. Santos-Martinez (MSM), Asst. Prof. T. Ryan (TR), Dr. Melissa Tutty, (MT), Prof. L. O'Driscoll (LOD)

External contributors: NA

Coordinators: Prof. L. O'Driscoll

AIMS: This module aims to provide the student with knowledge of the health sciences relevant to the use of drugs and medicines in endocrinology and reproductive endocrinology.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Critically discuss the normal and abnormal functioning of the endocrine and reproductive systems, the tests and procedures used to assess those conditions and the role of drugs in the treatment of endocrine-related conditions and malignancies
2. Apply pharmacological knowledge regarding the endocrine and reproductive systems to case studies describing patients experiencing these conditions
3. Demonstrate pharmaceutical care

INTEGRATION

Integration Level: 9 (Multidisciplinary)

Present in the following Integration Schematics:

Theme 2: Example 1

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU33103 – Links to sources and properties of drugs which are produced from natural sources PHU33106 – Links to therapeutics and pharmacy practice

PHU33110, PHU33111, PHU33112 – Links to understanding of structure/medicinal chemistry/ mechanism of



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action of drugs for treatment of respiratory, gastrointestinal, immune system, eye and CNS disease management

Vertically across years

PHU44102 – Application of pharmaceutical/medicinal chemistry in contemporary drug design, discovery and development

PHU22102 – Understanding the metabolism and pharmacodynamic-pharmacokinetics characteristics of drugs used for indications affecting the endocrine and/or reproductive system

PHU44106, PHP55220 – Providing basis for practice and therapeutics of endocrine and/or reproductive system disorders, medication safety and rational use of medicines

PHU44112 – A knowledge of endocrine and/or reproductive system disorders, tests and treatments for the same, will prepare students for research projects on these topics.

SYLLABUS

Material will be covered on the following topics: pharmacology and clinical therapeutics in reproductive endocrinology, diabetes, growth hormone, thyroid and parathyroid hormones, hormones of the adrenal glands, hormones of the gastro-intestine, and malignancies associated with the oestrogen receptor and the androgen receptor.

COURSE OUTLINE

Lectures, practical classes, online case studies followed by face-to-face feedback sessions.

Lectures (18 hours)		Lecturer
1	Module overview, Introduction to Endocrinology, Mechanisms of hormone action	LOD
2-4	Hypothalamus & pituitary gland; abnormalities, test and treatment	LOD
5	Growth & Growth Hormone: abnormalities, tests and treatment	LOD
6	Adrenal gland: abnormalities, tests and treatment	LOD
7	Bone metabolism & bone diseases	MSM
8-9	Reproductive endocrinology	MSM
10-11	Thyroid & parathyroid glands; abnormalities, test and treatment	LOD
12	Endocrine pancreas	LOD
13	Type 1 diabetes: including symptoms & tests	LOD
14	Type 2 diabetes: including symptoms & tests	LOD
15	Insulins: formulations & delivery	LOD
16	Oral hypoglycaemics	LOD
17-18	Hormonal contributions to malignancy & associated treatment	LOD
Practical/Workshop (3 hours)		
Drugs and devices for treatment of diabetes		TR



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Tutorials (1 hour each, 2 hours total)

Feedback on Continuous Assessment 1	MSM
Feedback on Continuous Assessment 2	tbc

DIRECTED READING

Goodman and Gilman's The Pharmacological Basis of Therapeutics, 12th Edition, 2010. *Kumar & Clark Clinical Medicine*, 10th Edition, 2020.

Rang and Dale's Pharmacology by James Ritter, Rod Flower, Graeme Henderson, Yoon Kong Loke, David MacEwan & Humphrey Rang., 9th Edition, 2020.

Walker & Whittlesea (Eds), *Clinical Pharmacy and Therapeutics*, 5th edition, 2011. *Brody's Human Pharmacology: Molecular to Clinical* (4th Ed.) by K.P. Minneman Supplementary references as recommended by academic staff

ASSESSMENT

Pass mark for this module = 50%.

The pass mark for each component (exam paper, continuous assessment) is 50%. The qualifying mark is 40%.

Component	Contribution to module grade
Written examination 2 hours: including case-based essay-type questions (equal marks) and MCQs (+1/-0.25)	70%
Continuous assessment: online, group work on two case studies (GenAI use not permitted)	30%

NB. If a student attains a qualified fail, they must be reassessed in all components below the PASS mark.

Students who obtain more than 40% (the qualifying mark) in either the written or continuous assessment components but less than 50% will be considered to have failed the component but may compensate within the module if their overall mark is greater than 50%.

Students who fail the written requirement (i.e., less than 40%) of the formal University assessment session will be required to sit a reassessment session.

Students who fail the continuous assessment (i.e., less than 40%) will be required to re-submit (parts of) the continuous assessment.

Students who fail the module (i.e., less than 50%) will be required to sit a reassessment session and may be required to re-submit (parts of) the continuous assessment.

SUMMARY OF HOURS

Lectures	Practical/Workshop	Tutorials	Total contact	Continuous Assessment	Guided study	Annual Exam	TOTAL	ECTS
18	3	2	23	8	77	2	110	5



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FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50%. See 'Assessment' above. Students

should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardise successful completion of the module.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components and must be reassessed in the component(s) below the relevant qualifying fail mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is compensatable (if all qualifying marks have been met).



RESPIRATORY AND GASTROINTESTINAL SYSTEMS & CLINICAL THERAPEUTICS



Year 3 (Junior Sophister)
Semester 1

MODULE CODE: PHU33110
10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. D. D'Arcy (DD), Prof. J. Gilmer (JG), Prof. A.M. Healy (AMH), Assoc. Prof. C. Medina (CM), Assoc. Prof. N. O'Boyle (NB), Mrs K. Rossi (KR), Assoc. Prof. M.J. Santos-Martinez (MSM), Assoc. Prof. A. Sasse (AS).

Coordinator: Assoc. Prof. C. Medina

AIMS: This module seeks to support learning of the basic pathophysiological principles of gastrointestinal and respiratory tract diseases and acquire knowledge of drug delivery, pharmaceutical chemistry and pharmacological use of drugs used in these conditions.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Describe the basic anatomy, physiology and functions of the respiratory and gastrointestinal (GI) systems
2. Differentiate and classify selected respiratory and gastrointestinal diseases
3. Describe the pathology/symptoms, diagnostic tests and treatment for different respiratory and gastrointestinal diseases
4. Explain the discovery, structure-activity relationships, mechanism of action and delivery of drugs used in the treatment of respiratory and gastrointestinal conditions
5. Demonstrate from structural formulae an ability to identify and classify the major steroidal cholesterol metabolites in man and their analogues used in medicine
6. Demonstrate competence in the practical laboratory techniques used in the analysis and characterization of pharmaceutical materials used in GI and respiratory medicine
7. Demonstrate the ability to produce a poster presentation as part of a small team that integrates multiple pharmaceutical facets of a GI or respiratory disease management, prevention or treatment
8. Apply knowledge to individual patient case studies
9. Demonstrate the delivery of pharmaceutical care.

INTEGRATION

Integration Level: 10 (Interdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Example 4

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1



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Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU33103 - Links to sources and properties of drugs which are produced from natural sources

PHU33109, PHU33111, PHU33112 - Links to understanding of structure/medicinal chemistry/ mechanism of action of drugs for treatment of respiratory and gastrointestinal disease management

Vertically across years

PGU11006 – Links to understanding the physiology of the GI and respiratory systems PHU11109 – Provides basis for drug design, development and testing.

PHU22101 – Links to understanding fundamental pharmaceutical and bioorganic chemistry of the materials used in medicines

PHU22110 - Links to understanding the inflammatory process involved in GI and respiratory diseases, such as inflammatory bowel disease and asthma

PHU44102 – Links to understanding of drug structure, medicinal chemistry, structure/activity relationships with more complexity

PHU22102, PHU44106 – Links to understanding pharmacokinetics and drug metabolism

PHU44106, PHP55220 – Provides basis for practice and therapeutics of GI & respiratory disorders, safe and rational use of medicines.

PHU44112 – Literature review and practical work on GI & respiratory topics PHP55104 – Provides basis of pulmonary drug delivery and inhalation aerosols

SYLLABUS

Material will be covered on the following topics: pharmaceutical chemistry, pharmaceuticals, pharmacology and clinical therapeutics of respiratory and gastrointestinal systems.

COURSE OUTLINE

Lectures, seminars, online teaching, practical laboratory classes and continuous assessment activities.

Lectures (38 hours)		Lecturer
1	Introduction/practicals	CM/AS
2	Introduction to Continuous Assessment eLearning Case Studies, Clinical Pharmacy Assessment and Interprofessional education (IPE) activities	MSM
3	Anatomy, physiology and pathophysiology of the respiratory system	MSM
4-6	Drug delivery by inhalation I-III	AMH
7-8	Anticholinergics I-II	JG
9	Beta-adrenergics	NB
10-12	Bronchodilators I-III	MSM
13	Introduction to steroid chemistry	AS
14	Steroid chemistry	AS
15	Adrenocorticoids: Introduction	JG



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16	Glucocorticoids, SAR, classification, genomic & non genomic responses	AS
17	Inhaled corticosteroids & allergic reactions	MSM
18	Histamine H1 receptor antagonists	JG
19	Biologics & Leukotriene antagonists	MSM
20	Allergen immunotherapy	MSM
21	Antitussives, mucolytics, expectorants and pulmonary surfactants	MSM
22	Introduction to GIT/Control of acid secretion	CM
23	Antacids	JG/CM
24	Cytoprotective agents	CM
25, 26	H2 receptor antagonists	JG/CM
27	Proton pump inhibitors (PharmChem)	NB
28	Proton pump inhibitors (Pharmacol)	CM
29	Peptic ulcer disease	CM
30	GORD	CM
31	Anti-emetics	CM
32	Constipation	CM
33	Diarrhea/Adverse food reactions	CM
34	IBS	CM
35	IBD	CM
36	Liver pharmacology	CM
37	Liver and drug clearance	DD
38	Hepatic disease and Pharmacokinetics	DD

Practical Classes / Workshops / Seminars (12 hours)

Pharmaceutical Chemistry Practical: Omeprazole stability (2h)	NB
Pharmaceutical Chemistry Practical: Salbutamol MDI evaluation (1.5h)	AS
Workshop: Inhalers (1 hour guided preparation, 1 hour demo)	MSM
Seminar: Asthma (1 hour guided preparation, 1 hour seminar)	MSM
Seminar: COPD (1 hour guided preparation, 1 hour seminar)	MSM
Workshop: Adrenaline injection (1 hour guided preparation and 30 mins demo)	KR/MSM
Interprofessional education (IPE): management of a respiratory patient (2h)	MSM/
Poster presentation (30 min)	All

Tutorials (3 hours)

Feedback on Respiratory Case Studies (1h)	MSM
Feedback session on GIT Case Studies (1h)	TBC
End of module tutorial (1h)	All

DIRECTED READING – will be indicated, as relevant at each lecture.

ASSESSMENT

Pass mark: 50%

Qualifying mark: 40%



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Component

Contribution to module grade

Written examination (2 hours):

- Section A: 3 Long questions (20 marks each, weighting of 60%) 75%
- Section B: 20 MCQs (negative marking will apply, +2/-0.5, weighting of 40%)

Continuous assessment (the use of GenAI is not allowed)

- e-learning Case Studies (10%) 25%
- Practical Continuous Assessment (7.5%)
- Poster Presentation (7.5%)

Students who obtain more than 40% (the qualifying mark) in the written or continuous assessment components but less than 50% will be considered to have failed the component but may compensate within the module if their overall mark is greater than 50%.

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme.

SUMMARY OF HOURS

Lectures	Practical/Workshop/ Seminars	Tutorials	Contact hours	Assignments	Independent and guided study	TOTAL	ECTS
38	12	3	53	31	116	200	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50%. See 'Assessment' above. Students

should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate. Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work may jeopardise successful completion of the module.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components and must be reassessed in the component(s) below the relevant qualifying fail mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.



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Non-satisfactory reports

Students whose attendance is non-satisfactory may be reported to the Senior Lecturer and may be required to repeat the year.

Compensation

This module is compensatable.



MALIGNANT DISEASE, IMMUNE & OCULAR SYSTEMS AND CLINICAL THERAPEUTICS



Year 3 (Junior Sophister)
Semester 2

MODULE CODE: PHU33111
10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. C. Cadogan (CC), Prof. J. Gilmer (JG), Asst. Prof. O. Gobbo (OG), Assoc. Prof. C. Medina (CM), Assoc. Prof. N. O'Boyle (NB), Prof. L. O'Driscoll (LOD), Prof. N. Panoskaltsis (NP), Asst. Prof. R. Parkin (RB), Assoc. Prof. M.J. Santos-Martinez (MSM), Assoc. Prof. A. Sasse (AS), Asst. Prof. S. Smith, (SS), Asst. Prof. S.N. Smith (SNS), Assoc. Prof. J. Walsh (JW)

External contributors: Felicity McDonnell (FMD), Jennifer Dwyer (JD), Caoimhe O'Boyle (CB)

Coordinator: Assoc. Prof. A. Sasse

AIMS: The student will acquire knowledge of the health sciences relevant to the discovery, analysis and use of drugs and medicines in the treatment of malignancy, and immunological disorders. The student will acquire knowledge of drug delivery, pharmaceutical chemistry and pharmacological use of drugs relevant to the pharmaceutical care of patients with selected conditions.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Demonstrate the ability to recognise cancer symptoms
2. Discuss the prevention of most frequent types of cancer in Ireland
3. Identify and classify important anti-cancer drugs and drugs used in immunotherapy from their structural formulae
4. Discuss the principles of chemotherapy of cancer, including molecular mechanisms of action, chemical principles governing activation, uptake and metabolism, and the approaches used to minimise side effects and maximise efficacy
5. Apply principles of palliative care when appropriate
6. Explain the abnormal functioning of the immune system
7. Describe the basic anatomy and physiology of skin and eyes
8. Recognise skin and ocular symptoms and differentiate between eczema and psoriasis
9. Explain the physicochemical properties of drugs that influence skin residence, penetration, metabolism
10. Demonstrate competence in specialised practical laboratory techniques used in the analysis of pharmaceutical products.
11. Demonstrate the ability to interpret, evaluate, and present a research paper
12. Demonstrate pharmaceutical care

INTEGRATION

Integration Level: 10 (Interdisciplinary)

Present in the following Integration Schematics (*inter alia*):



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Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU33103 – Links to sources and properties of drugs which are produced from natural sources
PHU33109/10/12 – Links to understanding of structure/medicinal chemistry/mechanism of action/basic pharmacokinetics/pharmacology of drugs for treatment of endocrine, reproductive, respiratory, gastrointestinal and CNS disease management.

Vertically across years

PHU11109/PHU22110/11 – Provides basics of general pharmacology, immunology and cardiovascular pharmacology. PHU11101, PHU22101 – Provides basics of organic and analytical chemistry, underpinning topics taught in this module.

PHU44102 – Application of pharmaceutical/medicinal chemistry in drug design, discovery and development of medicines

PHU22102, PHU44107 – Links to understanding pharmacokinetics and drug metabolism

PHU44107, PHP55220 – Provides basis for practice and therapeutics of eye and skin disorders, safe and rational use of medicines.

PHU44112 – Literature review, communication and oral presentation skills.

SYLLABUS

Material will be covered on the following topics: pharmaceutical chemistry, pharmacology and clinical therapeutics of cancer pathogenesis, cytotoxic drugs, chemotherapy, palliative care, immunosuppression and -stimulation, dermatology, and ophthalmology.

COURSE OUTLINE

Lectures, seminars, tutorials, literature presentation, online assignments and practical laboratory classes.

Lectures (34 hours)			Lecturer
TREATMENT OF MALIGNANT DISEASE			
0	Introduction to the Module		AS/NP/MSM
1	Cancer pathogenesis	Pharmacol	CM
2	General principles of action of cytotoxic drugs	Pharmacol	CM
3	Types of cancer: solids and non-solids	Pharmacol	CM
4	Main types of solid cancers in Ireland	Pharmacol	CM
5	Mechanism of action and molecular targets of alkylating agents	PharmChem	NB



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6	Alkylating agents (cisplatin) and anthracycline antibiotics	PharmChem	NB
7	Anti-metabolites	PharmChem	NB
8	Kinase inhibitor medicinal chemistry and immunotherapy development I	PharmChem	JG
9	Kinase inhibitor medicinal chemistry and immunotherapy development II	PharmChem	JG
10	Vinca alkaloids and anti-mitotics	Pharmacog	JW
11	Pharmacology of alkylating agents	Pharmacol	LOD
12	Pharmacology of anti-tumour antibiotics	Pharmacol	LOD
13	Pharmacology of anti-metabolites and plant derivatives	Pharmacol	LOD
14	Androgens	PharmChem	AS
15	5 α -Reductase inhibitors / aromatase inhibitors	PharmChem	AS
16	Oestrogens	PharmChem	AS
17	Progestins	PharmChem	AS
18	Breast & prostate cancer clinical cases	Pharmacol	CM
19	Biological response modifiers	Pharmacol	CM
20	Haematopoiesis and precision therapeutics for blood cancers	Pharmacol	NP
21	Treatment of side effects of chemotherapy	Pharmacol	CM
22	Palliative Care	Pharmacol	CC
IMMUNOLOGY			
23	Immune system and cytokines	Pharmacol	SS
24	Potential toxicities of immunotherapy: The case of TGN1412	Pharmacol	NP
25	Cell Therapeutics as "Living Drugs"	Pharmacol	NP
26	Hypersensitivity states & treatments	Pharmacol	SS
27	Immunosuppression I	Pharmacol	CM
28	Immunosuppression II	Pharmacol	CM
DERMATOLOGY			
29	Dermatopharmacology I	Pharmacol	OG
30	Dermatopharmacology II	Pharmacol	OG
31	Dermatopharmacology III	Pharmacol	OG
32	Dermatochemistry	PharmChem	NB
OPHTHALMOLOGY			
33	Ocular Pharmacology I	Pharmacol	OG
34	Ocular Pharmacology II	Pharmacol	OG
Practical Classes / Workshops / Seminars (17 hours)			
Seminars (6 hours total)			
Cancer chemotherapy (1 hr)			FMD (Ext)
Immunology/Liver Transplants (2 hrs)			JD (Ext)
Practical aspects of drug treatment in eczema and psoriasis (2 hrs)			CB (Ext.)
Clinical cases – A Pharmaceutical Chemist's Perspective (1 hr)			AS
Practicals (5 hours total)			
Anti-metabolite chemistry (quantification by extraction) - 3 hrs			AS
Hydrocortisone Specifications – 2 hrs			AS
Online Case Study Feedback Sessions (2 hrs)			



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Clinical case study: Cancer	NP
Clinical case study: Immunology/Dermatology	NP
Mock CPA (online)	
CPA Feedback session (1 hr)	RP/MSM
Literature Presentation (3 hours)	SNS/JG/CM/MSM/NB/OG/CC/NP

Oral presentation (10 min plus 5 min discussion) in pairs of a research paper on a topic in cancer drug development/medicinal chemistry/immunology/dermatology/ ophthalmology.

TUTORIALS – *Tutorials may be scheduled on request.*

DIRECTED READING – *Will be indicated, as relevant at each lecture.*

ASSESSMENT

The pass mark for this module is 50%.

Component	Contribution to module grade
Written examination 2 hours (Pass mark is 50%, Qualifying mark is 40%) Section A: 3 Long questions (20 marks each, weighting of 60%) Section B: 20 MCQ (negative marking will apply, +2/-0.5, weighting of 40%)	70%
Continuous Assessment (Pass mark is 50%, Qualifying mark is 40%) Online case studies (10%) – GenAI use <u>not</u> permitted. Capped at pass mark in case of late submission. Lab reports and practical CA (5%) Literature presentation (5%)	20%
Clinical Pharmacy Assessment, CPA (MSM/RP) (Pass mark is 50%, Qualifying mark is 50%) <i>This is a combined assessment of PHU33109, PHU33110, PHU33111 and PHU33112. It is an “open book” examination that includes case studies based on topics covered in 2nd and 3rd year modules. Students are required to demonstrate knowledge and understanding of the case study (which may include clinical pharmacology, pharmaceutical chemistry, and practice of pharmacy: management and goals of therapy for a given disease state; parameters to be monitored/assessed; structure- activity relationships; mechanism of action, side effects, contraindications and/or interactions of therapeutic agents; patient/carers counselling). The use of GenAI is not permitted for the CPA.</i>	10%
NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme (e.g., in PHU11109, PHU22101/10/11, PHU33103/9/10/12).	

SUMMARY OF HOURS

Lectures	Practical/Seminars/ Feedback	Contact hours	Assignments Assessment	Exam	Independent and guided study	TOTAL	ECTS
34	17	51	22	2	125	200	10



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FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for the written examination and all other assessment components is 50%. See 'Assessment' above. The continuous assessment component consists of online case studies, lab reports and a literature presentation, which do not need to be passed individually. The combined mark for this continuous assessment component has a pass mark of 50% and a qualifying mark of 40%. It is a requirement to pass the Clinical Pharmacy Assessment (pass mark is 50%, no compensation is possible for this component).

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardise successful completion of the module.

Students who are unable to attend a practical class for a valid reason, may be re-scheduled within term-time. If this is not possible, students may still submit the lab report for one missed practical per term.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components and will then be reassessed in all components below the pass mark of 50% (this applies even to components that are between the qualifying mark and the pass mark). A student who achieves an overall module mark less than 50% will be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory attendance

Students whose attendance is non-satisfactory may be reported to the Senior Lecturer and may be required to repeat the year.

Compensation

This module is compensatable (if all qualifying marks have been met).



NEUROPHARMACOLOGY & CLINICAL THERAPEUTICS



Year 3 (Junior Sophister)
Semester 1

MODULE CODE: PHU33112
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. A. Harkin (AH), Assoc. Prof. S. Ryder (SR).

Coordinator: Prof. A. Harkin

AIMS: To teach the principles of neuropharmacology and drug therapies for disorders of the central nervous system.

LEARNING OUTCOMES: On successful completion of this module the student will be able to:

1. Discuss the diagnostic criteria and symptom presentation, biological basis and drug treatment of affective and anxiety disorders, insomnia, schizophrenia, drug dependence, pain, epilepsy, Parkinson's and Alzheimer's disease.
2. Describe the mechanisms of action and clinical uses of local and general anesthetic drugs
3. Identify the pharmacokinetic characteristics and adverse effects associated with antidepressant, mood stabilizing, anxiolytic, hypnotic, analgesic, anesthetic, anticonvulsant, anti-Parkinsonian and cognitive enhancing drugs
4. Discuss the neurobiological theory of CNS disorders and neurobiological adaptation to psychotropic drugs
5. Provide examples of recent advances in the drug treatment of CNS disorders.
6. Apply pharmacological knowledge regarding the central nervous system to case studies describing patients experiencing neurological conditions.
7. Demonstrate pharmaceutical care

INTEGRATION

Integration Level: 7 (Correlation)

Present in the following Integration Schematics:

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU33103 – Links to sources and properties of drugs which are produced from natural sources PHU33106 – Links to therapeutics and pharmacy practice



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PHU33109, 3110, 3111 – Links to understanding of structure/medicinal chemistry/ mechanism of action of drugs for treatment of endocrine, reproductive, respiratory, gastrointestinal and CNS disease management

Vertically across years

PHU11109 – General principles of pharmacology, drug targets, pharmacokinetics, biochemical basis of neuropharmacology

PHU44102 – Application of pharmaceutical/medicinal chemistry in drug design, discovery and development of medicines

PHU22102, PHU44106 – Identification of pharmacodynamic-pharmacokinetics characteristics of CNS acting drugs, examples of drug treatments and therapeutic drug monitoring

PHU44106, PHP55220 – Provides basis for practice and therapeutics of CNS disorders, safe and rational use of medicines.

PHU44112 – Review of recent advances in drug treatment and CNS drug development prepared students for research project.

PHP55108 – Provides understanding of the neurobiological basis of drug dependence

SYLLABUS

Material will be covered on the following topics: Diagnostic criteria, symptom presentation, biological basis and drug treatment of affective and anxiety disorders, insomnia, schizophrenia, drug dependence, pain, epilepsy, Parkinson's and Alzheimer's disease.

COURSE OUTLINE

Lectures and online case studies followed by feedback.

Lectures		AH
1, 2	Depression	
3	Antidepressants	
4	Mood stabilizers - Lithium	
5	Anxiety disorders	
6	Anxiolytics	
7	Hypnotics	
8	Schizophrenia	
9	Antipsychotics	
10	Neuropharmacology of drugs of abuse	
11	Anaesthetics (Local)	
12	Anaesthetics (General)	
13	Epilepsy	
14,15	Anticonvulsant drugs	
16	Pain – nociception, spinal and supra spinal pain pathways	
17, 18	Parkinson's disease and anti-parkinsonian drugs	
19	Alzheimer's disease and drug treatment of Alzheimer's disease	
20	Brain ischemia and neuroprotection	



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Clinical presentation/Case study (3 hours each)

Clinical Case, presentation	AH/SR
Clinical Case, pharmaceutical care	AH/SR
Completion of interprofessional learning (IPL) activity	AH

DIRECTED READING

Rang and Dale's Pharmacology (10th Ed.) by James Ritter Rod Flower Graeme Henderson Yoon Kong Loke David MacEwan, Emma Robinson, James Fullerton. Elsevier (2023)

Brody's Human Pharmacology. Mechanism-Based Therapeutics (6th Ed) by Lynn Wecker Elsevier (2019) Clinical Medicine, Kumar & Clark (Eds), 11th Edition, 2025.

Clinical Pharmacy and Therapeutics, Whittlesea & Hodson (Eds). 6th edition, 2018. Elsevier. Fundamentals of Psychopharmacology (3rd Ed.) by B. Leonard

Goodman and Gilman's The Pharmacological Basis of Therapeutics (14th Ed.) 2023

Molecular Neuropharmacology: A Foundation for Clinical Neuroscience (4th Ed.) 2020. by E.J. Nestler, Paul J. Kenny, Scott J. Russo, Anne Schaefer

The Biochemical Basis of Neuropharmacology (8th Ed.) by J.R. Cooper, F.E. Bloom, R.H. Roth

ASSESSMENT

Pass mark = 50% unless specified otherwise

<i>Component</i>	<i>Contribution to module grade</i>
Written examination in two sections. Section I: Multiple choice questions. Answer all questions (2% for each correct answer; 40% in total) Negative marking applies (Correct answer = +2; unanswered = 0; Incorrect answer = -0.5) Section II: Short essay questions. Answer 3 out of 4 questions (20% for each answer; 60% in total)	70%
Continuous assessment (2 assignments 15% each) (Coordinators Assoc. Prof. S. Ryder and Prof. A. Harkin) Assessments are based on topics covered in the module. Students are required to demonstrate knowledge and understanding of a case study (including clinical pharmacology and practice of pharmacy: management and goals of therapy for a given disease state; parameters to be monitored/assessed; mechanism of action, side effects, contraindications and/or interactions of therapeutic agents; patient/carer counseling).	30%

SUMMARY OF HOURS

Lectures	Tutorials	Total contact	Case studies	Reports	Guided study	TOTAL	ECTS
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21

2

29

6

9

70

110

5

FURTHER INFORMATION

Pass mark, progression and reassessment

The pass mark for PHU33112 is 50%. The qualifying mark (see below) is 50% for the continuous assessment (case study and IPL) and 40% for the theory paper. To pass the module, it is compulsory to attain the qualifying mark in every component and to achieve an overall module mark of at least 50%. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall mark of at least 50% but less than the qualifying mark in one or more components. A student who achieves an overall module mark of less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Plagiarism

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

The use of GenAI

The use of Gen AI for clinical case study, pharmaceutical care and interprofessional learning assignments and Clinical Pharmacy Assessment as per PHU33111 is not permitted.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Non-satisfactory attendance

Students whose attendance is non-satisfactory may be reported to the Senior Lecturer and may be required to repeat the year.

Compensation

This module is compensable (if all qualifying marks have been met).



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13. SENIOR SOPHISTER (4th YEAR)

Module details may be subject to corrections/amendments. The School reserves the right to amend the list of available modules and to withdraw and add modules.

- *It is each student's responsibility to be aware of dates, times, locations, etc. of lectures, tutorials, seminars and practical classes.*
- *Reports, continuous assessments and laboratory notebooks must be presented for assessment by the dates specified by the examiner.*
- *Reports, continuous assessments and laboratory notebooks submitted after the specified dates will be treated in accordance with the **B.Sc. (Pharmacy) and M.Pharm. Late Submission Policy** and the College's **Policy on Late Submission of Assessments (Extension Policy)**.*

PRE-REQUISITE: Successful completion of Junior Sophister (Year 3)



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13.1. SENIOR SOPHISTER MODULES

Code	Module Coordinator	Module Title	ECTS
PHU44000		Year 4 Administration	—
PHU44101	Theo Ryan (TR)	Professional Development and Communication – Service Development	5
PHU44202	Rebecca Parkin (RP)	Medicines Optimisation in Practice	5
PHU44303	Eimear Ní Sheachnasaigh (ENÍS)	Developing Competency through Experiential Learning	20
PHU44102	John Gilmer (JG)	Advanced Pharmaceutical Chemistry, Drug Discovery & Design	5
PHU44106	Cristín Ryan (CRy)	Evidence Informing Practice	10
PHU44112	Lorraine O'Driscoll (LOD)	Senior Sophister Capstone Research Project	15



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PROFESSIONAL DEVELOPMENT AND COMMUNICATION – SERVICE DEVELOPMENT



Year 4 (Senior Sophister)
Semester 1

MODULE CODE: PHU44101
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Asst. Prof. Theo Ryan (TR); Ms. Karen Rossi (KR); Assoc. Prof. Máire O'Dwyer (MO'D); Asst. Prof. Rebecca Parkin (RP); Asst. Prof. Juliette O'Connell (JO'C); Prof. Lorraine O'Driscoll (LO'D)

Coordinator: Dr. Theo Ryan

AIMS: This module aims to help students develop their knowledge, skills and behaviours in pharmacy service development across the PSI's CCF, particularly for Domain 1 (Personal), Domain 2 (Professional), Domain 3 (Organisation and Management Skills) and Domain 5 (Public Health).

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Participate in accordance with the competencies and behaviours identified in the PSI's CCF, particularly Domain 1 (Personal), Domain 2 (Professional), Domain 3 (Organisation and Management Skills) and Domain 5 (Public Health) for pharmacy services
2. Describe the processes involved in the development and provision of professional services, including various vaccination services, by pharmacists
3. Integrate knowledge, skills and behaviours to ensure safe, effective and ethical pharmacy service practice
4. Tailor interpersonal communication skills for patients with diverse health literacy backgrounds and healthcare needs, carers and healthcare workers in various pharmacy service contexts
5. Develop and work within documented policies and procedures required in pharmacy service development and implementation
6. Critically evaluate the leadership, professional and personal skills required to develop, promote and implement pharmacy services

INTEGRATION

Integration Level: 11 (transdisciplinary)

Horizontally within the year:

PHU44106 – Evidence Informing Practice

Vertically across years:

PHU22110 – Molecular and Chemotherapeutic Pharmacology and Clinical Therapeutics PHU33104 – Sterile Products & Advanced Pharmaceutical Biotechnology



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Linking with all other practice-based modules in the PHxxx106 sequence where topics are iteratively addressed with progressive complexity (e.g., patient care cases).

NOTE ON THE USE OF INDEPENDENT WORK AND ARTIFICIAL INTELLIGENCE (AI) IN ASSIGNMENTS

Students will be assessed based on their own **independent work**.

Collaboration with other students on submitted assignments and examinations is not permitted and will be treated as **plagiarism**.

If **AI of any kind** is used in the completion of assignments, students are required to include a declaration in their submission which describes:

- The names of the platform(s) used
- The prompt(s) entered
- A copy of the output generated by the AI – copied and pasted verbatim
- A comprehensive description of how this output was interpreted, used or helped you to formulate your **own independently developed** submission.

Any cases of undeclared use of AI will be treated as suspected plagiarism.

SYLLABUS & COURSE OUTLINE

Learning Units (Weeks 1-5)

Learning Units		Lecturer
	Introductory lecture	TR
1	Vaccine production for human use	LO'D
2	Leadership in pharmacy-based vaccination services	KR
3	Effective communication in pharmacy-based vaccination	KR
4	Provision of vaccine services by pharmacists – PSI guidance	TR
5	Vaccination – pre-administration, administration and post-administration phases	TR
6	Ensuring vaccine safety in pharmacy practice	KR
7	Influenza vaccination	TR
8	COVID-19 vaccination	TR
9	Common Conditions Service Protocol – Shingles	TR
10	Varicella (chicken pox) and herpes zoster (shingles) vaccination	TR
11	Pneumococcal vaccination	RP
12	Childhood vaccination schedule	RP
13	Travel vaccination and travel advice 1	JO'C
14	Travel vaccination and travel advice 2	JO'C

Directed Learning

Material presented within each learning unit to be provided to students.



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SUMMARY OF HOURS

Online	Directed Study	Self-directed Study	Continuous Assessment	Total	ECTS
11	18	32	40	101	5

ASSESSMENT

Pass mark = 50% (no compensation)

Summative Assessment [100%]

- Written Presentation Skills [40%]
- Oral Communication Skills [60%]

[Comprising PowerPoint presentation and audio voice-recording, explaining and justifying all the important aspects of a patient vaccination consultation, including patient details, clinical checks and patient informed consent]

Learning activities and assessment will be guided by separate detailed rubrics, which will be provided at the start of the module.

Specific assessment instructions will be released at the beginning of Week 6.

NB: Students will be expected to draw upon knowledge and skills gained both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme.

Compensation

This module is not compensable.



School of Pharmacy & Pharmaceutical Sciences

MEDICINES OPTIMISATION IN PRACTICE



Year 4 (Senior Sophister)
Semester 1

MODULE CODE: PHU44202
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof Cristín Ryan (CR); Assoc. Prof. Máire O'Dwyer (MOD); Asst. Prof. Rebecca Parkin (RP); Asst. Prof. Juliette O'Connell (JOC)

Coordinator: Asst. Prof. Rebecca Parkin

AIMS: This module aims to contextualise the elements of medicines optimisation (MO) across all pharmacy practice settings and in reference to the PSI's CCF, particularly:

Domain 1 (Personal)

Domain 2 (Professional) Domain 4 (Pharmacy Care) Domain 5 (Public Health)

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Apply a person-centred approach to medicines optimisation.
2. Apply legal, reflective and ethical approaches to medicines optimisation.
3. Apply evidence-based resources and guidelines to optimise medicines use and support shared decision-making within pharmacy.
4. Apply the core principles of medicines optimisation to complex patient scenarios across diverse practice settings.
5. Communicate effectively and professionally through written case studies and poster presentations, demonstrating critical reflection on practice-based experiences.

INTEGRATION

Integration Level: 11 (Transdisciplinary)

Horizontally within the year:

- PHU44106 Evidence Informing Practice
- PHU44101 Professional Development and Communication - Service Development

Vertically across years:

- PHU11106 Practice of Pharmacy I
- PHU22106 Practice of Pharmacy II
- PHU22110 Molecular & Chemotherapeutic Pharmacology and Clinical Therapeutics



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- PHU22111 Blood, Cardiovascular & Renal Pharmacology and Clinical Therapeutics
- PHU33106 Practice of Pharmacy III
- PHU33109 Endocrine & Reproductive Pharmacology and Clinical Therapeutics
- PHU33110 Respiratory & Gastrointestinal Systems and Clinical Therapeutics

NOTE ON THE USE OF ARTIFICIAL INTELLIGENCE (AI) IN ASSIGNMENTS

If AI of any kind is used in the completion of assignments, students are required to include a declaration in their submission at the end of the document which describes:

- The names of the platform(s) used
- The prompt entered
- A copy of the output generated by the AI – copied and pasted *verbatim*
- A comprehensive description of how this output was interpreted, used or helped you to formulate your submission
- There must be a **clear distinction** between **your independent work** and that developed by **AI**

Any cases of undeclared use of AI will be treated as suspected plagiarism

AI declarations will not contribute towards page or word counts.

SYLLABUS & COURSE OUTLINE

The module will focus on a series of themes, each (apart from theme 7) comprising several learning units or parts (pre-recorded lectures of around 30 mins duration):

Theme	Learning Theme	Lecturer
1	Core Concepts of Medicines Optimisation	RP
2	Respiratory and Sustainable Healthcare	RP
3	Polypharmacy, Older Patients and Cognitive Impairment	CR
4	The Expanding Role of the Pharmacist and Equality, Diversity and Inclusivity	RP
5	Weight-loss Medicines, Misinformation and Health Literacy	MOD
6	Cardiovascular Health and Artificial Intelligence (AI)	JOC
7	Poster Development & Presentation	RP

Directed Learning

Directed learning material presented within each theme will be provided to students.

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities, etc.).



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In-person	Online	Directed Study	Continuous Assessment	TOTAL	ECTS
2	12	30	60	104	5

ASSESSMENT

Pass mark = 50% overall (no compensation)

Continuous Assessment [100%]

Two case studies [30% each]

Students will complete two case studies which will be randomly allocated to students. Case study one will focus on content covered in themes 1, 2 and 3. Case study two will focus on content covered in themes 4, 5 and 6.

Poster development and presentation [40%]

Students in groups corresponding to their placement setting (community, hospital, industry or role-emerging practice) will design a poster focusing on one medicines optimisation issue that is relevant to their placement setting and spend 5 minutes presenting the poster focusing on how it relates specifically to their placement setting.

Learning activities and assessment will be guided by detailed rubrics, which will be provided prior to the assessment being released.

NB: Students will be expected to draw upon knowledge and skills gained both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme.

Late work

See policy on late submission of coursework.



DEVELOPING COMPETENCY THROUGH EXPERIENTIAL LEARNING



Year 4 (Senior Sophister)
Semester 1

MODULE CODE: PHU44303
20 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Asst Prof Eimear Ni Sheachnasaigh (Practice Educator), Muireann Counihan

External contributors: APPEL preceptors and external supervisors.

Coordinator: Asst Prof Eimear Ni Sheachnasaigh (Practice Educator)

AIMS: This module aims to enable students to gain competencies as outlined in the Pharmaceutical Society of Ireland Core Competency Framework for Pharmacists (CCF) Domains 1–3 and assess their attainment. The module will allow students to develop an appreciation for the professional challenges faced throughout pharmacy via preceptor/external supervisor formative assessment and reflective practice. Students will have the opportunity to undertake experiential learning through a 16-week placement in one of a variety of practice settings including community, hospital, industry and role-emerging practice. It will also help raise awareness of the importance and necessity of critical appraisal and lifelong learning thereby enabling students to practise and demonstrate the knowledge, skills and attitudes of a pharmacist. Students will undergo summative competency assessment (CA) within the workplace.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

- Apply knowledge, skills and behaviours developed across modules previously completed during their MPharm programme to a pharmacy practice setting through supervised experiential learning.
- Demonstrate the appropriate level of competence (i.e. 'MIN' level) across Domains 1–3 of the PSI CCF for Pharmacists, including:
 - Personal skills (e.g. leadership, problem solving, self-awareness, communication)
 - Professional skills (e.g. patient care, decision-making, evidence-based practice, life-long learning)
 - Organisation and management skills (e.g. time management, quality assurance, resource management)
- Reflect critically on their own learning and performance during placement to identify both strengths and areas for improvement.
- Engage effectively with colleagues in a manner that demonstrates accountability, integrity, and a



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commitment to professional standards.

- Respond to feedback from formative and summative assessments to enhance performance and contribute safely and effectively within a pharmacy team.
- Develop and implement a personal training plan aligned with the CCF-identified learning needs, placement opportunities and career goals.

INTEGRATION

Integration Level: 11 (transdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 5 example 1

Theme 1 example 4

Theme 1 example 2

Theme 1 example 1

Theme 2 example 1

Theme 3 example 1

SYLLABUS

Material covered will provide students with the opportunity to develop and demonstrate competencies related to Domains 1 – 3 of the PSI CCF. In addition, students' learning will draw upon and be scaffolded by knowledge, practice tools, behaviours, skills and competencies from all modules of their course to date.

The syllabus includes the following key components:

Preparation for Practice Placement

- Pre-work, guided reading, eLearning modules, workshops

Experiential Learning in Practice

- Immersive placement in a pharmacy workplace environment

Competency Development and Assessment

- Placement supervision and feedback, formative and summative Competency Assessment

Reflective and Self-Directed Learning

- Development and review of a personalised and dynamic training plan, webinars and structured reflection

COURSE OUTLINE

Experiential learning placement, formative and summative CA, workshops, pre-recorded lectures, online workshops before, during and after placement.

DIRECTED READING

Supplementary references as recommended by preceptor/external supervisor/Practice Educator.

ASSESSMENT

Competency Assessment sign-off at a 'MIN' level ('requires minimal supervision') in all CCF competencies from domains 1–3 of the PSI CCF at the summative assessment (satisfactory/unsatisfactory).



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COMPETENCY ASSESSMENT

The attainment of core competencies will be formally assessed, primarily by students' preceptors, in the workplace according to a structured process. Students will complete both formative and summative Competency Assessments. Competencies are rated according to the grading system below.

NB: Students will be expected to draw upon knowledge and skills gained in all module content from throughout their previous years of study.

Level	Rating	Definition
N/A*	Not applicable	Not possible to evaluate the competency in the placement setting
CLO	Close supervision	Trainer has to do it themselves or walk the student through it (requires hands on guidance or constant direction)
MOD	Moderate supervision	Trainer has to prompt the student from time to time (demonstrates some independence but requires intermittent direction)
MIN	Minimal supervision	Trainer needs to be there just in case (student is more independent but unaware of all risks and still requires supervision for safe practice)

SUMMARY OF HOURS

Students are to complete 30 hours per week of experiential learning. Students will attend a pre-placement preparation day which follows completion of assigned pre-work and further reading.

Experiential learning	Workshops and associated work	TOTAL	ECTS
480	10	490	20

FURTHER INFORMATION

Pass mark, plagiarism

An independent 'satisfactory' judgement must be achieved for the Competency Assessment, determined by preceptor. Students should note that College penalties for plagiarism apply.

Late work

See policy on late submission of coursework (Student Handbook).

Missed classes/assessments

In common with other modules for the pharmacy (integrated) programme, 100% attendance at scheduled experiential learning placement for this module is compulsory. A student who is unexpectedly unable to attend placement for any reason must notify their practice educator and their preceptor/training establishment without delay, and present certification as appropriate.

Progression and reassessment

Students who fail to achieve a satisfactory result in the summative Competency Assessment will be reassessed, if appropriate. In the event that a student remains unable to demonstrate a satisfactory result at reassessment, additional experiential learning may be required, as prescribed by the School.

Students and preceptors are encouraged to contact their Practice Educator as soon as possible if they have any concerns regarding the placement or student performance. Students who have not fulfilled the module requirements regarding attendance may be recorded as 'non-satisfactory'.



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Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (e.g. practice placement sites). Please note: There will be specific dress code requirements in some environments, e.g. short sleeves (for hand hygiene purposes), no ties (for health and safety purposes), no jewellery/make-up/watches/nail polish in some clinical/manufacturing environments. Students can contact preceptor/external supervisor regarding the specific dress code for their placement.

Compensation

This module is non-compensable.



ADVANCED PHARMACEUTICAL CHEMISTRY, DRUG DISCOVERY AND DESIGN



Year 4 (Senior Sophister)
Semester 2

MODULE CODE: PHU44102
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. J. Gilmer (JG), Assoc. Prof. N. O'Boyle (NB),
Assoc. Prof. A. Sasse (AS)

External contributors: Xavier Ligneau (XL, Bioprojet- Biotech, France)

Coordinator: Prof. J. Gilmer (JG)

AIMS: The aims of this module are to provide the student with an understanding of approaches to drug discovery and associated pharmaceutical chemistry methods. The module provides a comprehensive overview of the concepts of modern medicinal chemistry as applied to antibiotic/antiviral, CNS and cardiovascular pharmacology. It builds on pharmacology and introductory organic and medicinal chemistry from earlier years of the program and consolidates key pharmaceutical chemistry skills and develops awareness of future drug discovery prospects, trends and challenges.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Critically discuss the principles and methods of drug discovery, design and development including artificial intelligence applications and approaches. Identify structural features of pharmaceutical materials associated with adverse effects and likely to impact patient safety.
2. Identify important cardiovascular, antibiotic, antiviral and CNS drug classes from structural formulae, and recognize and appraise drug pharmacophores in each class.
3. Maintain and develop techniques in the analysis of pharmaceutical products and consolidate skills in interpretation of analytical data.
4. Demonstrate knowledge of drug properties relevant to pharmaceutical care, the optimum use of drugs and to drug analysis.

INTEGRATION

Integration Level: 7 (Correlation)

Present in the following Integration Schematics: Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHU44106 – Evidence Informing Practice, appropriate use of antibiotics and common processes of drug metabolism with implications for the common usage of medicines



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PHU44112 – Links with pharmaceutical data analysis in the context of drug development and manufacture, research project related to drug discovery aspects of pharmaceutical chemistry.

Vertically across years

PHU22101, PHU33110, PHU33111 elements of medicinal chemistry and molecular mechanism of action that are touched on in JS modules are revisited more systematically and with appropriate progressive complexity and depth PHU22110 – Antimicrobial pharmacology

PHU22111 – Cardiovascular pharmacology

PHU33112 – Neurobiological theory of CNS disorders and recent advances in the drug treatment of CNS disorders PHP55101 – Industrial pharmacy – regulatory approval processes and advanced analytical and processing PHP55108 – Addiction pharmacy

SYLLABUS

Material will be covered on the following topics: drug targets, sources, mechanistic types and numbers of current drugs, potential for new drugs, target selection and validation, high throughput experimental and in silico screening, pharmacophores and quantitative methods in pharmacology and toxicology, ligand-based drug design, rational and structure-based drug design, fragment-based design, historic and current examples of cardiovascular drug discovery, anti-infective and antimicrobial chemotypes and drug discovery in this class, analytical methods for antibiotic drugs, mechanisms of antibiotic resistance, SAR of key selected CNS drug types, clinical development, prospects and challenges for new CNS drugs.

COURSE OUTLINE

Lectures, tutorials, online lectures, workshops, practical classes and associated assignment.

Lectures (16 hours)		Lecturer
1	Overview of the modern drug discovery process including applications of AI	JG
2	In silico and AI methods in ligand-based drug design.	JG
3	In silico and AI methods in structure-based drug design.	JG
4	Drug discovery, drug safety and chemical flags.	AS
5	Drug properties influencing PK/PD and clinical candidate selection.	JG
6	Introduction to cardiovascular drug discovery and development; endothelial dysfunction, nitrates, sGC activation/stimulation.	JG
7	Aspirin - scientific and clinical development history, anti-platelet and anti-coagulant prodrugs; cyclo-oxygenase as a drug target, aspirin, celecoxib, GI versus CV risk, mechanisms and perspectives.	JG
8	Mediators of peptide signaling in cardiovascular disease; from captopril to Ernesto.	JG
9	History of antimicrobial drug discovery and development and introduction to structural classes.	NB
10	Structure, mechanism of action and resistance to beta-lactam and cephalosporin antibiotics.	NB
11	Structure and mechanism of action of DNA and RNA viral enzyme inhibitors/Antibiotics and antivirals in the future.	NB
12	Central nervous system drug discovery – Dementia	AS



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13	Central nervous system drug discovery – Migraine	AS
14	Central nervous system drug discovery – Narcolepsy	AS

Practical Classes / Workshops /Seminars (8 hours)

NB/JG/XL

Integrated Pharmaceutical Chemistry Workshop: Penicillins — From Molecular Structure to Clinical Function (6h)

Case study seminar: the discovery and clinical development of Pitolisant (Wakix) (2h)

Tutorials (2 hours)

Review of cardiovascular, CNS and anti-infective pharmaceutical chemistry (1x 2 h.) AS/JG/NB

DIRECTED READING

- *The organic chemistry of drug design and drug action*. Silverman, Richard B. 2nd Ed., Amsterdam; London: Elsevier Academic Press, Second Edition, 2004.
- *Principles of Medicinal Chemistry*; Foye, Lemke and Williams; 7th Ed., Lippincott Williams & Wilkins, 2013.
- Selected articles from *Nature Reviews Drug Discovery*.
- Supplementary references as recommended by academic staff.

ASSESSMENT

The pass mark for this module is 50%.

The qualifying mark for the written examination component in this module is 40%.

Component	Contribution to module grade
Written examination: 4 questions to be answered from 4. Question 1 consists of 10 short answer questions. 2 hrs	80%
Continuous assessment – penicillin workshop	20%

Gen AI use is not permitted in completing this assignment. Submission will be two weeks from completion.

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other modules in the current year and wherever relevant in all previous years of the programme (e.g. in PHU1101, PHU22101, PHU22108, PHU22110, PHU22111, PHU33110, PHU33111, PHU33112).



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SUMMARY OF HOURS

Lectures	Practicals/ Workshops/ Seminars/Online	Tutorials	Contact hours	Assignment(s) & Assessments	Independent and guided study	TOTAL	ECTS
15	8	2	25	8	67	100	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50%. See 'Assessment' above. Students

should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardise successful completion of the module.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in the written component, or 50% in the CA component and will then be reassessed in the component below the pass mark of 50%. A student who achieves an overall module mark less than 50% will be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements regarding attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is not compensatable.



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EVIDENCE INFORMING PRACTICE



Year 4 (Senior Sophister)
Semester 2

MODULE CODE: PHU44106
10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Asst. Prof. Juliette O'Connell (JOC), Asst. Prof. Rebecca Parkin (RP), Asst. Prof. Theo Ryan (TR), Assoc. Prof. Deirdre Darcy (DD)

Teacher-practitioners: Ms. Karen Rossi (KR), Ivana Forsyth (IF)

External contributors: Medicines Management Programme (Ext)

Coordinator: Prof. Cristín Ryan (CRy)

AIMS: This module aims to develop students' understanding of the science and evidence base that underpins and advances clinical therapeutics and pharmacy practice, and provide students with the opportunity to apply the principles of evidence-based healthcare to medicines optimisation, pharmacy practice and public health policies. Students will integrate and further develop their knowledge of therapeutics, clinical pharmacokinetics and formulation science through the discussions of case studies, which focus on vulnerable population groups.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Demonstrate knowledge of various research study designs and how they inform evidence-based guidelines, and their subsequent translation into practice and policy
2. Demonstrate knowledge of public health policies and their delivery, and the delivery of pharmacy practice services within these
3. Demonstrate knowledge of and application of principles such as medicines optimisation/healthcare management in the assessment, prioritisation and evidence-based management of vulnerable patient groups in different healthcare settings
4. Apply biopharmaceutics and clinical pharmacokinetics principles to selected practice scenarios
5. Prepare individualised pharmaceutical care plans, incorporating screenings to assess the appropriateness of prescribing when appropriate, and integrating issues such as demographics, presence of multimorbidities, polypharmacy, clinical pharmacokinetics
6. Reflect upon practice experience and ethical dilemmas, identify learning needs as practitioners and plan to address these needs

INTEGRATION

Integration Level: 9 (Multidisciplinary)

Present in the following Integration Schematics:

Theme 1: Example 2

Theme 1: Example 4



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Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

TEACHING AND LEARNING FORMAT: Lectures, tutorials, workshops, practical classes, portfolio preparation and completion, online activities, reflective practice (based on placement experiences), technology-enhanced learning.

Lectures (Total: 23 hours)

Note: Due to timetabling constraints, the sequence of classes may differ from that below

		Lecturer
1	Introduction to the Module	CR
2	Introduction to Population and Public Health	CR
3	Clinical Pharmacokinetics: Pharmacists' Professional Role	DD
4	Pharmacokinetics at extremes of age: Older People	DD
5	Care of vulnerable populations: Polypharmacy & Multimorbidity	RP
6	Dementia	CR
7	Antimicrobial Stewardship	CR
8	Care of vulnerable populations: Complexity and Frailty	RP
9	Care of vulnerable populations: Nursing home residents	IF
10	Pharmacokinetics at extremes of age: Pediatrics	DD
11	Care of vulnerable populations: Pediatrics 1	TR
12	Care of vulnerable populations: Pediatrics 2	TR
13	Care of vulnerable populations: Pregnancy	TR
14	Care of vulnerable populations: Lactation	TR
15	Health Promotion, Disease Prevention, Public Health Policies	KR
16	Pharmacy Practice Service Development 1	KR
17	Overview of the HSE Medicines Management Programme	BD
18	Fundamental pharmaceutical principles and application to practice	DD
19	Effects of food on medication administration via the oral route	DD
20	Tools for bioavailability exploration 1	DD
21	Tools for bioavailability exploration 2	DD
22	Formulation related issues in clinical practice	DD
23	IVF and Fertility	IF

Workshops/ Case Studies/ Seminars (Total: 37 hours)

Brief interventions: Marking every contact count (online material 4 hours)	CR
Brief interventions/ OSCE: Workshop (2 hours)	TR/CR
Pharmacy practice service development (2 hours)	KR
Clinical Practice: Diabetes in the community (3 hours)	KR
Disease Screening & Standards of Practice in Pharmacy Practice (2.5 hours)	CR
Clinical Practice: Older multi-morbid patients (2 hours)	RP
Clinical Practice; Paediatrics, Pregnancy, Lactation (2 hours)	TR
Clinical Practice: Heart Failure (2 hours)	IF
Clinical Practice: Fertility treatment (2 hours)	IF
Clinical Practice: Medication review for nursing home residents (2 hours)	IF
Ethics and Professionalism: Reflection on practice (2 hours)	CR
Inter-professional Learning: Traumatic Brain Injury (Swallowing Difficulties) (2 hours)	IPL Team*
Biopharmaceutics and Clinical Pharmacokinetics (2 hours)	DD
APPEL Pre-Placement Preparation (6 hours)	TBD



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*IPL Team: Pharmacy, Speech & Language Therapy

DIRECTED READING

Dodds L (2013). Drugs in Use. Fifth Edition, Pharmaceutical Press.

Rutter P (2017). Community Pharmacy: symptoms, diagnosis and treatment. Fourth Edition, Elsevier.
Whittlesea & Hodson (6th Ed.) Clinical Pharmacy and Therapeutics, Elsevier (2019)

Wingfield J. & Badcott D. (2007) Pharmacy Ethics and Decision Making. London: Pharmaceutical Press.

Southwood RL et al. (2018) Concepts in Clinical Pharmacokinetics 7th Ed., ASHP.

[NB e-book via STAT!Ref library database (www.statref.com)].

Clinical and Regulatory Guidelines and other reference material as provided by preceptor(s) to the unit.
References as provided by lecturer(s) to the unit.

ASSESSMENT

Pass mark = 50% unless otherwise specified Each component must be passed independently.

	<i>Contribution to module grade</i>
Written Examination: 4 questions, no choice	70%
Continuous Assessment: Biopharmaceutics and clinical pharmacokinetics	10%
OSCE	20%
Reflective continuing professional development e-portfolio (Satisfactory/Unsatisfactory)	N/A
IPL activity (Satisfactory/Unsatisfactory)	N/A
Total	100%

SUMMARY OF HOURS

Lectures	Seminars	Total Contact	Continuous Assessment	Guided study	TOTAL	ECTS
23	37	60	20	120	200	10

Compensation

This module is not compensable.



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SENIOR SOPHISTER CAPSTONE RESEARCH PROJECT



Year 4 (Senior Sophister)
Semester 2

MODULE CODE: PHU44112
15 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences:

Unit PHU44112 A (Research Methods): Assoc. Prof. C. Cadogan (CC), Prof. C. Ryan (CR), Prof. A. Harkin (AH), Assoc. Prof. S. Ryder (SR), Assoc. Prof. C. Medina (CM), Assoc. Prof. M. O'Dwyer (MOD).

Unit PHU44112 B (Research Project): Academic staff will supervise projects and participate in the panels which will assess the write-ups and presentations.

Projects Coordinator: Prof. L. O'Driscoll

AIMS: This module will enable the student: a) to gain an understanding of statistical ideas and methods encountered in many different pharmaceutical areas: community surveys, clinical trials, epidemiological trials and basic science; b) to gain an understanding of various methodologies used in undertaking research projects c) to carry out a research project, report writing and presentation of scientific findings.

PRE-REQUISITES: Successful completion of Junior Sophister (Year 3)

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

Discuss how different research methods can be used to address research questions and to interpret data derived from drug discovery and development studies, surveys, epidemiological investigations, qualitative studies and clinical trials,

1. Recognize and appraise ethical issues that may arise while carrying out research
2. Apply and understand the basic statistical methods to carry out a research project in any area of Pharmacy
3. Explain the background to a chosen research area
4. Generate and/or retrieve data and analyse it appropriately using a statistical package
5. Demonstrate research skills relevant to their chosen area of research
6. Plan and carry out practical work carefully and to a high standard with minimal supervision from an academic supervisor
7. Evaluate their research findings in the context of the current understanding of that area of research, in a balanced and concise way
8. Prepare a report of the project in the form of (i) a well-organised and well-argued report in the form of a research paper for a specified target journal and (ii) an oral presentation, demonstrating comprehensive understanding and critical interpretation of methodologies and data to set the research in context.

INTEGRATION

Integration Level: 9 (Multidisciplinary)

Present in the following Integration Schematics:

Theme 5: Example 1



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SYLLABUS

For the research method component of the module, material will be covered on the following topics: statistical basic concepts, quantitative and qualitative research methods, data processing and interpretation, writing a research protocol and library skills. These topics will also be useful for the Practice Research Project in Year 5 of the programme (PHP55400).

Research projects could be group projects that are assessed individually, individual projects, lab or non-lab based and will cover all disciplines, from basic science to practice.

COURSE OUTLINE:

Lectures, workshops and research projects.

The module is comprised of two Units:

Lectures (15 hours)

Unit PHU44112A: RESEARCH METHODS

		Lecturer
1	Introduction	LOD
2	Good Research Practice: Research with Animal Subjects	AH/SR
3	Good Research Practice: Other Research	SR
4	Quantitative Research Methods	MOD
5	Writing a Research Protocol and Academic Writing	CR
6,7	Questionnaire Design & Development	CR
8,9	Systemic Reviews & Metanalysis	CC
10	Scientific Method and Basic Experimental Design	CM
11-14	Analysing & Interpreting Quantitative Data	MOD/CM
15	Qualitative Research Methods	CR

Workshops/Practical Session (Library Skills) (6 hours) The material covered in the lectures will form the basis of a series of statistical laboratories, which will involve use of output from statistical packages. Most statistical packages produce essentially the same output, so students should be able to pick up very quickly other packages should they have need to do so in the future. Solutions to the classroom examples will be presented in the form of computer output, so, at the end of the course, students should have a strong grasp of how to interpret analyses presented in this way. Each practical exercise will include a continuous assessment assignment to be completed by each student.

1. Quantitative Data Analysis 1 MOD/CM

2. Quantitative Data Analysis 2 MOD/CM

Two-hour session which will be delivered by the Trinity Library on Finding Journals, Accessing E-Resources from off- campus, Research Skills, Literature Review, Searching Databases, Workshop on PubMed and Embase, Evaluating Sources and EndNote Online Workshop

DIRECTED READING – Directed reading will be indicated, as relevant at each lecture



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Unit PHU44112B: RESEARCH PROJECT

Project options will be available during Hilary Term and students will rank 15 favorite projects. Projects will be then allocated according to preference and overall result in the JS year. Projects will take place for four weeks and this period will include both research and a large portion of the write-up. First drafts of the write-up are expected at the end of the four-week period. Each student will be required to give an oral presentation to the panel on their project which will be 10 minutes plus 5 minutes for questions.

Teaching and learning format – Individual sessions with project supervisor, write-up, presentation to a panel and discussion.

DIRECTED READING – As relevant to the research project and as directed by the project supervisor.

ASSESSMENT

Pass mark = 50% unless specified otherwise.

<i>Component</i>	<i>Contribution to module grade</i>
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PHU44112A: Research Methods

- | | |
|---|-----|
| <ul style="list-style-type: none">Written examination: exam (2 hours), 60 MCQ (+1 for correct answer, -0.25 for incorrect answer, 0 if blank) (20%) | 30% |
| <ul style="list-style-type: none">E-learning Continuous Assessment (10%) | |

PHU44112B: Research Project

Project write-up: It will be presented in the form of a research paper for a specified target journal (5,000 words max). The journal for which the paper should be prepared for will be decided by the Supervisor.

Oral presentation: 15-minute oral presentation (10 mins for presentation + 5 mins for questions)

Research Project marks are broken down as:	70%
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- Attendance, commitment, engagement, and quality of work (20%)
- Project write-up (20%)
- Understanding and presentation of data (20%)
- Conclusion and recommendations (10%)
- Oral Presentation (20%)
- Discussion (10%)

N.B. If a student attains a qualified fail, they must be reassessed in all components below the PASS mark.

Students who obtain more than 40% (the qualifying mark) in the written or continuous assessment



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components but less than 50% will be considered to have failed the component but may compensate within the module if their overall mark is greater than 50%.

It is a requirement to pass the subunit PHU44112B: Research project (pass mark is 50%, no compensation is possible for this component).

SUMMARY OF HOURS

Lectures/Workshops	Practical work	Total contact	Practical write-up	Guided study	TOTAL
21	120	140	60	100	301

FURTHER INFORMATION

Students may undertake an internal or external research project during the summer in between JS and SS years. Where approved in advance with the Director of Undergraduate Teaching and Learning, a student may use data acquired during a summer research project for PHU44112.

Such students will be assigned to an internal project supervisor by the Director of Undergraduate Teaching and Learning and are expected to submit a project write-up and make an oral presentation of their research to a panel as all other SS students.

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate. Students are required to submit an attempt for each piece of course work and continuous assessment outlined for the module. Failure to submit the work will jeopardize successful completion of the module.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components and must be reassessed in the component(s) below the relevant qualifying failure mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Students who fail the written requirement (i.e., less than 40%) of the annual examination will be required to sit a supplemental examination.

Students who fail the continuous assessment (i.e., less than 40%) will be required to re-submit (parts of) the continuous assessment.

Students who fail the Research project (i.e., less than 50%) will be required to repeat this component.



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Non-satisfactory reports

Students who have not fulfilled the module requirements regarding attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory. Students reported as non-satisfactory may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat the year.

Compensation

This module is not compensable.



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14. Year 5 (M.Pharm.)

Module details may be subject to corrections/amendments. The School reserves the right to amend the list of available modules and to withdraw and add modules.

- *It is each student's responsibility to be aware of dates, times, locations, etc. of lectures, tutorials, seminars and practical classes.*
- *Reports, continuous assessments and laboratory notebooks must be presented for assessment by the dates specified by the examiner.*
- *Reports, continuous assessments and laboratory notebooks submitted after the specified dates will be treated in accordance with the **B.Sc. (Pharmacy) and M.Pharm. Late Submission Policy** and the College's **Policy on Late Submission of Assessments (Extension Policy)**.*
- *In cases where reports, continuous assessments or laboratory notebooks do not meet the pass mark on first submission and resubmission is permitted within a module, the mark of any resubmitted coursework will be capped at the pass mark.*

PRE-REQUISITE: Successful completion of Senior Sophister (Year 4)



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14.1. YEAR 5 MODULES

Code	Module Coordinator	Module Title	ECTS
PHP55101	Anne-Marie Healy (AMH) John Gilmer (JG)	Industrial Pharmacy	5
PHP55103	Fabio Boylan (FB)	Complementary and Alternative Medicine: Context, Legislation, Standards and Practice	5
PHP55104	Carsten Ehrhardt (CE)	Advanced Pharmaceutics	5
PHP55106	Cristín Ryan (CRy)	Practice of Pharmacy & Integrated Pharmacy Skills	10
PHP55108	Fabio Boylan (FB)	Addiction Pharmacy	5
PHP55110	Cathal Cadogan (CC)	Health Inequalities and Inclusion Health	5
PHP55220	Juliette O'Connell (JOC)	Medication Safety, Open Communication and Learning from Practice	5
PHP55330	Cicely Roche (CRo)	Pharmacists Advancing Practice Pharmacists Advancing Practice	5
PHP55400	Juliette O'Connell (JOC)	Pharmacy Practice Research Project	30
PHP55500	Theo Ryan (TR) Eimear Ní Sheachnasaigh (ENÍS)	Experiential Learning & Professional Registration Examination	15

Pass mark = 50% unless specified otherwise

It is each student's responsibility to be aware of dates, times, locations, etc. of lectures, tutorials, seminars and practical classes.

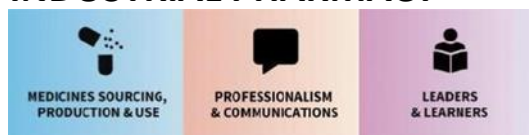
Reports, continuous assessments and laboratory notebooks submitted after the specified dates will be treated in accordance with the B.Sc. (Pharmacy) and M.Pharm. Late Submission Policy and the College's Policy on Late Submission of Assessments (Extension Policy).

In cases where reports, continuous assessments or laboratory notebooks do not meet the pass mark on first submission and resubmission is permitted within a module, the mark of any resubmitted coursework will be capped at the pass mark.



School of Pharmacy & Pharmaceutical Sciences

INDUSTRIAL PHARMACY



Year 5 (M.Pharm.)

MODULE CODE: PHP55101

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. A.M. Healy (AMH), Prof J.F. Gilmer (JG), Assoc. Prof. B. Naughton (BN), Prof L. Tajber (LT), Assoc. Prof. A. Sasse (AS).

External contributors: Luke Kiernan (LK), Maria Ines Amaro (MIA), Gary McAuslan (GMcA), Edward Crimin (EC), Evelyn Kelly (EK), Mark Gouldson (MG), Stan O'Neill (SON), Gareth Clarke (GC), Peter O'Connell (POC), Brian Corrigan (BC), Karen O'Connor (KOC), Gillian Molloy (GM), Patricia Grimes (PG), Derek Kenny (DK), Alice Parkes (AP), Vincent Curtin (VC), Jan Rosier (JR), Damien Flynn (DF).

Coordinator: Profs. A.M. Healy and J.F. Gilmer

AIMS: To create an appreciation of roles for pharmacists in the pharmaceutical industry and to give students knowledge of critical manufacturing issues. A secondary aim is to cultivate commercial awareness and processes for innovation in pharmaceutical product and service provision.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Outline aspects of the events in drug product development, production and marketing, identify the regulatory bodies that are relevant to pharmacy, and provide an overview of the regulation of product authorization, drug distribution and supply
2. Present a group solution to a problem related to an industrially relevant case in pharmaceutical product development or production
3. Define specific roles and functions within a pharmaceutical manufacturing organization/site and their relationship to each other in ensuring product quality including stability
4. Demonstrate knowledge of quality assurance (QA), good manufacturing practice (GMP), and process analytical technology (PAT).

INTEGRATION

Integration Level: 3 (Harmonization)

Other aspects which may be considered for integrative learning:

PHP55110 [Health Inequalities and Inclusion Health](#) **PHP55103** Regulatory aspects of CAMs

PHU22102 Bioequivalence

PHU22104 Physical Pharmacy, Formulation and Pharmaceutical Technology **PHU33104** Sterile Products and Advanced Pharmaceutical Biotechnology **PHU44107** Clinical trials and pharmacovigilance

PHU33106 Risk management; clinical trials legislation; career planning – industrial pharmacy

PHU44100 Risk management/organizational behaviour/pharmacoeconomics



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SYLLABUS

Material will be covered on the following topics: pharmaceutical manufacturing processes; pharmaceutical Quality Control (QC); the role of the Qualified Person (QP) in product release and development; organization of a pharmaceutical manufacturing site; advanced concepts in manufacturing; the drug approval process; pharmaceutical development in a regulated environment; documenting and planning a solution to a problem in product development and manufacturing.

COURSE OUTLINE

Lectures (14 hours)		Lecturer
1	History of Drug Product Approval and Regulatory Development	BN
2	Commercial, Legal and Technical Aspects of Generic Product Development	MIA
3	Cell and Gene Therapy – science, manufacturing and quality issues	GMcA
4	Product and patent lifecycle management	EC
5-6	Good Distribution Practice, the Responsible Person and orphan drugs	EK
7	Health Technology Assessment (HTA), the economics of drug pricing and reimbursement and the influence on commercial development decisions	MG
8	Quality by Design (QBD) and Design of Experiments (DoE)	LT
9-10	Organization of a pharmaceutical manufacturing site and the role of the Qualified Person	SON
11	The application of AI, process simulation, automation and digital twins in the pharmaceutical industry	GC
12	Pharmaceutical stability and ICH Q1	POC
13	Sources and characterization of impurities in drug substances and drug products	JG
14	Theory and Practice of Pharmaceutical Innovation	JR

Online Lectures (12 hours)

Online Modules (Innopharma Education; LK)

- Quality Assurance and Good Manufacturing Practice,
- Utilities, Facilities, HVACs and Cleanrooms
- Process Analytical Technologies (PAT)
- Process Validation

Pharma Spinouts/Campus-based company presentations (1 h)

JG/DF

Industry Case Studies and Problem Solving in Manufacturing, Product Quality and Product Design (50 hours total – including research, group discussions, consultation with an appointed expert, preparation and delivery of group presentation, Executive Report preparation)

DIRECTED READING

- ICH.org: ICH Q,S and E and multidisciplinary topics
- Pharmaceutical Medicine, 7th Edition, Griffin, Posner and Barker, Wiley Blackwell
- WHO good manufacturing practices for pharmaceutical products: main principles (WHO Technical Report



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Series, No. 961, 2011)

- Pharmaceutical Quality Systems, Edited by Oliver Schmidt, Taylor and Francis, 2000
- Pharmaceutical Quality by Design, Pharmaceutical Research, April 2008, Volume 25, Issue 4, 781-791
- WHO guidelines on transfer of technology in pharmaceutical manufacturing (Annex 7)

Supplementary references as recommended by academic staff.

ASSESSMENT

For all components of this module: Pass mark = 50% Qualifying mark = 40%

<i>Component</i>	<i>Contribution to module grade</i>
Examination: 1 h, 30 multiple choice questions, negative marking applies	50%
Case study: Executive Report and Presentations	50%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other industrially focused modules in the current year and wherever relevant in all previous years of the programme (e.g. in PHU22104, PHU33104).

SUMMARY OF HOURS

Lectures & Seminars	Case Studies (contact hrs.)	Total Contact	Online (Innopharma)	Independent and guided study (including case study work)	TOTAL	ECTS
15	4	19	12	65	96	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more of the components. If a student attains a qualified fail, they must be reassessed in all components that are below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even



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components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Dean of Graduate Studies as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Dean of Graduate Studies to repeat the year.

Compensation

This module is compensatable.

Compensation is allowed across the course/year to a max of 10 ECTS once the module mark is at least 45% or higher and the credit weighted average for the year is at least 50%.



COMPLEMENTARY AND ALTERNATIVE MEDICINE: CONTEXT, LEGISLATION, STANDARDS AND PRACTICE



Year 5 (M.Pharm.)

MODULE CODE: PHP55103

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. F. Boylan (FB), Assoc. Prof. A. Sasse (AS)

External contributor: Clinical aromatherapist; Ms. Fiona Hedigan

Coordinator: Assoc. Prof. Fabio Boylan

AIMS: This module aims to advance and synergise the student's knowledge of the nature and use of Complementary, Alternative, Traditional Medicine (CATM) and Phytotherapy. This learning will be practice focused and will cover the relevant legislation in Global, European and Irish Contexts. The incorporation of practice-based seminars aims to enhance theoretical learning and facilitate synergy. The learning material will underpin legislative aspects of Herbal medicines and aims to present state of the art practices in establishing Herbal quality, safety and efficacy as outlined in 2004/24/EC.

LEARNING OUTCOMES: On successful completion of this module the student will be able to:

- 1- Identify the increasing importance of Traditional Medicine and its position in The Sustainable Development Goals (SDGs).
- 2- Describe current legislation relating to HMPs.
- 3- Demonstrate the application and utilisation of visual, microscopic, chromatographic, chemical and metabolomics techniques used for qualitative and quantitative analysis of herbal drugs in crude samples, formulated products or clinical samples.
- 4- Evaluate the evidence base for the safety of HMPs, including drug-herb interactions.
- 5- Evaluate the importance of Complementary, Alternative and Traditional Medicine in an international, European and Irish context.
- 6- Explain the conceptual differences between conventional medicine and CATM.
- 7- Describe the nature of therapies such as Traditional Medicinal use, Aromatherapy, Naturopathy etc.
- 8- Critically discuss the concepts underlying Traditional Chinese Medicine (TCM), Ayurveda and Homoeopathy Explain the differences between Medical Herbalism and Rational Phytotherapy.
- 9- Evaluate the phytochemical, Phyto-pharmacological and clinical evidence base for the efficacy of Herbal Medicinal Products (HMPs) used in Rational Phytotherapy.
- 10- Experience and evaluate yogic practices and explore mindfulness for health promotion.

INTEGRATION

Integration Level: 10 (Interdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 2: Example 1



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Theme 4: Example 1

Theme 5: Example 1

SYLLABUS

Material will be covered on the following topics: natural remedies, homeopathy, aromatherapy, phytotherapy, traditional, complementary and preventive medicine.

COURSE OUTLINE

Lectures, workshops, and experiential learning.

Lectures (15 hours)		Lecturer
1	Introduction to Module	FB
2	Introduction to Integrative Medicine	FB
3	Scientific Evidence for Integrative Medicine	FB
4	Traditional Medicine and Who Strategy	FB
5	Nagoya Protocol	FB
6	Phytotherapy I	FB
7	Phytotherapy II	FB
8	Phytotherapy III	FB
9	Phytotherapy IV	FB
10	Traditional Herbal Medicinal Products - Quality and the Regulatory Framework	FB
11	Yoga and Mindfulness	AS
12	Evidence Basis for Adverse Reactions and Side Effects in Phytotherapy	FB
13	Ayurveda	AS
14	Integrative techniques practiced in Ireland	FB
15	Case Studies	FB

Workshops (2 hours)

Workshop on Aromatherapy	Clinical aromatherapist
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DIRECTED READING

- EU, WHO, HMP's, TRIPs, MDG's: Selected reading material will be given to students.
- European Pharmacopoeia.
- Pharmacognosy. Trease & Evans. Elsevier, 16th edition, 2009.
- Kayne SB Complementary Therapies for Pharmacists. Pharmaceutical Press, London, 2002
- Ernst E, Pittler M, Wider B. The Desktop Guide to Complementary and Alternative Medicine – an Evidence- based Approach. 2nd Ed. Mosby Elsevier, 2006
- Kayne SB Homeopathic Pharmacy. 2nd Ed., Elsevier Edinburgh, 2006
- Barnes J, Anderson L & Phillipson JD. Herbal Remedies. 2nd Ed., Pharmaceutical Press, London, 2002. (<https://about.medicinescomplete.com/>).

Supplementary references as recommended by academic staff.



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ASSESSMENT (Pass Mark 50%)

<i>Component</i>	<i>Contribution to module grade</i>
Written Examination	70%
Group work with individual submissions on Blackboard. Group projects will be assigned at the start of the module. The date for submissions of group topics will be confirmed.	30%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme (e.g. in PHU33103).

SUMMARY OF HOURS

Lectures	Practicals/ Workshops/ Seminars	Contact hours	Independent and guided study	TOTAL	ECTS
15	2	17	63	80	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Note on the use of artificial intelligence (AI) in assignment

Any use of AI by students completing this module must be declared. Any use of AI must align with the College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research (available at <https://www.tcd.ie/academicpractice/resources/gen-ai-hub/>) and uphold the relevant principles, particularly Transparency and Honesty, Responsibility and Accountability

Students are also reminded that they have committed to a Code of Conduct which outlines the defined standards and principles by which you must abide in the academic, clinical, and professional environment.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more of the components, and must be reassessed in the component(s) below the relevant qualifying mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the



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qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Dean of Graduate Studies as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their formal University assessment sessions and may be required by the Dean of Graduate Studies to repeat the year.

Compensation

This module is compensatable.

Compensation is allowed across the course/year to a max of 10 ECTS once the module mark is at least 45% or higher and the credit weighted average for the year is at least 50%.



ADVANCED PHARMACEUTICS



Year 5 (M.Pharm.)

MODULE CODE: PHP55104

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. D. D'Arcy (DD), Prof. C. Ehrhardt (CE), Prof. A.M. Healy (AMH), Assoc. Prof. E. Ruiz-Hernandez (ERH), Assoc. Prof. M. J. Santos-Martinez (MSM)

Coordinator: Prof. C. Ehrhardt

AIMS: This module will provide an overview of advanced drug delivery strategies and alternative administration routes for local and systemic delivery. It will familiarise the students with the anatomical and (patho)physiological particularities of those pathways and it will introduce advanced medical devices, personalized medicines, nanomaterials and nucleic acid-based therapies.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Describe and give examples of advanced drug delivery approaches for small and large molecules
2. Discuss various approaches to targeted drug delivery
3. Discuss the potential applications of nanotechnology to the practice of medicine and describe basic aspects of nanotoxicology and toxicological evaluation of nanoparticles
4. Describe challenges and solutions/approaches to the delivery of a range of macromolecules
5. Describe the concept and applications of *in vivo* predictive dissolution testing and *in vivo-in vitro* correlations, as well as biopharmaceutics-relevant modelling and simulation approaches
6. Discuss approaches taken to site specific drug delivery, and challenges and approaches to overcoming various biological barriers
7. Define and explain stratified and personalised medicines
8. Demonstrate an understanding of medical devices for the treatment and prevention of disease, processes used in their manufacture and their applications.

INTEGRATION

Integration Level: 4 (Nesting)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Example 2

Other aspects which may be considered for integrative learning:

Vertically across years

PHU11102, PHU11104, PHU22104, PHU33104, PHU44106 – Fundamental to these modules PHU44102 – An understanding of quantitative aspects of medicinal chemistry



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SYLLABUS

Material will be covered on the following topics: design of drug delivery systems, advanced drug delivery, particle manufacture, gene therapy, biopharmaceutics, delivery of complex drugs, drug targeting, personalised medicines.

COURSE OUTLINE

Lectures, Workshops

Lectures (13 hours)		Lecturer
1	Advanced topics in biopharmaceutics	DD
2, 3	Advanced pulmonary drug delivery	CE
4-6	Challenges in formulation and delivery of macromolecules	CE
7	Introduction to nanomedicine and its potential applications	MSM
8	Pharmaceutical nanocarriers	ERH
9	Nanoparticle targeting to tumours	ERH
10	Nanotoxicology and the Regulatory Landscape	MSM
11	Formulation approaches to age-appropriate/stratified medicines	AMH
12, 13	Advanced medical devices	AMH

Workshops (2 hours)

1, 2	Advanced topics in biopharmaceutics	DD
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DIRECTED READING

Physicochemical Principles of Pharmacy, Florence and Atwood, 6th Ed., Pharmaceutical Press, 2015 Martin's Physical Pharmacy and Pharmaceutical Sciences, PJ Sinko, 8th Ed., Wolters Kluwer Health, 2023 Aulton's Pharmaceutics, 6th Ed., KMG Taylor, ME Aulton (eds.), Elsevier, 2021

Biopharmaceutics Applications in Drug Development, R Krishna and L Yu (Eds.), Springer, 2007
Supplementary references as recommended by academic staff.

ASSESSMENT

Pass mark = 50% unless specified otherwise.

Component	Contribution to module grade
Continuous assessment: 2 x 1 h; MCQ, short answer and essay type questions	100%

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all subsequent years of the programme (e.g. in Pharmacology and Pharmaceutics).



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SUMMARY OF HOURS

Lectures	Workshops	Contact hours	Independent and guided study	TOTAL	ECTS
13	2	15	85	100	5

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for the written examination is 50% except where otherwise indicated. See 'Assessment' above.

Students should note that College penalties for plagiarism apply to the written examination.

Late work

See policy on late submission of coursework.

Missed classes

In common with other modules for the Pharmacy (integrated) programme, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify the programme director/coordinator of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in the written assignment. A student who achieves an overall module mark of less than 50% must be reassessed.

If a student's performance is judged unsatisfactory in a continuous assessment component other than a competency assessment, the student may be permitted to undergo reassessment, e.g. resubmission of coursework or submission of supplementary assessment(s), by an appointed date in accordance with the requirements for individual modules. Only one supplementary attempt will normally be permitted for any failed component.

Compensation

This module is compensatable.

Compensation is allowed across the course/year to a maximum of 10 ECTS once the module mark is at least 45% or higher and the credit weighted average for the year is at least 50%.



PRACTICE OF PHARMACY & INTEGRATED PHARMACY SKILLS



Year 5 (M.Pharm.)

MODULE CODE: PHP55106

10 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Prof. C. Ryan (CRy), Assoc. Prof. C. Roche (CRo), APPEL Teacher Practitioner, Asst. Prof. Theo Ryan (TR), IPL Team. **Teacher-practitioners:** Ms. Karen Rossi (KR), Ms Ivana Forsyth (IS)

External contributors: Additional specialist contributors (Ext): E. O'Dwyer (EOD), SJUH (St James' University Hospital); Y. Hampson (YH), Miriam Moriarty (MM); P. Byrne (PB), R. Tallon (RT), S. Moloney (SM), B. McGrath (BM), Tallaght University Hospital (TUH), St. Vincent's University Hospital (SVUH); Irish Pharmacy Union (IPU); First Aid for Life

Coordinator: Prof. Cristín Ryan

AIMS: This module aims to enable students to integrate knowledge, skills and attitudes to enhance the scope of pharmacy practice in all clinical settings.

This module also aims to provide students with an understanding of the clinical specialism within the pharmacy profession, how pharmacists contribute to the clinical care of complex patients, in chronic disease management and in advancing pharmacy care.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Demonstrate competence in first aid for pharmacists
2. Demonstrate competence in vaccination consultations
3. Apply principles of financial management to retail pharmacy business management
4. Outline the role of pharmacy specialism in caring for complex patients and in the delivery of patient centered care
5. Prepare pharmaceutical care plans for management of specialist, complex patients
6. Demonstrate proficiency in advanced communication
7. Describe developments in Irish health policy and their implications on developments in the provision of pharmacy practice and linked services



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INTEGRATION

Integration Level: 10 (interdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Example 2, Example 4

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

Michaelmas Term

PHP55104 Advanced Pharmaceutics: Stratified and Personalised Medicines PHP55108 Addiction Pharmacy
Hilary and Trinity Terms

PHP55101 Health inequalities and inclusion health PHP55220 Medication safety, open communication and learning from practice

PHP55330 Pharmacists advancing practice

PHP55500 Experiential Learning & Professional Registration Examination PHP55400 Practice Research Project

Vertically across years

Case based teaching links with the pharmacology and clinical therapeutics modules, and practice of pharmacy modules including:

PHU11106 Practice of Pharmacy I

PHU22110 Molecular and chemotherapeutic pharmacology & Clinical Therapeutics PHU22111 Blood, Cardiovascular and Renal Pharmacology and Clinical Therapeutics PHU22106 Practice of Pharmacy II

PHU33109 Endocrine and Reproductive Pharmacology and Clinical Therapeutics PHU33110 Respiratory & Gastrointestinal Systems and Clinical Therapeutics PHU33111 Malignant Disease, Immune & Ocular Systems and Clinical Therapeutics PHU33112 Neuropharmacology and Clinical Therapeutics

PHU33106 Practice of Pharmacy III

PHU44202 Medicines optimization in practice

PHU44101 Professional Development and Communication – Service Development

PHU44102 Advanced pharmaceutical chemistry, drug discovery and design

PHU44106 Evidence Informing Practice

PHU44112 Research Project



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SYLLABUS

Material will be covered on the following topics: health policy, pharmacy and the practice of pharmacy, management science and financial management, stakeholders in health care, models of health and illness, men's health, specialism (e.g. intensive care & high dependency, infectious disease, cystic fibrosis, palliative care, mental health, renal, cardiology), emerging treatment strategies, medicines provision and supporting patients' use of medicines, patient engagement and advocacy, multidisciplinary collaboration across the treatment trajectory for patients with oral cancer.

COURSE OUTLINE

Lectures, workshops, online and directed learning.

Note: Due to lecturer availability, the order in which lectures appear on this list, might not reflect the order in which the course material will be delivered.

Lectures		Lecturer
1	Introduction and pharmaceutical care planning	CRy
2, 3	Financial management	IPU/ TR
4	Medicines provision in community pharmacy	KR
5- 6	Men's Health	TR
7	Pharmacogenomics and Emerging Treatment Strategies	CRy
8	Specialism 1: Severe Mental Illness	PB
9	Specialism 2: Cystic Fibrosis	SVUH
10	Specialism 3: Critical Care	SJUH
11	Specialism 4: Infections Diseases	SJUH
12, 13	Specialism 5: Renal 1-2	TUH
14	Specialism 6: Palliative Care	EOD
15	Horizon scanning	CRy



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Workshops

First aid training (7 h)	External & CRy
Safe Talk/LivingWorks Start: Suicide Prevention (4 h)	HSE
Pharmaceutical Care and Therapeutics: Severe Mental Illness (2 h)	PB&CRy
Pharmaceutical Care and Therapeutics: Infectious Diseases (2 h)	SJUH&CRy
Pharmaceutical Care and Therapeutics: Critical Care (2 h)	SJUH &CRy
Pharmaceutical Care and Therapeutics: Renal (2 h)	TUH &CRy
Pharmaceutical Care and Therapeutics: Hidradenitis Suppurativa (HS) (2 h)	SM, BM &CRy
Pharmaceutical Care and Therapeutics: Palliative Care (3 h)	EOD &CRy
Medicines Provision and Patient Care: Community Dispensing (1.5 h)	KR
Patient Perspective: Cystic Fibrosis Patient (1 h)	RT&CRy
Vaccination Consultations (2 h)	KR&TR
Interprofessional Learning: Oral Cancer (2 h)	IPL Team
APPEL Pre-Placement Preparation (3 h)	TP&CRo
OSCE Preparation (2 h)	TP
Debate preparation (1h)	CRy
Pharmacogenomics (1hr)	CRy

OSCE Preparation

A formative OSCE will be undertaken towards the end of the module.

DIRECTED READING

Texts

- Clinical guidelines, policy documents and other reference material as provided by lecturer(s) to the module.
- PSI Guidance on the provision of Vaccination Services by Pharmacists in Retail Pharmacy Businesses
- National Immunisation Advisory Committee (NIAC) Immunisation Guidelines for Ireland.
- Guidance on the Provision of an Influenza Vaccination Service for Children Aged 6 Months and Older



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- Ireland's Strategy to Reduce Suicide and self-harm, connecting for life: 2026-2035.
- Clinical Pharmacy and Therapeutics, Walker and Whittlesea, 5th Edition, Churchill, Livingstone
- Supplementary references as recommended by academic staff or as presented on Blackboard for each theme/lecture and workshop.

ASSESSMENT

Each component must be passed to pass the module. Group work will include a peer assessment which will be considered when providing an individual mark for group work.

Pass mark = 50% unless specified otherwise.

Component	Contribution to module grade
Written examination: 1.5 h	
There are two components to the assessment, Part A and Part B; both are compulsory. Part A consists of MCQ style questions, part B will involve the development of a pharmaceutical care plan, for a complex patient.	
All questions are compulsory. The examination questions will be based on the module content, in addition to directed reading, and modules from previous years, including pharmacology and clinical therapeutics modules, as well as practice of pharmacy modules.	70%
Continuous Assessment 2: Debate (3 h)	30%
Reflective continuing professional development e-portfolio (Satisfactory/ Unsatisfactory)	N/A
Competence in Vaccination Consultation	Formative assessment

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in all previous years of the programme as described in the Integration section above.



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SUMMARY OF HOURS

Lectures	Practicals/ Workshops/ Seminars	Contact hours	Assignments(s)	Independent and guided study	TOTAL	ECTS
15	38.5	53.5	35	111.5	200	10

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify his/her tutor of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in one or more components, and must be reassessed in the component(s) below the pass mark. A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even components that are between the qualifying mark and the pass mark.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance and/or coursework may be reported to the Senior Lecturer as non-satisfactory for one or more terms. Students reported as non-satisfactory for the Michaelmas and Hilary terms may be refused permission to take their annual examinations and may be required by the Senior Lecturer to repeat the year.

Professional dress and behaviour

Students must make every effort to complete their work in a timely fashion and to communicate any difficulties that they experience with the lecturer concerned and/or the Module Coordinator and to seek advice or guidance. Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities etc.). External lecturers give their time and expertise to this Module without requiring any personal recompense and students are expected to be punctual in their attendance and to respect and acknowledge appropriately the contribution that these lecturers make to the course.

Compensation

This module is not compensable.



School of Pharmacy & Pharmaceutical Sciences

ADDICTION PHARMACY



Year 5 (M.Pharm.)

MODULE CODE: PHP55108

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. F. Boylan (FB), Prof. A. Harkin (AH), Prof. J. Gilmer (JG), Dr. D. Corrigan (DC), Assoc. Prof. C. Roche (Cro), Assoc. Prof. M.J. Santos-Martinez (MSM).

Teacher-Practitioner: Ms. K. Rossi (KR)

External Contributors: Dr. Gary Broderick (GB) Mr. J. Bourke (JB), Dr. D. O'Driscoll (DOD), Mr. F. Guy (FG), Dr. R. Maguire (RM)

Coordinator: Assoc. Prof. F. Boylan

AIMS: This module aims to provide the student with an understanding of the nature, extent and causes of drug-taking problem in Ireland in order that they can undertake professional activities as pharmacists in the prevention and treatment of drug dependence and other drug-related problems.

LEARNING OUTCOMES: On successful completion of this module, students should be able to critically:

1. Assess the complexity of a drug-taking problem.
2. Describe proposed molecular and cellular mechanisms of drug dependence and addiction and current drug treatment of alcohol and opiate dependence
3. Discuss psychosocial aspects of drug abuse.
4. Describe the role of the pharmacist in smoking cessation as well as techniques available for the same.
5. Outline the main sources of addictive drugs and their acute and long-term effects on the health of the drug user
6. Evaluate the National Drug Strategy and the role of the pharmacist in addressing drug misuse.
7. Summarise the controls and protocols relating to the supply of methadone.

INTEGRATION

Integration Level: 9 (Multidisciplinary)

Present in the following Integration Schematics:

Theme 2: Example 1

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year

PHP55103 – The relationship with this module is in relation to the abuse of molecules coming from nature, and the misuse of plants due to their chemical composition.



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PHP55106 – The relationship with this module is in relation to the social role a pharmacist needs to have in relation to the addiction to chemical compounds and in developing health policies to support the addicts.

PHP55110, PHP55220 and PHP55330 – Safe and rational supply of methadone and the public health policies involved with addiction

Vertically across years

This module is closely related to modules in Pharmacognosy (PHU33103), Neuropharmacology and Medicinal & Pharmaceutical Chemistry (PHU33112 and PHU44102), Legislation in relation to abuse of drugs (PHU33106) and Practice and Therapeutics & Professionalism and Ethics (PHU44106) in previous years.

SYLLABUS

The following topics will be covered: pharmaceutical chemistry of opioids, related peptides and receptors, molecular and cellular mechanisms of addiction, chemistry and pharmacology of *Cannabis* and cannabinoids, pharmacology of smoking cessation, and the national drug strategy.

COURSE OUTLINE

Lectures, workshops, seminars, assessments, and lab-based topics.

Lectures	Lecturer
1 Introduction to module and workshop series and assessment	FB
2 Role of the pharmacist in preventing and addressing drug misuse	CR
3 Cannabis	FB
4 Phytocannabinoids	FB
5 Pathophysiology of cannabis	FB
6 Smoking cessation	MSM
7 Drug related problems	FB
8 Drug related problems	FB
9 Molecular and cellular mechanism of addiction	AH
10 Ethanol abuse, dependence and withdrawal. Alcoholism pharmacotherapy	AH
11 Current and experimental therapeutics for the treatment of cocaine and opiate addictions	AH
12 Medicinal chemistry of opioids	JG
13 Medicinal chemistry of opioids	JG
14 Medicinal chemistry of opioids	JG
15 Driving under the influence of drugs	RM

Workshops and Seminars (14 hours)

1 Pharmaceutical drug misuse and its implications	DC (Cro)
2 Role of the pharmacist in preventing and addressing drug misuse	Cro
3 Psychosocial aspects of drug taking.	GB
4 Role of the pharmacist in smoking cessation	KR/JB
5 The Methadone Protocol in practice	DOB
6 Brief interventions – skills development	GB



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7	Role of the pharmacist in harm reduction & team peer review session	FG/Cro
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Laboratory Topic (3 hours total)

Identification of Drugs of Abuse I-Narcotics

DIRECTED READING

- Graham Patrick – An Introduction to Medicinal Chemistry. 5th Ed., Ch. 24, Oxford University Press, 2013.
- Wills S. Drugs of Abuse 2nd Edn, Pharmaceutical Press, London 2005
- Anon. Facts about Drug Misuse in Ireland. 4th Edn., 2003, Health Promotion Unit, Dept. of Health and Children through <https://www.drugs.ie/>
- Cathy Stannard, Michael H. Coupe, Anthony Pickering – Opioids in Non-Cancer pain. (Oxford Pain Management Library Series), 2008.
- Karen Forbes – Opioids in Cancer pain. (Oxford Pain Management Library Series), 2008.
- Kalant H. Adverse Effects of Cannabis on Health- An update of Literature since 1996. Progress in Neuropsychopharmacology & Biological Psychiatry, 2004; 28: 849-863.
- Joy M & J. Marijuana as Medicine. The Science beyond the Controversy. National Academy Press, Washington DC., 2001
- Ward J. et al. Role of maintenance treatment in opioid dependence. Lancet, 1999; 221-6

ASSESSMENT

<i>Component</i>	<i>Contribution to module grade</i>
Written Exam Pass mark = 50% unless specified otherwise (2 hours)	
Section A: 3 Essay-type questions (20% each) – 60%	50%
Section B: 4 Short-answer questions (10% each) – 40%	
Seminar/Workshop related to hot topics in Drugs of Abuse	30%
Engagement with workshops (Attendance)	5%
Lab Report on Narcotics	15%

Students who obtain more than 40% (the qualifying mark) in the online written assessment component but less than 50% will be considered to have failed the component but may compensate within the module if their overall mark is at least 50%.

SUMMARY OF HOURS

Lectures	Seminars/ Workshops	Practicals	Total Contact	Practical reports	Guided study (including preparation of labs report and seminars)	TOTAL	ECTS
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15	14	2	31	1	72	104	5
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FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations and other assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Note on the use of artificial intelligence (AI) in assignment

Any use of AI by students completing this module must be declared. Any use of AI must align with the College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research (available at <https://www.tcd.ie/academicpractice/resources/gen-ai-hub/>) and uphold the relevant principles, particularly Transparency and Honesty, Responsibility and Accountability

Students are also reminded that they have committed to a Code of Conduct which outlines the defined standards and principles by which you must abide in the academic, clinical, and professional environment.

Missed classes/assessments

In common with other modules for the Pharmacy (integrated) programme, attendance at all scheduled classes for this module is compulsory. A student who is unable to attend a class for any reason must notify the course director/coordinator of the reason for absence without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently. A student will be awarded a QF (qualified fail) grade if he/she achieves an overall module mark of at least 50% but less than the qualifying mark in the written examination, and must be reassessed in the component (written examination) below the relevant qualifying mark (40%). A student who achieves an overall module mark less than 50% must be reassessed in all components that are below the pass mark of 50%, even the component (written examination) that is between the qualifying mark and the pass mark.

If a student's performance is judged unsatisfactory in a continuous assessment component other than a competency assessment, the student may be permitted to undergo reassessment, e.g. resubmission of coursework or submission of supplementary assessment(s), by an appointed date in accordance with the requirements for individual modules. Only one supplementary attempt will normally be permitted for any failed component.

Compensation

This module is compensatable. Compensation is allowed across the course/year to a max of 10 ECTS once the module mark is at least 45% or higher and the credit weighted average for the year is at least 50%.



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HEALTH INEQUALITIES AND INCLUSION HEALTH



Year 5 (M.Pharm.)

MODULE CODE: PHP55110
5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. Cathal Cadogan (CC)

Coordinator: Assoc. Prof. Cathal Cadogan

AIMS: This module aims to help students develop their knowledge, skills, and attributes in CCF Domain 1 (Personal), Domain 2 (Professional) and Domain 4 (Pharmacy Care).

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

- Apply a person-centred approach to promoting inclusion health and addressing health inequalities that treats people with dignity and respect
- Understand legal and professional responsibilities under equality and human rights legislation and code of conduct
- Assess and respond to individuals' specific health needs, taking into account diversity, cultural differences and protected characteristics
- Explain how personal beliefs, values and/or biases can compromise person-centred care
- Engage in reflective practice and continuing professional development

INTEGRATION

Integration level 11 (Trans disciplinary)

Present in the following Integration Schematics:

Theme 1: Example 1, Example 2, Example 3, Example 4

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

CCF Competencies

All CCF Competencies in Domain 1 (Personal), Domain 2 (Professional) and Domain 4 (Pharmacy Care) (PSI, 2022)



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SYLLABUS

Material covered will provide the opportunity for students to develop and demonstrate competencies required of a practitioner working in a patient-facing role as related to the Supply of Medicines and Organisation and Management skills.

Learning Units		Lecturer
1	Health inequalities: an introduction	CC
2	Tackling health inequalities through inclusion health	CC
3	Providing inclusive care to ethnic minority groups	CC
4	Providing inclusive care to individuals with disabilities	TBC
5	Providing inclusive care to LGBTQIA+ Communities	CC
6	Providing inclusive care to individuals experiencing homelessness	CC

COURSE OUTLINE

Students will spend 30 hours per week learning in their placement. This module will be supported by 5 hours of directed study (online learning activities, completing core and recommended reading, and completing assessment activities). Students will also be expected to complete self-directed learning activities of 5 hours per week.

DIRECTED READING

Resources and Core References

The Module Coordinators(s) will recommend and notify of resources, directed reading and core references based on contemporary issues in pharmacy practice related to the module learning outcomes before the beginning of the module.

Note: The reading list will be reviewed annually by the module coordinators and updated as required.

ASSESSMENT

Pass-mark is 50%.

Case-based Online Assessment [100%]

Learning activities and assessment will be guided by detailed rubrics, which will be provided at the start of the module.

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in previous years of the programme.



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SUMMARY OF HOURS					
Placement Activities	Online	Self-directed Study	Continuous Assessment	TOTAL	ECTS
75*	5	15	25	120	5

***Note:** 75 hours placement time aligned with 5 weeks of this module is nominally aligned with PRE module

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations is 50%. See 'Assessment' above. Students should note that College penalties for plagiarism apply.

Note on the use of artificial intelligence (AI) in assignment

Any use of AI by students completing this module must be declared. Any use of AI must align with the College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research (available at <https://www.tcd.ie/academicpractice/resources/gen-ai-hub/>) and uphold the relevant principles, particularly Transparency and Honesty, Responsibility and Accountability

Students are also reminded that they have committed to a Code of Conduct which outlines the defined standards and principles by which you must abide in the academic, clinical and professional environment.

Late work

See policy on late submission of coursework.

Progression and reassessment

Students must satisfy the examiners in this module that they have achieved the learning outcomes. A student who achieves an overall module mark less than 50% must be reassessed (re-submit required work by an appointed date in accordance with the requirements for individual modules).

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities *etc.*).

Compensation

This module is not compensatable.



MEDICATION SAFETY, OPEN COMMUNICATION AND LEARNING FROM PRACTICE



Year 5 (M.Pharm.)

MODULE CODE: PHP55220

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Asst. Prof. Juliette O'Connell (JO'C)

Coordinator: Asst. Prof. Juliette O'Connell

AIMS: This module aims to help students develop their knowledge, skills, and attributes in CCF Domain 1 (Personal) and Domain 4 (Pharmacy Care).

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

1. Explain the importance of medication safety and evaluate the potential impact of medication errors on patients, family members and healthcare professionals.
2. Apply systems-based methods to analyse medication safety incidents and identify underlying contributory factors.
3. Evaluate appropriate approaches to error management in pharmacy practice and propose evidence-based strategies for risk reduction.
4. Apply effective communication strategies when managing medication safety incidents, including communication with patients, carers and other healthcare professionals.
5. Explain the principles of Open Disclosure, and apply them appropriately, considering relevant ethical, legal, and patient-centred considerations.
6. Engage in reflective practice and identify opportunities for continuing professional development.

INTEGRATION

Integration level 11 (Trans disciplinary)

Present in the following Integration Schematics:

Theme 1: Example 2

Theme 2: Example 1

Theme 4: Example 1

Theme 5: Example 1

Horizontally within the year: This module builds upon themes covered in other Year 5 modules, including patient safety, professionalism, communication skills, reflective practice, evidence-based practice, quality improvement and interprofessional practice, and aligns horizontally with PHP55106, PHP55110, PHP55330, PHP55400 and PHP55500.

Vertically across years: This module builds upon themes covered in modules through the MPharm programme,



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including medication safety, safe dispensing practice, patient safety, systems thinking, legislation, ethical practice, professionalism, accountability, communication skills, reflective practice, evidence-based practice, quality improvement, risk management and interprofessional practice, and aligns vertically with PHU11106, PHU22106, PHU33106, PHU44101, PHU44202 and PHU44106.

CCF Competencies

All CCF Competencies in Domain 1 (Personal) and the following competencies in Domain 4 (Pharmacy Care):

- Competency 4.4 Provides patient consultations and counselling
- Competency 4.5 Reviews and manages medicines
- Competency 4.6 Leads for safety
- Competency 4.7 Provides medicines information and education

SYLLABUS

Learning Units		Lecturer
1	Medication Safety	JO'C
2	Systems Analysis Methods	JO'C
3	Error Management in Practice	JO'C
4	Effective Communication and Open Disclosure	JO'C
5	Learning from Medication Safety Events	JO'C

COURSE OUTLINE

Students will spend 30 hours per week learning in their placement. This module will be supported by 5 hours of directed study (online learning activities, completing core and recommended reading, and completing assessment activities). Students will also be expected to complete self-directed learning activities of 5 hours per week.

DIRECTED READING

Resources and Core References

The Module Coordinators(s) will recommend and notify of resources, directed reading and core references based on contemporary issues in pharmacy practice related to the module learning outcomes before the beginning of the module.

Note: The reading list will be reviewed annually by the module coordinators and updated as required.

ASSESSMENT

Pass-mark is 50%.

Case-based Online Assessment [100%]

Assessment will be guided by detailed rubrics, which will be provided at the start of the module.



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NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in previous years of the programme.

SUMMARY OF HOURS

Placement Activities	Online	Self-directed study including assessment*	TOTAL	ECTS
75*	5	40	120	5

***Note:** 75 hours placement time aligned with 5 weeks of this module is nominally aligned with PRE module

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations is 50%. See 'Assessment' above. Students should note that College penalties for plagiarism apply.

Note on the use of artificial intelligence (AI) in assignment

Any use of AI by students completing this module must be declared. Any use of AI must align with the College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research (available at <https://www.tcd.ie/academicpractice/resources/gen-ai-hub/>) and uphold the relevant principles, particularly Transparency and Honesty, Responsibility and Accountability

Students are also reminded that they have committed to a Code of Conduct which outlines the defined standards and principles by which you must abide in the academic, clinical and professional environment.

Late work

See policy on late submission of coursework.

Progression and reassessment

Students must satisfy the examiners in this module that they have achieved the learning outcomes. A student who achieves an overall module mark less than 50% must be reassessed (re-submit required work by an appointed date in accordance with the requirements for individual modules).

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities etc.).

Compensation

This module is not compensatable.



PHARMACISTS ADVANCING PRACTICE



Year 5 (M.Pharm.)

MODULE CODE: PHP55330

5 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof. Cicely Roche (CRo)

Coordinator: Assoc. Prof. Cicely Roche (CRo)

AIMS: This module aims to help students develop their knowledge, skills, and attributes, in the context of 'Pharmacists Advancing Practice', in CCF Domain 1 (Personal), Domain 2 (Professional), Domain 3 (Organisation & Management Skills), Domain 4 (Pharmacy Care) and Domain 5 (Public Health).

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

- Illustrate the role of ethical principles in guiding pharmacists' integration of health and medicines laws, policies and guidelines in pharmacy service delivery. [Domains 2 and 4]
- Critically review professional dilemma(s) in pharmacy services. [Domain 3]
- Rationalise professional decision-making at the interface of individualised care and the collective good [Domains 1, 2 & 5]
- Engage in reflective practice and continuing professional development [Domains 1 & 2]

INTEGRATION

Integration level 11 (Trans disciplinary)

Present in the following Integration Schematics:

Theme 1: Example 1, Example 2, Example 3, Example 4

Theme 2: Example 1

Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

CCF Competencies

All CCF Competencies (PSI, 2022) with particular emphasis on:

- 1.2: Confidently makes sound decisions and solves problems
- 1.4: Communicates effectively



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- 2.2: Practises legally and ethically
- 2.4: Adapts to change and innovation
- 3.3: Manages resources and finance
- 3.4: Contributes to continuous quality improvement and risk management
- 4.2: Manages the medicines supply chain
- 4.7: Provides medicines information and education
- 5.1: Participates in population health initiatives
- 5.2: Engages in health promotion activities

SYLLABUS

Material covered will provide the opportunity for students to develop abilities to deal with patient-centred approaches to decision-making through ambiguities likely to present in pharmacy service delivery. These abilities will then be applied within the wider considerations of population health, whilst maintaining due regard for evolving legal, ethical and professional practice.

Learning Units	Lecturer
1 Principles and practice of Advancing Pharmacy Services.	
2 Approaches to ethical decision-making in pharmacy practice.	
3 Addressing the duty-of-care and public-good interface in pharmacy service delivery.	
4 The role of reflective practice in continuing Professional Identity Formation.	

COURSE OUTLINE

Students will spend 30 hours per week learning in their placement. This module will be supported by 5 hours of directed study (online learning activities, completing core and recommended reading, and completing assessment activities). Students will also be expected to complete self-directed learning activities of 5 hours per week.

DIRECTED READING

Resources and Core References

The Module Coordinators(s) will recommend and notify of resources, directed reading and core references based on contemporary issues in pharmacy practice related to the module learning outcomes before the beginning of the module.

Note: The reading list will be reviewed annually by the module coordinator(s) and updated as required.

ASSESSMENT

Pass-mark is 50%.

Case-based Online Assessment [100%]

Learning activities and assessment will be guided by detailed rubrics, which will be provided at the start of the module.

NB: Students will be expected to draw upon knowledge and skills gained in this module both in other clinically focused modules in the current year and wherever relevant in previous years of the programme.



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SUMMARY OF HOURS

Placement Activities	Contact hours	Online module activities, including assessment*	TOTAL	ECTS
75*	0	50	125	5

***Note:** 75 hours placement time aligned with 5 weeks of this module is nominally aligned with PRE module

FURTHER INFORMATION

Pass mark, plagiarism

The pass mark for examinations is 50%. See 'Assessment' above. Students should note that College penalties for plagiarism apply.

Late work

See policy on late submission of coursework.

Progression and reassessment

Students must satisfy the examiners in this module that they have achieved the learning outcomes. A student who achieves an overall module mark less than 50% must be reassessed (re-submit required work by an appointed date in accordance with the requirements for individual modules).

Professional dress code

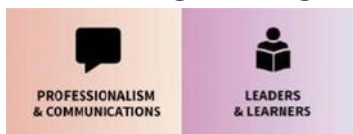
Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities *etc.*).

Compensation

This module is not compensatable.



PHARMACY PRACTICE RESEARCH PROJECT



Year 5 (M.Pharm.)

MODULE CODE: PHP55400
30 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Assoc. Prof Cathal Cadogan, Asst. Prof. Eimear Ní Sheachnasaigh, Asst. Prof. Juliette O'Connell, Assoc. Prof. Máire O'Dwyer, Assoc. Prof. Cicely Roche, Asst. Prof. Rebecca Parkin, Ms. Karen Rossi, Prof. Cristin Ryan, Asst. Prof. Theo Ryan, Assoc. Prof. Sheila Ryder.

External contributors: Other contributors TBC

Coordinator: Asst. Prof. Juliette O'Connell

AIMS: This module will enable the student: (a) to attain skills in developing a research question, (b) to devise investigations to explore a research question, (c) to develop practical research skills in managing a research project, and (d) to undertake high quality, rigorous research.

LEARNING OUTCOMES: On successful completion of this module, students should be able to demonstrate research competence and critical thinking by:

1. Developing, within the research team, a research protocol, using appropriate research methodologies for a research topic assigned to the team by the research supervisor;
2. Demonstrating an understanding of GDPR 2016/679 and Health Research Regulations 2018, if required by the chosen methodology;
3. Understanding and applying relevant principles of ethics and good research practice;
4. Collecting, collating and managing data for research purposes;
5. Analysing and interpreting data systematically and appropriately;
6. Presenting, within the research team, the research project using an appropriate modality, e.g., poster presentation;
7. Producing an individual research paper; and
8. Collaborating as an effective member of a research team throughout the research project.

INTEGRATION

Integration Level: 11 (transdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 4: Example 1

Theme 5: Example 1

Other aspects which may be considered for integrative learning:

Horizontally within the year:

PHP55106 – The health policy, health psychology and evidence-based practice components of PHP55106 provide context for the research project.



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PHP55110, PHP55220, PHP55330 – The precise nature of the research undertaken will vary but it is expected to include the evaluation of practice and clinical topics such as quality, safety and accuracy in the supply of medicines and/or the application of frameworks for risk management. It is also anticipated to link to the justification of decisions, for example, those concerning pharmacovigilance and pharmacoeconomic assessment and/or the critical analysis of the safe and rational use of medicines from multiple perspectives, including those of the patient, of prescribing, dispensing, administration, consumption, monitoring, and/or the identification and reporting of errors/avoidable problems (including adverse drug reactions) and their contribution to patient care and safety.

Vertically across years:

PHU44106 – This module utilizes concepts and skills from evidence-based health care, the application of evidence-based healthcare to the practice of pharmacy, public health, health policy, health economics and pharmacoeconomics.

PHU44112 – It builds upon the skills taught and developed in the research project module of year 4.

SYLLABUS

Material will be covered on the following topics: Information retrieval and bibliographic resources; research question generation; pharmacy practice research methods; data processing and interpretation, presentation and academic writing skills.

COURSE OUTLINE

Online material and activities, on campus training and research presentation, experiential workplace learning. An academic supervisor drawn from the staff of the School of Pharmacy and Pharmaceutical Sciences will oversee each project and will collaborate with students. The academic supervisor will facilitate the general direction of the research project and maintain academic standards. Projects will be assigned by the academic staff of the School. In group projects, individual students will be expected to be accountable for the delivery of specific elements of the project.

This module will primarily be undertaken while the student is on placement. Depending on the nature of the project, it may require ethical approval from the School's Research Ethics Committee (Level 1 or 2 – for low-risk projects, e.g., certain surveys of opinion, audits), the Faculty of Health Sciences Research Ethics Committee (Level 3 – for higher risk projects), and/or ethics committees associated with external bodies such as hospitals. Project design will take account of the workplace setting and standard practice but will require a specific commitment from the student to ensure the quality and completeness of the data collection process.

The syllabus topics will be covered during classes prior to placement commencing, through comprehensive training material (delivered in person and via Blackboard) focusing on research skills, and through associated preliminary workplace activities in research design and planning. Online support will be provided via email contact with the academic supervisor. Discussions among the project groups will occur by email or other mechanism as chosen by group members. Posters will be presented at a seminar at the end of the course.



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DIRECTED READING

Resources and Core References

- Smith F. Conducting Your Pharmacy Practice Research Project, 2nd edn. Pharmaceutical Press; 2010.
- Austin Z, Sutton J. Research Methods in Pharmacy Practice: Methods and Applications Made Easy, 1st edn. Elsevier; 2018.

The Module Coordinators(s) and Project Supervisor(s) will recommend and notify of resources, directed reading and core references based on module learning outcomes and research project aims and objectives at the beginning of the module.

ASSESSMENT

Pass-mark is 50% for all module components.

All components must be passed independently to pass the module. Assessment will be based upon both group and individual contribution:

Protocol (group mark)	20%
Poster Presentation (group mark)	20%
Research Paper (individual mark)	60%

Where failure of the module is contemplated, resubmission and/or an oral examination will be scheduled in advance of the Court of Examiners (see “Progression and reassessment”, below).

Efforts will be made through consultation with supervisor(s) and module coordinator(s) to rectify any issues identified with teamworking within a group. However, if, following attempts at remediation, a student’s teamworking contribution is not adequate, a penalty will be applied on a case-by-case basis to the student’s individual group work grade. This penalty will be made at the discretion of supervisor(s) and module coordinator(s).

SUMMARY OF HOURS

Online Learning Podcast	Introductory Lecture	Methodology Workshop	Contact Hours	Poster Presentation	Independent and Guided Study	Placement Activities	TOTAL	ECTS
1	1	3	4	5	230	360	600	30

Note: 240 hours allocated to module activities (12 weeks X 20 hours) and 360 hours allocated to placement activities (12 weeks X 30 hours).



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FURTHER INFORMATION

Guidance Handbook

A module specific handbook will be provided to students which provides additional information on all key components of the research project.

Pass mark, plagiarism

The pass mark for all assessment components is 50% except where otherwise indicated. See 'Assessment' above. Students should note that College penalties for plagiarism apply.

Note on the use of artificial intelligence (AI) in assignment

Any use of AI by students completing this module must be declared. Any use of AI must align with the College Statement on Artificial Intelligence and Generative AI in Teaching, Learning, Assessment & Research (available at <https://www.tcd.ie/academicpractice/resources/gen-ai-hub/>) and uphold the relevant principles, particularly Transparency and Honesty, Responsibility and Accountability

Students are also reminded that they have committed to a Code of Conduct which outlines the defined standards and principles by which you must abide in the academic, clinical and professional environment.

Late work

See policy on late submission of coursework.

Progression and reassessment

Students must satisfy the examiners in all components of the module independently.

If the group performance is judged unsatisfactory in the Protocol or Poster, oral examination of students will be scheduled in accordance with the requirements for the module. If a student's performance is judged unsatisfactory in the Research Paper, the student may be permitted to undergo reassessment by resubmission by an appointed date and/or oral examination in accordance with the requirements for the module. Only one supplementary attempt will normally be permitted for any failed component. Resubmission marks will be capped at 50% (i.e., the pass mark).

Professional dress code and behaviour

Students must make every effort to complete their work in a timely fashion and to communicate any difficulties that they experience with the lecturer concerned and/or the Module Coordinator and to seek advice or guidance. Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities etc.). Students must respect the confidentiality of all the data that they handle and must follow the School's, College's and national (HRR 2018) requirements for all aspects of data handling, processing and presentation.

Compensation

This module is not compensatable.



EXPERIENTIAL LEARNING AND PROFESSIONAL REGISTRATION EXAMINATION



Year 5 (M.Pharm.)

MODULE CODE: PHP55500

15 ECTS

Staff of the School of Pharmacy & Pharmaceutical Sciences: Asst Prof Eimear Ni Sheachnasaigh (Practice Educator) (ENS), Asst Prof Theo Ryan (TR), staff of the School.

External contributors: APPEL Senior Preceptors, staff of the Schools of Pharmacy in RCSI and UCC, practising pharmacists.

Coordinators: Asst Prof Eimear Ni Sheachnasaigh (TCD), Asst Prof Theo Ryan (TCD).

AIMS: This module aims to enable students to gain competencies as outlined in the Pharmaceutical Society of Ireland Core Competency Framework for Pharmacists (CCF) Domains 1-5 and evaluates their attainment. The module will encompass the legal, clinical, ethical and professional challenges faced by pharmacists in their working environment on a daily basis through Senior Preceptor formative assessment and reflective practice. It will also help raise awareness of the importance and necessity of critical appraisal and lifelong learning and enable students to demonstrate the knowledge, skills and attitudes of a pharmacist. Summative assessment will take place both within and outside the workplace.

LEARNING OUTCOMES: On successful completion of this module, students should be able to:

- Practise patient-centred care professionally, legally and ethically.
- Demonstrate appropriate personal skills including leadership skills, decision-making skills, team working skills and communication skills.
- Review the supply, compounding and dispensing of medicines so that they are conducted in a safe and accurate manner.
- Counsel patients, review and manage their medicines, and identify and manage medication safety issues.
- Engage in health promotion strategies with patients, taking account of population health and public health resources by linking to various national health strategies in areas such as cardiovascular disease, obesity, etc.
- Recognise and practise good organisation and management skills, including quality assurance, as they apply to healthcare provision and pharmacy practice.

INTEGRATION

Integration Level: 11 (transdisciplinary)

Present in the following Integration Schematics (*inter alia*):

Theme 1: Examples 1, Example 2, Example 3, Example 4

Theme 2: Example 1



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Theme 3: Example 1

Theme 4: Example 1

Theme 5: Example 1

SYLLABUS

Material will be covered on the following topics:

Experiential learning, guided by the workplace Senior Preceptor, will address all competencies in Domains 1-6 of the CCF. In addition, students' learning will draw upon and be scaffolded by knowledge, practice tools, behaviours, skills and competencies from all modules of the 5-year integrated programme.

COURSE OUTLINE

Patient-facing experiential learning placement, formative and summative Competency Assessment, mock OSCE examination and Professional Registration Examination (OSCE).

DIRECTED READING – Supplementary references as recommended by Senior Preceptor/academic staff.

ASSESSMENT

Professional Registration Examination (**satisfactory/unsatisfactory**)

Competency Assessment sign-off at Level 'RDY' (ready for independent practice) on all CCF competencies (**satisfactory/unsatisfactory**)

NB: Students will be expected to draw upon knowledge and skills gained in all module content from throughout the previous years of the 5-year integrated programme.

Note:

- To qualify to attempt the Professional Registration Examination students must have achieved a 'satisfactory' grade in the Competency Assessment and have passed all other modules in the 5-year integrated programme.
- Successful completion of this module is conditional on there being no outstanding Fitness to Practice or Disciplinary cases relating to the student.

SUMMARY OF HOURS

Contact hours	Independent and guided study	TOTAL	ECTS
150	225	375	15

FURTHER INFORMATION

Pass mark, plagiarism

A 'satisfactory' judgement for Professional Registration Examination. An independent 'satisfactory'



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judgement must be achieved for the Competency Assessment.

Students should note that College penalties for plagiarism apply to both examinations and continuous assessment.

Late work

See policy on late submission of coursework.

Missed classes/assessments

In common with other modules for the pharmacy degree, attendance at scheduled experiential learning placement for this module is compulsory. A student who is unable to attend placement for any reason must notify their Practice Educator without delay, and present certification as appropriate.

Progression and reassessment

Students must satisfy the examiners in each component of the module independently i.e. the Professional Registration Examination and the Competency Assessment. In the event of an 'unsatisfactory' grade, additional experiential learning may be required as prescribed by the School.

Non-satisfactory reports

Students who have not fulfilled the module requirements with regard to attendance may be reported to the Dean of Graduate Studies as non-satisfactory for one or more terms. Students reported as non-satisfactory may be refused permission to take the Professional Registration Examination and may be required by the Dean of Graduate Studies to repeat the year.

Professional dress code

Students are required to dress appropriately and behave in a professional manner for elements of the course entailing attendance at external facilities (professional experience in pharmacies, case review in hospitals, health service facilities, etc.).

Compensation

This module is non-compensable.

Note: the information in this module descriptor may be subject to change.



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15. SCHOOL POLICIES AND PROCEDURES

In addition to College policies, the School has several policies and procedures. The full policies can be accessed on the School website: <https://www.tcd.ie/pharmacy/school-policies/>. Summaries of selected policies and procedures are provided below.

These include:

- Fitness to Practise Policy
- Policy and Procedures regarding recording and notification of breaches (and potential breaches) of the student Code of Conduct
- Late Submission Policy
- Open Disclosure Policy

Fitness to Practise Policy

This policy outlines the School of Pharmacy and Pharmaceutical Sciences' approach to supporting and assessing students' fitness to practise throughout their programme of study. Its primary purpose is to ensure that students develop and maintain the professional knowledge, skills, behaviours and standards required to practise safely, effectively and ethically, while also protecting patients, the public, the profession, and the wider university community. The policy applies to undergraduate and postgraduate students undertaking programmes with professional practice requirements, including clinical and experiential placements. It is underpinned by principles of fairness, transparency, consistency, respect, inclusion and due process, while recognising that public protection is the overriding consideration when concerns about fitness to practise arise.

The School is committed to supporting students in meeting professional expectations and, wherever possible, addressing concerns at an early stage through guidance, advice, remediation and appropriate support. Most minor concerns can be managed through informal or formal support processes designed to help students reflect on and improve their professional practice. Where more serious concerns arise, the policy provides a structured framework for reviewing and managing these matters through designated Fitness to Practise procedures and committees. Students are afforded clear information about the process, opportunities to respond to concerns raised, and rights of representation and appeal. The policy also recognises the importance of appropriate support and reasonable accommodation for students with disabilities, ensuring that individual circumstances are considered alongside professional and public safety requirements. Overall, the policy seeks to foster professionalism, support student development, maintain confidence in the pharmacy profession, and ensure that graduates are prepared to meet the standards expected of healthcare professionals.

Policy and Procedures regarding recording and notification of breaches (and potential breaches) of the student Code of Conduct

The Policy and Procedures regarding Recording and Notification of Breaches (and Potential Breaches) of the Student Code of Conduct outlines the School of Pharmacy and Pharmaceutical Sciences' approach to identifying, recording and responding to concerns regarding student professionalism and conduct within the MPharm programme. The policy recognises that pharmacy students are preparing to enter a regulated healthcare profession and are therefore expected to uphold the highest standards of ethical and professional behaviour throughout their academic, clinical and professional training. Compliance with the Student Code of Conduct is considered an important indicator of fitness to practise.

The policy establishes a clear, transparent and consistent process for reporting and documenting actual or potential breaches of the Student Code of Conduct through the School's dedicated "Notification and Recording of Student Breaches/Potential Breaches of the Code of Conduct" form. This formal reporting mechanism ensures that concerns are appropriately recorded, reviewed and managed, while also facilitating early



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identification of issues that may require support, guidance or professional development interventions. The policy applies to all School staff and outlines their responsibilities in recognising, reporting and recording concerns. Reports may relate to a range of issues, including academic misconduct, poor engagement, unprofessional behaviour, or matters affecting patient safety. Records are maintained securely, reviewed periodically, and considered collectively to identify any emerging patterns of concern, enabling the School to determine whether supportive measures or more formal procedures may be warranted.

Overall, the policy supports the School's commitment to maintaining professional standards, safeguarding patients and the public, promoting student development, and ensuring compliance with the professional and regulatory expectations of future pharmacists.

Late Submission Policy

The Late Submission Policy sets out the School of Pharmacy and Pharmaceutical Sciences' expectations regarding the timely submission of coursework and assignments within the MPharm (Integrated) programme. The policy emphasises that students are responsible for meeting published deadlines and for communicating with lecturers in advance if circumstances arise that may affect their ability to submit work on time.

The policy promotes fairness, consistency and transparency in the management of late submissions by outlining a framework of academic penalties that may apply when work is submitted after the deadline without prior approval. It also provides guidance on the circumstances in which extensions may be granted, recognising that exceptional personal situations may require flexibility and appropriate consideration. In addition to supporting equitable assessment practices, the policy encourages student engagement, personal responsibility and effective time management, which are important professional skills for future pharmacists. It also sets out the process for seeking support or appealing decisions where concerns arise regarding the application of late submission penalties.

Overall, the policy aims to ensure a consistent approach to assignment submission across programmes while maintaining academic standards and supporting students in fulfilling their educational and professional responsibilities

Open Disclosure Policy

The SOPPS Open Disclosure Policy sets out the School of Pharmacy and Pharmaceutical Sciences' commitment to fostering a culture of openness, honesty and learning in relation to patient safety incidents within the MPharm (Integrated) programme. The policy supports compliance with the Department of Health National Open Disclosure Framework (2023) and aims to ensure that students and staff understand the principles and importance of open disclosure as an integral component of safe, patient-centred healthcare practice. The policy applies to teaching, learning and clinical placement activities within the Pharmacy programme and emphasises the importance of embedding open disclosure principles throughout the curriculum. Students are introduced to these concepts during their studies and are encouraged to develop the communication skills, professionalism and ethical awareness required to participate appropriately in open disclosure processes during their future careers.

The policy also highlights the responsibility of both academic and clinical educators to support a culture of open disclosure through appropriate training and role modelling. Clinical placements are expected to operate in line with relevant professional, regulatory and placement-provider requirements, ensuring that students gain experience in environments where transparency, patient safety and continuous improvement are valued. Overall, the policy seeks to enhance the quality and safety of pharmacy education, support professional standards, and contribute to the preparation of graduates who understand the importance of open communication, learning from incidents, and maintaining public trust in healthcare services.



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16. CODE OF CONDUCT FOR PHARMACY STUDENTS

You are preparing to enter a profession which carries certain expectations and requirements. Membership of a healthcare profession requires the highest standards of professional and ethical conduct. During your education and training you are also obliged to abide by a set of standards. The Code of Conduct (“the Code”) outlines the defined standards and the principles by which you must abide in the academic, clinical and professional environment. You must formally agree to abide by the Code. Every student is personally responsible under the code for his/her own acts or omissions. Compliance with these standards is considered as evidence of fitness to practise.

The Code is based on six core principles:

1. Your primary concern must be to maintain and improve the health, wellbeing, care and safety of patients.
2. Develop your professional competence, skills and standing so as to bring health gain and value to the community and society.
3. Be honest and trustworthy and show respect for others.
4. Conduct yourself in a manner which enhances the service provided to society and which will maintain the good name of your profession.
5. Maintain your professional knowledge and competence.
6. Be aware of your obligations under the Code of Conduct and do not do anything which constitutes a breach of the Code.

The Higher Education Institution with which you are registered as a student (referred to in this Code as “College”) takes seriously any breach of the Code. It is the College’s responsibility to ensure that students are aware that the code should be adhered to throughout students’ registration with the College. If your behaviour fails to meet the standards outlined in the Code, the matter may be referred in accordance with the Higher Education Institution’s relevant policies and regulations. Individual and/or repetitive breaches of the Code will be dealt with on a case-by-case basis under the relevant College disciplinary and/ or Fitness to Practice policies and procedures. Repetitive breaches will be reviewed cumulatively, and will warrant further, possibly more serious sanctions. Decisions will be made on a case-by-case scenario and will be judged by reference to the principles set out in the Code. A range of sanctions may be applied, up to and including withdrawal from the MPharm programme. The Pharmaceutical Society of Ireland’s sanctioning guidelines will not be enforced as are applicable only to those registered as practising pharmacists.

The following information is to direct you on the proper use of the Code in terms of your relationships and interactions with staff, fellow students, placement tutors, patients, carers, and other individuals with whom you come into contact.



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Principle 1

- **Your primary concern must be to maintain and improve the health, wellbeing, care and safety of patients.**

Throughout your education and training you are required to develop knowledge, skills, attitudes and values intrinsic to your practise as a competent healthcare professional. As part of your course you will engage with patients and gain knowledge and experience in the clinical and professional setting. Even when you are not in direct contact with patients, you must make the health, well-being and safety of patients your main concern. All other principles must be read in light of this first principle.

As a student you must:

- 1.1. Always bear in mind your future role as a healthcare professional when studying. This applies equally to all aspects of your education and training.
 - 1.1.1. Take responsibility for your work, studies and behaviour.
 - 1.2.1. Apply your learning for the maximum benefit of patients.
 - 1.2.2. Behave in a trustworthy and professional manner.
- 1.2. Ensure that your beliefs and actions do not compromise patient care.
 - 1.2.1. Recognise and respect the rights of patients.
 - 1.2.2. Never discriminate on the basis of gender, religion, age, civil status and family status, disability, sexual orientation, race ethnicity, or membership of the Travelling community.
 - 1.2.3. Be prepared to undertake physical examination of patients if appropriate.
 - 1.2.4. Adhere to the dress codes of the College, clinical and professional environment (clinical and professional placements).
- 1.3. Never knowingly allow your judgment to be influenced by personal interests.
 - 1.3.1. Do not abuse the trust of a patient and maintain proper professional boundaries, especially with children and vulnerable adults.
 - 1.3.2. Do not make decisions for personal interest or gain that in any way may adversely affect the health and welfare of patients and the public.
- 1.4. Never knowingly mislead others.
 - 1.4.1. You should introduce yourself by name to patients and always make it clear to patients and the public that you are a student and not a qualified healthcare professional.
 - 1.4.2. You must never recommend a medical treatment or course of action to anyone unsupervised.
 - 1.4.3. You should never misrepresent data or information that could adversely affect the health and welfare of patients and the public.
- 1.5. Never compromise patient care.
 - 1.5.1. Raise concerns as soon as possible with an appropriate member of staff if you believe that patient safety or care could be compromised.
 - 1.5.2. Be prepared to challenge the judgement of others if you have reason to believe that their decisions could compromise safety of care.



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Principle 2

- **Develop your professional competence, skills and standing so as to bring health gain and value to the community and society.**

It is your responsibility to acquire all necessary knowledge, skills, values, attitudes and behaviours to become a competent practitioner and not impede other students in acquiring the same knowledge and skills. This should guide you in your academic education, training and during clinical and professional placements

As a student you must:

- 2.1. Take responsibility for your learning.
 - 2.1.1. Use every opportunity to learn. Attend classes. Be punctual. Be contactable. Plan and use your time effectively.
 - 2.1.2. Reflect on feedback about your performance and respond constructively.
 - 2.1.3. Make informed decisions.
- 2.2. Engage constructively in assessment.
 - 2.2.1. Complete and submit your course work on time.
 - 2.2.2. Appropriately reference the academic work of others.
 - 2.2.3. Never misrepresent data, coursework or information that could result in the awarding of a grade not reflective of your competence.
- 2.3. Recognise and stay within the limits of your competence.
 - 2.3.1. Recognise your limitations and ask for help, where and when appropriate.

Principle 3

- **Be honest and trustworthy and show respect for others.** Demonstrating respect for the dignity, views and rights of others is fundamental in forming and maintaining appropriate relationships with academic staff, fellow students, placement tutors, patients, carers, and other individuals with whom you come into contact. All health professionals must be guided by their primary responsibility to act in the best interests of their patient without influence of any personal consideration. The patient-health professional relationship is a privileged one and is based on trust and professionalism which are enshrined in the ethical principles of beneficence, non-maleficence, autonomy and justice.

As a student you must:

- 1.1. Act in the best interest of the patient and contribute to the safety of patients.
- 1.2. Accept and agree to be bound by the ethical principle of autonomy.
 - 1.2.1. Obtain consent from the patient before you interview or examine him or her. The patient should be offered a chaperone as appropriate. In the case of a minor patient, obtain the consent of the parent or legal guardian before you interview or examine the minor patient.
 - 1.2.2. Respect the patient's right to refuse health care or to take part in teaching.
- 1.3. Preserve the confidentiality of the patient at all times. This includes personal data that is in their



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clinical records as well as information they disclose to you during a consultation.

3.3.1 Do not share medical information with anyone except those health care professionals involved in the care of the patient.

3.3.2 Make sure that patients, or anyone close to them, cannot be identified outside the clinical setting or protected virtual learning environment. This includes conversations and discussions on social networking sites, texts or e-mails, recordings of interviews or assignments on e.g. smart-phones and/or YouTube, and pictorial records, e.g., photographs and/or video clips.

3.3.3 Recognise the circumstances when confidential information may be disclosed without consent.

1.4. Accept and agree to be bound by the ethical principle of justice.

1.4.1. Recognise and respect the rights of the patient to fair treatment and care.

1.5. Be honest and trustworthy.

1.5.1. Identify yourself truthfully.

1.5.2. Represent your qualifications, position and abilities honestly on all applications.

1.5.3. Do not knowingly mislead others

1.5.4. Be truthful in verbal and written communications

1.5.5. Use research and laboratory data honestly and ethically, seeking permission to use data as required.

1.5.6. Ensure any funds you are responsible for are used for the purpose they are intended.

1.5.7. Decline gifts from the pharmaceutical, medical device or biotechnology industries.

1.5.8. Do not plagiarise.

1.5.9. Be truthful in all your interactions with staff in both the College and in professional placements.

Principle 4

- **Conduct yourself in a manner which enhances the service provided to society and which will maintain the good name of your College and profession.**

The public trusts healthcare professionals. As a student, and throughout your career, you must justify that trust by acting with integrity and professionalism. You should be aware of the importance of looking after your own health and how it impacts on you and your professional responsibilities. You need to develop skills to work on a multidisciplinary team to deliver a high standard of care and ensure patient safety. You need to be able to work effectively with patients, staff, colleagues and healthcare professionals.

As a student you must:

4.1. Recognise the importance of self-care and take responsibility for your own health, especially if it may impact negatively on other people.

4.1.1. Seek prompt and appropriate professional advice about your general wellbeing, i.e. your physical or mental health, or substance use or other issues which may impact on your ability to complete your studies or interact with patients, staff or colleagues.

4.1.2. Inform appropriate staff if there is anything that could impair your ability to study or to practise as a professional.

4.1.3. Inform appropriate staff if you are being affected by a major life event e.g. bereavement that may impair your ability to practise as a professional



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- 4.1.4. Inform appropriate staff if you have, to your knowledge, any disability or medical condition that might affect your ability or role as a future healthcare professional, or that might put patients at risk.
- 4.1.5. Inform appropriate staff if you take medicines that may impair your judgment and impact on the safety of others.
- 4.1.6. Respect the confidentiality of your colleagues but appropriately disclose information of concern to include information regarding 4.1.1 above as relevant to your colleagues.
- 4.2. Learn how to work in partnership with others in College, on professional placement, and with patients and their carers in the management of their treatment and care.
 - 4.2.1. Recognise the expertise of healthcare professionals.
 - 4.2.2. Respect the knowledge and skills of those involved in your education.
 - 4.2.3. Be aware of the limitations of your knowledge and skills.
- 4.3. Treat others politely with consideration and respect.
 - 4.3.1. Recognise diversity and respect the cultural differences, values and beliefs of others.
 - 4.3.2. Refrain from behaviour that includes intimidation, foul language, threats of violence or retaliation.
 - 4.3.3. Listen to, and respect, the opinions of others and be non-judgemental in your attitudes toward them.
- 4.4. Learn how to communicate effectively.
 - 4.4.1. Ensure you have adequate English Language skills.
 - 4.4.2. Learn how to listen to patients and their carers and communicate effectively with them in a way they can understand.
 - 4.4.3. Learn how to communicate effectively with others including academic staff, placement tutors and other healthcare professionals.

Principle 5

- **Maintain your professional knowledge and competence**

At all stages of your professional journey you must take responsibility for ensuring your knowledge and skills are up-to-date and that you maintain your competence. You have engaged in a career of lifelong learning and teaching.

As a student you must:

- 1.1. Commit to developing, and continuously improving, your professional knowledge and competence.
- 1.2. Learn from experience and grow from the knowledge gained from errors to avoid repeating them.
- 1.3. Ensure that you are aware of continuing professional development requirements.

Principle 6

- **Be aware of your obligations under the Code of Conduct and do not do anything which constitutes a breach of the Code.**

It is the responsibility of all students to make every reasonable effort to ensure that everything they do conforms with the principles laid down in the Code of Conduct.



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As a student you must:

- 6.1. Ensure you are aware, apply and adhere to the principles of the Code of Conduct.
 - 6.1.1. Promote and support the principles of the Code of Conduct by example.
 - 6.1.2. Refrain from any activity that would negatively affect the reputation of the College, or your intended profession.
 - 6.1.3. Report breaches of the Code of Conduct to the appropriate person (e.g. Head of School, member of staff in College or on placements).
- 6.2. Obey the law.
 - 6.2.1. Inform an appropriate member of staff immediately if you are the subject of any criminal legal proceedings.
- 6.3. Comply with College Policies, Rules and Regulations, and those of other organisations linked to your studies.
 - 6.3.1. Respect all College, and clinical and professional placement policies, procedures and property. Never willingly cause damage to such property, remove property from the premises in which it is located, or make use of property for personal reasons.
 - 6.3.2. Ensure that you are contactable.
 - 6.3.3. Supply accurate information in response to lawful requests and update that information as necessary.
 - 6.3.4. Cooperate with honesty and openness in formal investigations about you or others.
- 6.4. Comply with health and safety requirements.
 - 6.4.1. Comply with the College's health requirements and health policies.
 - 6.4.2. Comply with the College's, clinical and professional placements' safety requirements, including dress code and other safety requirements.

This code was guided by the following professional standards:

- Code of Conduct for Pharmacists from the Pharmaceutical Society of Ireland (2009) The Pharmaceutical Society of Ireland
- Code of Conduct for Pharmacy Students (2010) General Pharmaceutical Council Great Britain
- Guidelines for Medical School on Ethical Standards and Behaviour appropriate for Medical Students (2011) Irish Medical Council
- Guide to Professional Conduct and Ethics for Registered Medical Practitioners (2009) Irish Medical Council
- Rules of Professional Conduct Incorporating Code of Ethics and Guidelines for Professional Behaviour (2010) Irish Society of Chartered Physiotherapists.

We acknowledge the prior permission of Mr Damian Day of the Royal Pharmaceutical Society of Great Britain (RPSGB) to reproduce extracts from the Code of Conduct for Pharmacy Students, written by the RPSGB and adopted by the General Pharmaceutical Council of Great Britain.

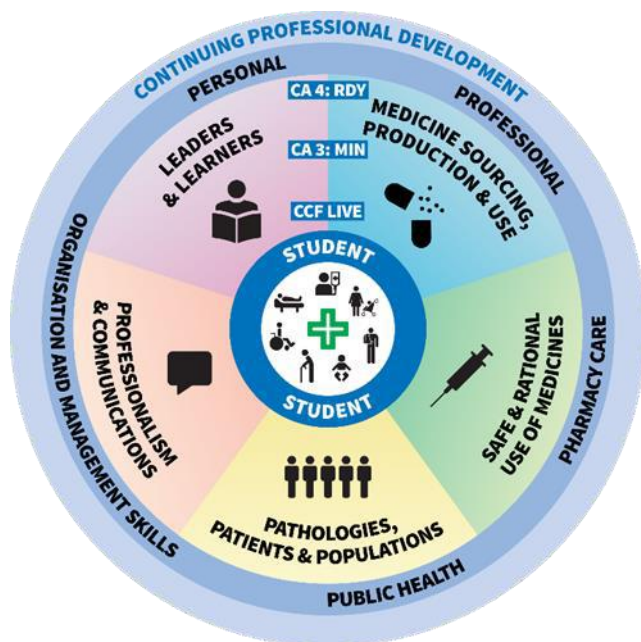


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17. Pharmacy (Integrated) Programme Teaching and Learning Strategy

Philosophy

The Teaching and Learning Strategy is informed by the Pharmacy (Integrated) programme framework, encapsulated in the figure below.



Pharmacy (Integrated) Programme Framework Principles

- *Core objective: Development of pharmacists whose practice will maintain and improve health, wellbeing, patient care and medication safety, whether independently or within healthcare teams in patient-facing settings, or in non-patient-facing settings (e.g. industry, research).*
- *Student-centred: Encouraging personalized learning and accommodating diversity.*
- *Integration of the curriculum, teaching, learning and assessment through five overarching themes: Medicines sourcing, production and use; safe and rational use of medicines; pathologies, patients and populations; professionalism and communications; leaders and learners.*
- *Progressive development and evaluation of students' competencies through CCF-Live, CA 3 (MIN) and CA 4 (RDY)³, culminating in demonstration of readiness for independent practice in all competencies within the five domains of the Pharmaceutical Society of Ireland's Core Competency Framework for Pharmacists: Personal; Professional; Organisation and Management Skills; Pharmacy Care; Public Health.*
- *Inculcation of a commitment to continuing professional development.*

Strategic principles

The Teaching and Learning Strategy implements and builds upon the programme framework above, through application of the following key principles:

- Teaching and learning are profession-focused, within a culture of professionalism in which staff lead by example. Teaching and learning approaches in every module across the Pharmacy (Integrated) programme must be considered for their suitability in preparing students for professional practice as

³ CCF-Live: Programme components requiring application of the Core Competency Framework (CCF) in the practice environment. CA 3 and CA 4: Competence Assessment and Performance Appraisal of CCF behaviours at level 3 (MIN: Requires minimal supervision) and level 4 (RDY: Ready for independent practice).



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pharmacists. Wherever possible, teaching and learning activities should be linked to the Core Competency Framework for Pharmacists of the Pharmaceutical Society of Ireland.

- Teaching and learning are grounded in well-evidenced pedagogic frameworks and techniques. While specific approaches may vary across modules as appropriate, core pedagogic frameworks that underpin the programme as a whole are Harden's integration ladder⁴ and Miller's pyramid of clinical competence⁵.
- Teaching and learning are student-centred. This includes addressing students' diverse learning needs through the principles of universal design for instruction articulated in the *Trinity Inclusive Curriculum*, incorporating opportunities for feedback, reflection and remediation, and accommodating students with disabilities insofar as practicable in keeping with College policies, and promoting collegiality, civility and respect among students and staff.
- Teaching and learning are in keeping with the spiral nature of the curriculum: There is horizontal and vertical integration within the programme, guided by the five key integration themes, with progressive depth and complexity as themes are revisited, increasing the intellectual and professional demands of the campus- and practice-based components as students progress through the programme.
- Where appropriate, there is also integration with the teaching and learning of other healthcare professions and allied biomedical sciences, and interprofessional collaboration with students of other healthcare professions takes place in all years of the programme.
- Teaching and learning are directed at the achievement of clinical excellence, underpinned by a strong scientific foundation, including social and behavioural sciences. Besides their subject-specific content, modules must include an array of activities that collectively across the programme develop students' consultation, counselling and communication skills, leadership skills, peer review and assessment skills, critical and analytical skills, students' understanding of research methods, and skills in problem-solving, rational decision making and evidence-based practice.
- Teaching and learning approaches empower students to take responsibility for their own learning, develop their capacity for self-appraisal, formulating personalized learning plans and independent learning, inculcate a commitment to Continuing Professional Development and foster students' skills in reflective professional and ethical practice. This is supported by a strong ethos of formative assessment throughout the programme.
- Teaching and learning are research-led, with staff drawing upon cutting edge research in developing both the programme content and its delivery.
- There are clear lines of communication with students about teaching and learning, with open and bi-directional dialogue.
- Teaching and learning are evidence-based wherever possible (both in their content and in their methodology), current, and subject to ongoing review for suitability and quality.

⁴ Harden RM. The integration ladder: a tool for curriculum planning and evaluation. *Med Educ* 2000 Jul;34(7):551-7. doi: 10.1046/j.1365-2923.2000.00697.x.

⁵ Miller GE. The assessment of clinical skills/competence/performance. *Acad Med* 1990 Sep;65(9 Suppl):S63-7. doi: 10.1097/00001888-199009000-00045.



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- Teaching and learning facilitate students' access to a diverse range of modules by participation in initiatives such as the Trinity Electives and international exchange programmes such as the Erasmus (*EuRo*pean Community Action *Sch*eme for the *Mo*bility of *Un*iversity *Stu*dents) programme.
- The School will, with College, support academics to engage in teaching and assessment pedagogy.

Outcomes

The Teaching and Learning Strategy is designed to contribute to:

- A fully integrated programme that balances science with practice, and university-based learning with practice-based experiential components that provide meaningful interaction with patients, carers, the public and other healthcare professionals.
- The attainment of the graduate attributes approved by the University Council, namely the capacity to think independently, to communicate effectively, to act responsibly and to develop continuously. These are grounded in the following translational attributes: breadth of scholarship; independent reflective thinking; intellectual and professional agility and adaptability; capacity for creativity; social and cultural understanding and awareness; a global outlook.
- The attainment of the Pharmacy (Integrated) programme outcomes and individual module learning outcomes, including demonstration of readiness for practice in all competencies within the PSI's *Core Competency Framework for Pharmacists*.
- The development of graduates who are fit to apply to the Pharmaceutical Society of Ireland for registration as pharmacists and to practise safely and effectively.

Alignment

Teaching and learning are in keeping with:

- University policies and procedures, in particular the core objectives of the Trinity Education Project, namely to:
 - Promote a research inspired curriculum;
 - Introduce flexibility in programme patterns allowing for engagement with other disciplines, opportunities for study abroad, and internships;
 - Develop the key skills of critical thinking, problem recognition, problem-solving, adaptability, leadership skills, collaborative working and effective communication;
 - Ensure curricula enhanced through the use of new technologies and new learning paradigms;
 - Embed where possible the innovation and entrepreneurship strategy;
 - Expand engagement with employers;
 - Promote non-traditional modes of assessment;
 - Promote best teaching practice and best education.
- The School mission.
- The Pharmacy (Integrated) programme outcomes and individual module learning outcomes.
- The standards required of a Level 9 university programme (Quality and Qualifications Ireland).
- The European Credit Transfer and Accumulation System (ECTS).



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- Legislation and guidance relating to the education and training of pharmacists, notably Directive 2005/36/EC, EU Directive 2019/6, Directive 2001/83/EC, the Pharmacy Act 2007, the European Communities (Recognition of Professional Qualifications Relating to the Profession of Pharmacist) (No. 2) Regulations 2008, the Pharmaceutical Society of Ireland (Education and Training) (Integrated Course) Rules 2014, and the Advisory Committee on Pharmaceutical Training Report and Recommendations on Pharmaceutical Education Undergone at Higher Education Institutions (adopted by the Committee at its meeting on 3 and 4 May 1994) (XV/E/8341/6/93), taking into account any amendments.
- The Pharmaceutical Society of Ireland's Accreditation Standards for the Five-Year Fully Integrated Masters Degree Programmes in Pharmacy.

In addition, teaching and learning is designed in such a way that it can be assessed in accordance with the Pharmacy (Integrated) Programme Assessment Strategy, and it is reviewed and evaluated in accordance with both University policies and procedures and the operation and procedures of the Programme Management Committee (PMC). While all stakeholders (academic staff, module co-ordinators, students/student representatives) are involved in the process of evaluating teaching and learning, the PMC provides a forum to ensure objective reporting and constructive dialogue. Furthermore, the PMC has an oversight role with regard to the mapping of teaching and learning against the programme curriculum, it monitors quality assurance and has responsibility for ensuring the quality of teaching and learning procedures. External feedback on teaching and learning procedures is in line with University policy.

Format

The teaching and learning approaches used in the Pharmacy (Integrated) programme should vary according to the topic, the stage of the programme, and the learning outcomes. The following are encouraged:

- A constructivist approach, with progression of skills through successive related modules.
- Use of a variety of techniques, as appropriate, in order to accommodate different learning preferences and styles.
- Incorporation of case-based and problem-based learning, particularly problems drawn from pharmacy practice.
- Active and interactive learning, through practicals, workshops, seminars, peer engagement, student-led activities and patient-directed activities.
- A holistic design approach in which teaching and learning (including learning outcomes) are considered together with curriculum and assessment in an integrated manner, in order to ensure not only attainment of the required competencies but demonstration of them.
- The fostering of reflective practice and meta-learning through individual review of learning needs, personal goals, development activities and achievements on a cyclical basis, and a strong focus on formative assessment.
- Technology-enhanced teaching and learning, with the integration of e-learning activities into the programme where appropriate.
- Interprofessional learning, where students engage with students of other healthcare disciplines both in the online environment and face to face, learning with, from and about each other with a view to improving collaboration and the quality of patient care.
- Experiential learning, especially through workplace-based and workplace-simulated activities.

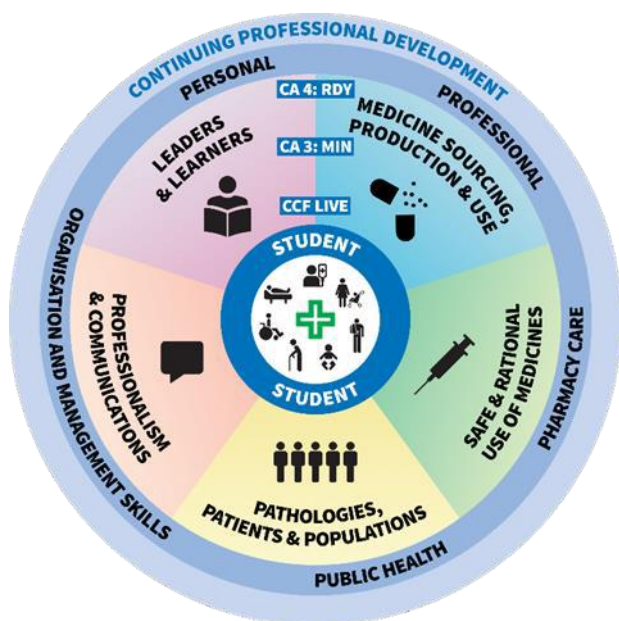


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18. Pharmacy (Integrated) Programme Assessment Strategy

Philosophy

The Assessment Strategy is informed by the Pharmacy (Integrated) programme framework, encapsulated in the figure below.



Pharmacy (Integrated) Programme Framework Principles

- *Core objective: Development of pharmacists whose practice will maintain and improve health, wellbeing, patient care and medication safety. , whether independently or within healthcare teams in patient-facing settings, or in non-patient-facing settings (e.g. industry, research).*
- *Student-centred: Encouraging personalized learning and accommodating diversity.*
- *Integration of the curriculum, teaching, learning and assessment through five overarching themes: Medicines sourcing, production and use; safe and rational use of medicines; pathologies, patients and populations; professionalism and communications; leaders and learners.*
- *Progressive development and evaluation of students' competencies through CCF-Live, CA 3 (MIN) and CA 4 (RDY)⁶, culminating in demonstration of readiness for independent practice in all competencies within the five domains of the Pharmaceutical Society of Ireland's Core Competency Framework for Pharmacists: Personal; Professional; Organisation and Management skills; Pharmacy Care; Public Health.*
- *Inculcation of a commitment to continuing professional development.*

Assessment influences the curriculum and it drives student learning. It has different purposes including:

- to measure achievement (summative assessment/ assessment of learning);
- to engender learning (formative assessment/ assessment for learning);
- to enable learners become aware of how they learn (assessment as learning).



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⁶ CCF-Live: Programme components requiring application of the Core Competency Framework (CCF) in the practice environment. CA 3 and CA 4: Competence Assessment and Performance Appraisal of CCF behaviours at level 3 (MIN: Requires minimal supervision) and level 4 (RDY: Ready for independent practice).

Assessment in the Pharmacy (Integrated) programme is based upon the well-evidenced pedagogic principles and frameworks of Harden's integration ladder⁷ and Miller's pyramid of clinical competence⁸.

The Assessment Strategy of the School of Pharmacy and Pharmaceutical Sciences (SoPPS) for the Pharmacy (Integrated) programme is underpinned by the following principles, which are consistent with the Trinity Education Project (TEP) and its Assessment Framework⁹:

Assessment supports the acquisition of graduate attributes: Graduate attributes are embedded and assessed incrementally and systematically throughout the programme, through a diverse and complementary range of assessments.

Assessment supports learning: Assessment is valid, reliable, transparent, relevant and conducive to effective learning, whilst protecting academic and professional standards. It supports future as well as present learning.

Assessment is programme-focused: Assessment is an integral part of the Pharmacy (Integrated) programme design and development. A range of purposeful assessment tasks are mapped and integrated throughout the programme. By shifting the balance away from the traditional end-of-year summative assessment, more integrative assessment practices will be considered. Assessment approaches are designed to avoid learners learning to the test or engaging in superficial strategic learning. Assessment pedagogy follows international best practice and evolves in relation to scientific and professional advances.

Assessment supports meta-learning: Assessment should build and reward student ability to reflect on and critically evaluate their own learning, and to assess the quality of their performance against agreed standards. Assessment can build student capacity to use these skills of judgment to influence future learning and practice.

Assessment actively engages students: Real-world assessment tasks engage students in deeper learning. Dialogue about the assessment process is encouraged amongst and between staff and students so that the purposes and standards of assessment are understood (assessment literacy), and effective and timely feedback can be provided to students. Quality improvement of assessment is ongoing and prospective. Changes to the curriculum and assessment may be either pro-active or reactive, in response to developments in accreditation standards, scientific/technical progress, external examiner or student feedback, professional matters or changes to pharmacy practice. Clear guidance is provided to students relating to the assessment of stated professional and learning outcomes in the Student Course Handbook.

Assessment is aligned with the programme Teaching and Learning Strategy, which emphasises a profession-focused approach, integrated across overarching themes, underpinned by a strong scientific foundation. Professional, clinical and scientific elements are considered concurrently as part of overall assessment evaluation of the Pharmacy (Integrated) programme.

Assessment at the individual student level includes assessment against the Pharmaceutical Society of Ireland's *Core Competency Framework*. Assessment emphasizes, monitors and promotes patient safety, while clearly defined marking criteria reflect safe and effective practice.



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⁷ Harden RM. The integration ladder: a tool for curriculum planning and evaluation. Med Educ 2000 Jul;34(7):551-7. doi: 10.1046/j.1365-2923.2000.00697.x.

⁸ Miller GE. The assessment of clinical skills/competence/performance. Acad Med 1990 Sep;65(9 Suppl):S63-7. doi: 10.1097/00001888-199009000-00045.

⁹ TEP Assessment Framework, approved by Council 11 May 2016

Assessment practices should engage students and encourage them to take responsibility for their learning. Assessment should enable students to become more reflective about their learning, more active and independent as learners, and promote ownership of learning, self-regulation, student autonomy and higher order learning.

The School will, with College, support academics to engage in *teaching and assessment pedagogy*.

Outcomes

The Assessment Strategy is designed to contribute to:

- The attainment of the graduate attributes as approved by University Council: *to think independently, to communicate effectively, to act responsibly and develop continuously*. These are grounded in the following translational attributes: *breadth of scholarship; independent reflective thinking; intellectually and professionally agile and adaptable; capacity for creativity; social and cultural understanding and awareness; global in outlook*.
- The attainment of the Pharmacy (Integrated) programme outcomes and individual module learning outcomes, including consistent demonstration of all competencies within the PSI's *Core Competency Framework for Pharmacists*.
- The development of graduates who are fit to apply for registration as pharmacists with the Pharmaceutical Society of Ireland and to practise safely and effectively.

Alignment

Assessment of the Pharmacy (Integrated) programme is aligned with:

- The TEP and particularly, Strand 3, Assessment. This will be reflected in University policy and the Calendar.
- Existing University policies and procedures, in particular those relating to examinations and the appeals process, to which the student body must have open access.
- The School mission.
- The Pharmacy (Integrated) programme outcomes and individual module learning outcomes.
- The standards required of a Level 9 university programme (Quality and Qualifications Ireland).
- The European Credit Transfer and Accumulation System (ECTS).
- Legislation and guidance relating to the education and training of pharmacists, notably Directive 2005/36/EC, Directive (EU) 2019/6, Directive 2001/83/EC, the Pharmacy Act 2007, the European Communities (Recognition of Professional Qualifications Relating to the Profession of Pharmacist) (No. 2) Regulations 2008, the Pharmaceutical Society of Ireland (Education and Training) (Integrated



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Course) Rules 2014, and the Advisory Committee on Pharmaceutical Training Report and Recommendations on Pharmaceutical Education Undergone at Higher Education Institutions (adopted by the Committee at its meeting on 3 and 4 May 1994) (XV/E/8341/6/93), taking into account any amendments.

- The Pharmaceutical Society of Ireland's Accreditation Standards for the Level 9 Five-Year Fully Integrated Masters Degree Programme in Pharmacy, including specific requirements with regard to assessment of professionalism, consultation, counselling and communication skills; problem-solving, rational decision-making, research and critical analytical skills as well as interprofessional teamworking and leadership skills. The Assessment Strategy includes demonstration of distinct competencies in the dispensing and supply of medicines, pharmaceutical calculations, pharmacy law, pharmacy practice (including clinical practice and therapeutics), ethics professional competence and the nature of assessments for this purpose.

In addition, evaluation of assessment is aligned with the operation and procedures of the Programme Management Committee (PMC). While all stakeholders (academic staff, module co-ordinators, students/student representatives) are involved in the process of evaluating assessment procedures, the PMC provides a forum to ensure objective reporting on assessments, constructive dialogue and evaluation of assessment. The PMC will engage in assessment mapping to avoid assessment overlaps and/or gaps. The PMC monitors quality assurance and has responsibility for ensuring assessment quality, in particular the validity and relevance of summative assessment (including, for example, oversight of the Objective Structured Clinical Examination [OSCE] validation and review process undertaken by academics/practitioners operating independently of OSCE case developers). External feedback on assessment procedures including their relevance and validity is in line with University policy.

Formats and procedures

Assessment methodology used in the Pharmacy (Integrated) programme, and its evaluation, should encompass the following approaches:

- A. High quality summative assessment will continue to play a key role in the School's approach to assessment and learning. These should be meaningful, streamlined and sufficient; assessment mapping will be useful in monitoring for over-assessment.
- B. Assessments should be distributed across the academic year to minimize student burden. End of semester examination is in place, eliminating the need for end-of-year examinations where possible.
- C. Broad scale assessment pedagogies (*e.g.* OSCEs, CAs) are encouraged because of their special suitability to programme-based assessment. Summative assessments can be broad-based but alternative methods and approaches provide increased flexibility and assurance in reaching teaching and learning goals of the Pharmacy (Integrated) programme. Formative and meta-assessment approaches can complement summative approaches in integrating discipline-based knowledge and its application in the pharmacy/real- world context.
- D. Assessments should explicitly assess graduate attributes alongside pharmacy knowledge and core competencies. Broad-based assessment that supports the integration themes underpinning the School's teaching and learning assessment is strongly encouraged. A diverse range of assessment approaches can support this model.
- E. Learners will be encouraged to engage in meta-learning, for example by challenging them to comment on strengths and weaknesses in their own work or by otherwise engaging in the assessment process.



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- F. *Reflection*: Assessment should include activities that explicitly endorse and involve critical reflection, self-critique and evaluation; throughout the programme use of reflective practice logs or ePortfolios incorporating critical reflection is encouraged.
- G. *Self and Peer assessment*: Emphasis will be placed on peer feedback and self-assessment where students make evaluative judgements on their own work and that of others.
- H. The use of complementary formative and meta-assessment approaches will close gaps in learning in association with assessment mapping exercises.
- I. Appropriate forms of assessment will be used to promote and exploit inter-professional learning, for example self-reflective learning cycles or presentation by pharmacy students to other healthcare disciplines.
- J. Assessment will be authentic and relevant, connecting university to real-world challenges. Assessment methods position knowledge, understanding and competence development in a pharmacy context for example, clinical and other case studies, OSCEs or laboratory-based assessments of a professional analytical competency. Special attention needs to be paid in such cases to quality assurance in relation to assessor training, benchmarking, relevance of the test procedure to the assessment and to demonstration of the achievement of the learning outcome.
- K. Selection of assessment formats and modalities should be consistent with the evolution of learning and learner maturity and in line with the Miller's pyramid of clinical competence. These formats include OSCEs, Competency Assessments (CAs), integrated clinical pharmacy assessment across modules and peer assessment. Such procedures are suitable for demonstrating the achievement of critical competencies. The growth and formation of the student in knowledge content and application, and the corresponding response in assessment procedure, is reflected in the Pharmacy (Integrated) programme framework.
- L. Assessment data should be designed to facilitate evaluation of both individual student performance and development, and of aggregate student performance (e.g. across a module or across a course year).

Assessment data should be reviewed to detect gaps in student learning and competency.

- When ongoing assessment (formative or summative) during a module indicates an area for concern in a student's performance, the module co-ordinator or relevant academic liaises with the student to facilitate remediation and/ or with the student's personal tutor.
- A report on module assessment outcomes is submitted by each module co-ordinator on an annual basis to the Director of Teaching and Learning (Undergraduate) or the M.Pharm. course coordinator. Assessment data is stored and readily retrievable, allowing analysis of trends over time for individuals, modules and overall programme results.



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19. EXAMINATION & PROGRESSION REGULATIONS ACADEMIC YEAR 2026-27 | B.Sc. (Pharm.)

GENERAL REGULATIONS

General College Regulations shall apply as set out in the University Calendar (2026-27) Part II (Undergraduate Studies) in the chapter B1 'General Regulations and Information': www.tcd.ie/calendar

Particular attention is drawn to the following:

CONDUCT OF EXAMINATIONS AND SUBMISSION OF ASSESSED WORK.

University Calendar (2026/27) Part II (Undergraduate Studies), B1 General Regulations and Information, II Academic Progress, *Conduct of examinations and submission of assessed work*, §§34-58 (<https://www.tcd.ie/calendar/undergraduate-studies/>).

³⁴ Programmes have discretion to utilise a broad range of assessment practices that are programme-focussed, equip students to apply their learning in contexts beyond the University and assess the graduate attributes appropriately throughout the programme. An assessment component is a discrete unit of assessment, e.g. an examination paper, an essay, an oral/aural examination, practical, field trip, professional placement, or performance which contributes a defined weighting to the overall assessment for a module. Programmes must make available to students details of the assessment components, together with their weightings, for each module, including details of penalties applying for late submission.

³⁵ Students are entitled to receive feedback on submitted coursework in line with the return of feedback on assessments policy. See www.tcd.ie/about/policies/academicpolicies.

³⁶ There are formal University assessment sessions following the end of teaching term in semester one (in Michaelmas term) and following the end of teaching term in semester two (in Trinity term). Students are assessed at the end of semester one in all modules that are taught only in semester one and at the end of semester two in all year-long modules and all modules that are taught only in semester two. There is one reassessment session which is held at the beginning of Michaelmas term. Students are assessed in all failed modules from both semesters during the reassessment session. The University reserves the right to amend assessment methods and the timetable for assessments for any reason and at any stage during the academic year. All teaching and assessments are subject to public health advice and guidance as and when issued.

³⁷ The dates of these formal assessment sessions are given in the Calendar PART I - ALMANACK. Examinations should be confined to these sessions. However, if and when approved by the University Council, certain courses, normally professional, are permitted to hold examinations outside of the standard academic year structure. The University Council may also approve additional contingency dates on which to hold examinations outside of the standard academic year structure.

³⁸ Examination timetables are published four weeks in advance of the formal start date of each assessment period on the my.tcd.ie portal. The College reserves the right to alter the published time and date of an examination in exceptional circumstances. Students should ensure that they are available for examinations for the duration of the relevant formal assessment session and approved contingency dates as stated in the Calendar PART I - ALMANACK.

³⁹ No notice is required of intention to take an end-of-semester examination or to sit for reassessment in the course for which students have registered. The onus lies on each student to establish the dates, times, mode and venue of examinations by consulting the relevant timetable on the my.tcd.ie portal. No timetable or reminder will be sent to individual students by any office.



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⁴⁰ Except as provided for below, candidates for examination are forbidden during an examination to do or to attempt to do, any of the following: to have in their possession or consult or use any books, papers, notes, memoranda, mobile phones, electronic devices, or written or electronic material of any nature, or to copy from or exchange information with other persons, or in any way to make use of any information improperly obtained.

⁴¹ Where the examination is of such a nature that materials are provided to the candidates, or where the candidates are allowed by the rules of that examination to have materials in their possession, then candidates may only make use of such materials, and the general prohibition above continues to apply in respect of any and all other materials.

⁴² Where candidates have the prior written permission of the examiner(s), of the Senior Lecturer, or of the Disability Officer, to have materials in their possession during an examination, then candidates may only make use of such materials, and the general prohibition above continues to apply in respect of any and all other materials.

⁴³ Candidates may be allowed to bring personal belongings to examination venues upon condition that such belongings are stored in designated areas. Candidates must ensure that they store their belongings accordingly and must not return to them until they have finished their examinations and are leaving the venue.

⁴⁴ Any breach of this regulation is regarded as a major offence for which a student may be expelled from the University (see §4 under CONDUCT AND COLLEGE REGULATIONS).

⁴⁵ Students must not leave the examination before the time specified for the examination has elapsed, except by leave of the invigilator.

⁴⁶ The College has approved the practice of anonymous marking for undergraduate examinations at the formal assessment and reassessment sessions.

⁴⁷ All undergraduate results are published by student number. The results for assessments completed in semester one are provisional until moderated by the court of examiners in Trinity term. The end of year or degree result moderated by the court of examiners must be returned and recorded on the student record.

⁴⁸ Students are required to complete the assessment components for each module as prescribed by the programme regulations.

⁴⁹ Students are not permitted to repeat, in the same academic year, assessments or examinations that they have successfully completed or for which they have already achieved a pass or qualified pass, in order to improve their performance.

⁵⁰ The Board of the College reserves the right to exclude from the College, on the recommendation of the University Council, students whose academic progress is unsatisfactory.

⁵¹ Students who are unable to complete such assessment components necessary to complete a module or modules at the end of the appropriate semester due to certified illness, disability, or other grave cause beyond their control may seek, through their tutor, permission from the Senior Lecturer to present at the reassessment session. Where certified illness, disability, or other grave cause beyond their control prevents a student from completing at the reassessment session they may seek, through their tutor, permission from the Senior Lecturer to repeat the year.

⁵² Students who may be prevented from sitting an examination or examinations (or any part thereof) due to illness should seek, through their tutor, permission from the Senior Lecturer in advance of the assessment



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session to defer the examination(s) to the reassessment session. Students who have commenced the assessment session, and are prevented from completing the session due to illness should seek, through their tutor, permission to defer the outstanding examination(s)/assessment(s) to the reassessment session. In cases where the assessment session has commenced, requests to defer the outstanding examination(s) on medical grounds, should be submitted by the tutor to the relevant school/discipline/course office. If non-medical grounds are stated, such deferral requests should be made to the Senior Lecturer, as normal.

⁵³ Where such permission is sought, it must be appropriately evidenced: (a) For illness: medical certificates must state that the student is unfit to sit examinations/ complete assessments and specify the date(s) of the illness and the date(s) on which the student is not fit to sit examinations/complete assessments. Medical certificates must be submitted to the student's tutor within three days of the beginning of the period of absence from the assessment/examination. (b) For other grave cause: appropriate evidence must be submitted to the student's tutor within three days of the beginning of the period of absence from the assessment/examination.

⁵⁴ Where illness occurs during the writing of an examination paper, it should be reported immediately to the chief invigilator. The student will then be escorted to the College Health Centre. Every effort will be made to assist the student to complete the writing of the examination paper.

⁵⁵ Where an examination/assessment has been completed, retrospective withdrawal will not be granted by the Senior Lecturer nor will medical certificates be accepted in explanation for poor performance.

⁵⁶ If protracted illness prevents a student from taking the prescribed assessment components, so that they cannot rise into the next class, they may withdraw from College for a period of convalescence, provided that appropriate medical certificates are submitted to the Senior Lecturer. If the student returns to College in the succeeding academic year they must normally register for the year in full in order to fulfil the requirements of their class. See §26 on capacity to study and §28 fitness to practise, if relevant.

⁵⁷ Where the effects of a disability prevent a student from taking the prescribed assessment components, so that they cannot rise into the next class, the Senior Lecturer may permit the student to withdraw from College for a period of time provided that appropriate evidence has been submitted to the Disability Service. If they return to College in the succeeding academic year they must normally register for the year in full in order to fulfil the requirements of their class.

⁵⁸ The nature of non-standard examination accommodations, and their appropriateness for individual students, will be approved by the Senior Lecturer in line with the Council-approved policy on reasonable accommodations. Any reports provided by the College's Disability Service, Health Service or Student Counselling Service will be strictly confidential.

CONTINUOUS ASSESSMENTS

Examinations or other exercises which are part of continuous assessment are subject to the same rules as other College examinations. Where submitted work is part of a procedure of assessment, plagiarism is similarly regarded as a serious offence and is liable to similar penalties.

USE OF CALCULATORS IN EXAMINATIONS

Electronic calculators are permitted in certain examinations provided that they are battery operated, pocket-sized, silent in operation and are not capable of using previously recorded programmes. The College does not supply calculators. The operation of calculators is entirely the responsibility of the students. No allowance is made for errors or omissions arising from the malfunction of calculators or the misuse of calculators by students. Calculators may not be passed from one candidate to another during examinations.



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It is essential that the stages of numerical work, including intermediate answers, be written clearly to demonstrate knowledge of the problems and their solutions.

APPEALS

Students may appeal through their Tutors to the School of Pharmacy & Pharmaceutical Sciences Court of First Appeal in the first instance and thereafter to the Academic Appeals Committee. See University Calendar (2026-27) Part II, B1 General Regulations and Information, II Academic Progress, §§69-70.

ACADEMIC PROGRESS

A student may not repeat any academic year more than once and may not repeat more than two academic years, except by special permission of the University Council*.

To rise with their class students must:

- (i) Attend satisfactorily the lectures given in the modules of their course in each term as required by the University Council and the School of Pharmacy & Pharmaceutical Sciences regulations;
- (ii) Perform and complete all laboratory work including project work, assignments and dissertations to the satisfaction of the Head of the School or module coordinator concerned; and
- (iii) Pass, in accordance with the School of Pharmacy & Pharmaceutical Sciences regulations, the prescribed examinations (including practical tests, continuous assessment components and work experience).

The following link provides an overview of the College's Progression and Award regulations: <https://www.tcd.ie/academic-affairs/academic-regulations/-undergraduate-progression-and-awards/>.

Information with regard to approved Derogations for the Five Year Pharmacy (Integrated) programme can also be viewed through this link.

**It is important to note that in order to satisfy timelines set out by the Pharmaceutical Society of Ireland (Pharmaceutical Society of Ireland (Education and Training) (Integrated Course) 2014 (S.I. No. 377)), a student must complete the Pharmacy programme within eight years of the date on which he or she commenced the programme. (NB: This is NOT eight years from commencing the M.Pharm. year; it is eight years from commencing the Pharmacy programme, i.e. the clock started when commencing the undergraduate portion of the programme.) The legislation permits this period to be extended by one more year (i.e. to nine years from programme commencement) only in exceptional circumstances where it does not conflict with the University regulations. Under the terms of the legislation, the University has no discretion to extend this period beyond nine years from the date on which the student commenced the programme.*

COMPENSATION AND REPETITION

To pass the year, a student will normally be required to pass each module, totaling 60 ECTS per year. However, the Court of Examiners may allow up to 10 ECTS to be accumulated at 'qualified pass' (QP, also known as 'pass by compensation' PC) where all the following conditions have been met:

- The student has obtained (and is returned with) an overall credit-weighted average of at least 50% for the year, and
- The student has passed outright modules totaling at least 50 ECTS, and
- The student has achieved at least 45% in the failed module(s), and
- All component(s) in the failed module(s) have reached at least the respective qualifying mark(s), and
- The failed module(s) is/are compensatable, and
- The student has not been returned as 'qualified fail' (QF) in any module.



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The following modules cannot be compensated:

Module Code	Module Name
Junior Fresh	
PHU11104	Introduction to Pharmaceutics and Formulation, including Mathematical Methods and Pharmaceutical Calculations
PHU11106	Practice of Pharmacy I
Senior Fresh	
PHU22104	Formulation and Pharmaceutical Technology
PHU22106	Practice of Pharmacy II
Junior Sophister	
PHU33104	Sterile Products and Advanced Pharmaceutical Biotechnology
PHU33106	Practice of Pharmacy III
Senior Sophister	
PHU44101	Professional Development and Communication – Service Development
PHU44202	Medicines Optimisation in Practice
PHU44303	Developing Competency through Experiential Learning
PHU44102	Advanced Pharmaceutical Chemistry, Drug Discovery & Design
PHU44106	Evidence Informing Practice
PHU44112	Senior Sophister Capstone Research Project

A student has an automatic right to reassessment when they have achieved a fail grade in any of their modules and is not eligible for compensation. The reassessment session usually occurs in August to coincide with the start of Semester 1 of the next academic year.

Students who are unsuccessful at the formal University assessments will normally be given credit for those modules in which they were successful and will be examined in the reassessment session only in those modules in which they are unsuccessful.

If a student has achieved a fail or qualified fail grade in any module completed in semester 1 or semester 2, they will be required to present for reassessment in all failed and qualified failed components in that module.

If a student has achieved fail and/or qualified fail grades in two or more modules completed in semester 1 and/or semester 2, they will be required to present for reassessment in all failed/qualified failed components in those modules.

On passing the year in the reassessment session, marks will not be capped, and the end-of-year result will be recorded as 'pass at reassessment'.

Penalties: Marks for repeated continuous assessment components during term-time or late submission of course work may incur penalties.

Students who are unsuccessful at both the formal University assessment and reassessment sessions and who have made a serious attempt or have a valid reason for their absence are required to repeat the year in full (i.e. all modules and all assessment components) §64.

Students who have passed the Junior Sophister examination may have the ordinary degree of B.A. conferred if they choose not to proceed to the Senior Sophister year or if they have failed the SS year. Except by permission of the University Council, on the recommendation of the Court of Examiners, the ordinary degree of B.A. may be conferred only on candidates who have spent at least three years in the University.

Students may not repeat any academic year more than once within the degree programme and may not repeat more



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than two academic years within the degree programme, except by special permission of the University Council.

B. B.SC. (PHARM.) DEGREE

In calculating the final degree mark the following proportions will be observed: 30% of the final mark awarded will be based on the overall mark in the JS year. 70% of the final mark awarded will be based on the overall mark in the SS year. The degree grades are as follows:

- **First Class Honours** **70%+**
- **Second Class Honours** **60-69%**
- **Pass** **50-59%**



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20. EXAMINATION & PROGRESSION REGULATIONS ACADEMIC YEAR 2026-2027 | M. Pharm.

A. GENERAL REGULATIONS

General College Regulations shall apply as set out in the University Calendar (2026-27) Part III (Graduate Studies and Higher Degrees) in Section I: General Academic Regulations for Graduate Studies and Higher Degrees and in Section III: General Regulations for Taught Graduate Programmes: <https://www.tcd.ie/calendar/>

Particular attention is drawn to the following sections

A.1. CONDUCT OF EXAMINATIONS AND SUBMISSION OF ASSESSED WORK

University Calendar (2026-27) Part III (Graduate Studies and Higher Degrees), Section I: General Academic Regulations for Graduate Studies and Higher Degrees, Coursework and Examinations. <https://www.tcd.ie/calendar/>

A.2. EXAMINATION TIMETABLES AND NOTICE

Examination timetables are published in advance of the formal start date of each assessment period. The College reserves the right to alter the published time and date of an examination in exceptional circumstances. Students should ensure that they are available for examinations for the duration of the relevant formal assessment session and approved contingency dates as stated by the College.

Students are not required to give notice of their intention to take an end-of-semester examination or to sit for reassessment in the course for which they have registered. The onus lies on each student to establish the dates, times and venues of examinations by consulting the relevant timetable as notified by the College. No timetable or reminder will be sent to individual students by any office.

A.3. MATERIALS BROUGHT TO EXAMINATION VENUES AND USE OF MATERIALS IN EXAMINATIONS

Please refer to University Calendar (2026-27) <https://www.tcd.ie/calendar/>

A.4. ABSENCE FROM EXAMINATIONS

Please refer to University Calendar (2026-27) <https://www.tcd.ie/calendar/>

A.5. DEFERRING TO REASSESSMENT SESSION/ GOING 'OFF-BOOKS'

Students who are unable to complete such assessment components necessary to complete a module or modules at the end of the appropriate semester due to certified illness, disability, or other grave cause beyond their control may seek, through their programme director/co-ordinator, permission to present at the reassessment session. The Programme Director will then seek permission to present at the reassessment session from the Dean of Graduate Studies on the student's behalf. Where certified illness, disability, or other grave cause beyond their control prevents a student from completing at the reassessment session they may



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similarly seek, through their Programme Director, permission from the Dean of Graduate Studies to present at the next available assessment session (normally in the following academic year).

Students who may be prevented from sitting an examination or examinations (or any part thereof) due to illness should seek, through their Programme Director, permission from the Dean of Graduate Studies in advance of the examination session to defer the examination(s) to the reassessment session. Students who have commenced the examination session, and are prevented from completing the session due to illness should seek, through their Programme Director, permission from the Dean of Graduate Studies to defer the outstanding examination(s) to the reassessment session.

Where such permission is sought, it must be appropriately evidenced.

- (a) For illness: Medical certificates must state that the student is unfit to sit examinations/complete assessments and specify the date(s) of the illness and the date(s) on which the student is not fit to sit examinations/complete assessments. Medical certificates must be submitted to the Programme Director within three days of the beginning of the period of absence from the assessment/examination.
- (b) For other grave cause: appropriate evidence must be submitted to the Programme Director within three days of the beginning of the period of absence from the assessment/examination.

Where illness occurs during the writing of an examination paper, it should be reported immediately to the chief invigilator. The student will then be escorted to the College Health Centre. Every effort will be made to assist the student to complete the writing of the examination paper.

Where an examination/assessment has been completed, retrospective withdrawal will not be granted by the Dean of Graduate Studies, nor will medical certificates be accepted in explanation for poor performance.

If protracted illness prevents a student from taking the prescribed programme components, so that they cannot rise into the next class, they may apply for permission to go off books from College for a period of convalescence, provided that appropriate medical certificates are submitted (through the Programme Director) to the Dean of Graduate Studies.

In all cases, Fitness to Study requirements [see University Calendar (2026-27) Part III (Graduate Studies and Higher Degrees), Section I: General Academic Regulations for Graduate Studies and Higher Degrees, §59] and Fitness to Practise requirements (see Fitness to Practise Policy and Procedures on the School website: <https://www.tcd.ie/pharmacy/school-policies/>) must be fulfilled where applicable.

Students should also note the time limits outlined in Section B of these regulations below, and the necessity to seek recognition from the Pharmaceutical Society of Ireland for certain periods of sick leave as outlined in

B.3 (ii).

A.6. APPEALS

Please refer to University Calendar (2026-27) Part III – Graduate Studies and Higher Degrees, <https://www.tcd.ie/calendar/>



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A.7. ACADEMIC PROGRESS

Attention is drawn to University Calendar (2026-27) Part III (Graduate Studies and Higher Degrees), Section I: General Academic Regulations for Graduate Studies and Higher Degrees, Coursework and Examinations, §35:

³⁵ *Academic progress*

The Board of the College reserves the right to exclude from the College, on the recommendation of the University Council, graduate students whose academic progress is unsatisfactory. Normally, students who fail to satisfy the requirements of their year are not permitted to repeat the year.

However, in the case of the M.Pharm. course repetition may be permitted within the constraints outlined below. To graduate with the M.Pharm. degree students must:

- (i) Attend satisfactorily the face to face classes and synchronized online learning components given in the modules of their course in each term as required by the University Council and the School of Pharmacy & Pharmaceutical Sciences regulations; and
- (ii) Undertake and complete all directed learning components (including laboratory work, project work, assignments and work experience components) and
- (iii) Pass, in accordance with the School of Pharmacy & Pharmaceutical Sciences regulations, the prescribed examinations/assessments (including practical tests, continuous assessment components and competency assessments); and
- (iv) Satisfy the Head of School in accordance with the Pharmaceutical Society of Ireland (Education and Training) (Integrated Course) Rules 2014 to 2017 of the following:
 - (a) the satisfactory demonstration of the competencies by the student as set out in the Core Competency Framework for Pharmacists, and
 - (b) that he or she has not become aware of any health problems that may compromise, in his or her belief, the ability by the student concerned to discharge properly the duties and responsibilities of a registered pharmacist, and
- (v) Have satisfied the timeline requirements set out in the Pharmaceutical Society of Ireland (Education and Training) (Integrated Course) Rules 2014 to 2017, which state that in order to be eligible to obtain the M.Pharm degree (the qualification appropriate for practice as a pharmacist), the student must complete the Pharmacy (Integrated) programme within eight years of the date on which he or she commenced the programme. (NB: This is NOT eight years from commencing the M.Pharm. year; it is eight years from commencing the Pharmacy (Integrated) programme, i.e. the clock started when commencing the undergraduate portion of the programme.) The legislation permits this period to be extended by one more year (i.e. to nine years from programme commencement) only in exceptional circumstances where it does not conflict with the University regulations. Under the terms of the legislation, the University has no discretion to extend this period beyond nine years from the date on which the student commenced the programme.

B. COMPENSATION AND REPETITION

B.1. COMPENSATION

To pass the year, a student will normally be required to pass each module, totalling 90 ECTS for the M.Pharm year. However, the Court of Examiners may allow up to 10 ECTS to be accumulated at 'qualified pass' (QP, also known as 'pass by compensation') where all the following conditions have been met:



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- The student has obtained (and is returned with) an overall credit-weighted average of at least 50% for the year, and
- The student has passed outright modules totalling at least 80 ECTS, and
- The student has achieved at least 45% in the failed module(s), and
- The failed module(s) is/are compensatable, and
- The student has not been returned as 'qualified fail' (QF) in any module.

The following modules cannot be compensated:

Module Code	Module Title
PHP55106	Practice of Pharmacy & Integrated Pharmacy Skills
PHP55110	Health Inequalities and Inclusion Health
PHP55220	Medication Safety, Open Communication and Learning from Practice
PHP55330	Pharmacists Advancing Practice
PHP55400	Pharmacy Practice Research Project
PHP55500	Experiential Learning & Professional Registration Examination

B.2. REASSESSMENT OF CONTINUOUS ASSESSMENT COMPONENTS AND EXAMINATIONS

B.2.1. Components to be reassessed

Students who are unsuccessful at the formal University assessments will normally be given credit for those modules in which they were successful.

Students failing to pass individual taught modules may present for supplemental examination or re-submit required work as decided by the Court of Examiners. Only modules in which the students achieved a fail or qualified fail grade will be reassessed; students will be reassessed in all fail and qualified fail components in the module/s. Students are not permitted to repeat successfully completed assessments or examinations in order to improve their performance.

B.2.2. Capping and penalties

On passing the year at the reassessment session, reassessment examination marks will not be capped and the end- of-year result will be recorded as 'pass at reassessment'.

Penalties: Marks for repeated continuous assessment components or late submission of coursework may incur penalties.

B2.3. Reassessment of continuous assessment components other than the competency assessment

If a student's performance is judged unsatisfactory in a continuous assessment component other than a competency assessment, the student may be permitted to undergo reassessment, e.g. resubmission of coursework or submission of supplementary assessment(s), by an appointed date in accordance with the requirements for individual modules. Only one supplementary attempt will normally be permitted for any failed component.



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B2.4. Reassessment – Competency assessment

The deadline for completion of the workplace-based competency assessment (demonstration of Level 4 performance in all competencies) has been set towards the end of the 8-month placement, but with sufficient time to accommodate a period of remediation and reassessment if required within the normal placement period. A student who remains unable to demonstrate Level 4 performance in all competencies following reassessment will be deemed to have failed the placement module for that year. Such a student may apply to repeat the M.Pharm. year in full in accordance with section B.3.

B2.5. Professional Registration Examination

Module PHP55500 includes the Professional Registration Examination (PRE). As it is necessary for students to have satisfactorily completed all other components of the Pharmacy (Integrated) programme in order to be eligible to sit the PRE, the annual sitting of the PRE is scheduled to take place after the standard reassessment session (in late September/early October). The registration of all students in Year 5 will be extended to the end of October free of additional fees each year, thereby permitting eligible candidates to take the PRE at the annual sitting within their registration period.

There is no reassessment PRE within the Year 5 registration period. However, a further sitting of the PRE will be scheduled in February, i.e. within a new academic year. Candidates who need to take the PRE in February (whether as a first or subsequent attempt) may apply for permission to take the PRE with a status of 'off books taking assessment' (OBA) for the year on payment of the standard OBA fee.

Candidates who require further attempts at the PRE which may run into yet another academic year may apply for permission for OBA status for that year and will be required to pay the standard OBA fee for that additional year.

The PRE may be attempted on a maximum of four occasions, and must be passed within a maximum of three years of the student's successful completion of all other required components of the M.Pharm. year (subject to the additional restrictions, timelines and exceptions outlined in B.3. below).

B.3. REPETITION OF THE M.PHARM. YEAR

Students who are unsuccessful at both the formal University assessment and reassessment sessions and who have made a serious attempt or have a valid reason for their absence may apply to repeat the year in full (i.e. all modules and all assessment components), subject to the additional restrictions, timelines and exceptions in (i)-(iii) below. Where permission for a repeat year is granted the student will be liable for full annual tuition fees and charges.

- (i) A student may not normally repeat the M.Pharm. year more than once.
- (ii) The PRE may be attempted on a maximum of four occasions
- (iii) In order to be eligible for the award of the M.Pharm. degree, a student must complete the Pharmacy (Integrated) programme within eight years of the date on which he or she commenced the programme (i.e. the clock starts upon commencing the undergraduate portion of the 5-year programme). This may be extended by one year in exceptional circumstances only, where it does not conflict with the University's regulations including (i) and (ii) in this section.

Requirements (i) to (iii) above have different origins (University regulations, School regulations and statutory requirements) and in individual circumstances (depending, for example, on the time the student has taken to complete the undergraduate portion of the Pharmacy (Integrated) programme) conflict may arise between some requirements. Where this occurs, the strictest requirement shall take precedence.



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Examples (not exhaustive):

- If the statutory timeframe for completion of the programme in (iii) has passed, a student will not be permitted to attempt the PRE even if he/she has not yet attempted it on four occasions.
- A student who has attempted the PRE on four occasions will not be permitted any further attempts, even if he/she is within the statutory period for completion of the programme.

B.4. CALCULATION OF M.PHARM. DEGREE MARK

The M.Pharm (year 5) carries 90 ECTS.

For the purposes of award, the final degree mark is the credit weighted average of 75 ECTS (all modules except PHP55500 which is graded satisfactory/non-satisfactory).

The pass mark is 50%.

The award of distinction does not apply in the M.Pharm Programme.



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21. Academic Integrity

Please refer to University Calendar (for excerpts, see below) and the following resources:

- [Academic Integrity - Trinity Teaching and Learning - Trinity College Dublin \(tcd.ie\)](#)
- [About this Guide - Academic Integrity - Library Guides at Trinity College Dublin \(tcd.ie\)](#)
- [Coversheet Declaration - Academic Integrity - Library Guides at Trinity College Dublin \(tcd.ie\)](#)

University Calendar (2026-27), Part II (Undergraduate Studies), B1 General Regulations and Information, II Academic Progress, *Academic Integrity*, §§96-100, (<http://www.tcd.ie/calendar>):

96 General

It is clearly understood that all members of the academic community use and build on the work and ideas of others. However, it is essential that we do so with integrity, in an open and explicit manner, and with due acknowledgement. Any action or attempted action that undermines academic integrity and may result in an unfair academic advantage or disadvantage for any member of the academic community or wider society may be considered as academic misconduct. Examples of academic misconduct can be found in the curriculum glossary.

97 The use of Generative Artificial Intelligence (GenAI) is permitted unless otherwise stated in programme handbooks. Where the output of GenAI is used in a document or work output, this usage should be acknowledged and appropriately cited, as per Library guidelines on acknowledging and referencing GenAI. Where restrictions are applied around the use of GenAI in particular modules, those restrictions must be explicitly stated in modules descriptions in Blackboard Ultra and/or in programme or module handbooks. For further guidance, see the Trinity GenAI statement (www.tcd.ie/media/tcd/academic-affairs/pdfs/College_Statement_on_GenAI_v2_2026.pdf).

98 Academic misconduct in the context of group work

Students should normally submit assessments and/or examinations done in co-operation with other students only when the co-operation is done with the full knowledge and permission of the lecturer concerned. Without this permission, submitting assessments and/or examinations which are the product of collaboration with other students may be considered to be academic misconduct.

When work is submitted as the result of a group project, it is the responsibility of all students in the group to ensure, so far as is possible, that no work submitted by the group is plagiarised, or that any other academic misconduct has taken place. In order to avoid academic misconduct in the context of collaboration and group work, it is particularly important to ensure that each student appropriately attributes work that is not their own.

Should a module co-ordinator suspect academic misconduct in a group assignment, the procedure in cases of suspected academic misconduct must be followed for each student.

99 Avoiding academic misconduct

Students should ensure the integrity of their work by seeking advice from their module co-ordinator, tutor or supervisor on avoiding academic misconduct. All schools and disciplines must include, in their handbooks or other literature given to students, guidelines on the appropriate methodology for the kind of work that students will be expected to undertake. In addition, a general set of guidelines for students on avoiding academic misconduct is available at <https://libguides.tcd.ie/academic-integrity>.

100 Procedure in cases of suspected academic misconduct

If academic misconduct as referred to in §96 above is suspected, the procedure in cases of suspected



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academic misconduct, available at www.tcd.ie/academic-affairs/academic-integrity must be followed. The case may be referred to the Junior Dean if:

- (i) the facts of the case are in dispute;
- (ii) the regulations of the College were not properly applied in the student's case;
- (iii) the Director of Teaching and Learning (Undergraduate), or designate, forms the view that that the consequences provided for under the academic misconduct procedure are inappropriate given the circumstances of the case.

The Junior Dean will interview the student and may implement the procedures as referred to under CONDUCT AND COLLEGE REGULATIONS §2. Nothing provided for under the procedure in cases of suspected academic misconduct diminishes or prejudices the disciplinary powers of the Junior Dean under the 2010 Consolidated Statutes.



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22. RESEARCH ETHICS

Please refer to the following resources and policies in relation to research ethics:

- <https://www.tcd.ie/research/support/ethics-integrity.php>
- <https://www.tcd.ie/about/policies/research-policies/>
- <https://www.tcd.ie/pharmacy/research/ethics/>
- <https://www.tcd.ie/students/assets/pdf/Student%20Services%20Handbook.pdf>



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23. GUIDELINES ON MARKING

23.1. Years 1 & 2 (Fresh Years)

Guidelines on awarding grades for essays and examination answers in the Fresh years

Class	Mark Range	Criteria
I	70-100	Full understanding of concepts coupled with excellent knowledge of subject. Evidence of extra reading. A structured answer. Minor lapses of content or presentations tolerated at lower end of range.
II	60-69	Good understanding of concepts supported by broad knowledge of subject. A lapse of content or several lapses of detail are tolerated at lower end of range.
III	50-59	Understands basic concepts and has sound knowledge of subject. Suffers from more than one substantial omission, error or misunderstanding. Answer sometimes lacks structure and suffers from omissions, errors and misunderstandings. Overall, a weak but adequate answer, or marginally adequate at bottom end of range.
F1	40-49	Basic understanding and knowledge of subject is poor. While some items of sound material may be presented the answer is inadequate. Answer lacks structure and suffers from omissions, errors and misunderstandings. Overall, a limited understanding and knowledge of subject.
F2	0-39	Basic understanding and knowledge of subject is very poor. At lower range lacks understanding with little knowledge of subject. Answer contains only few items related to question with serious errors. Could also be taken as a response to the misinterpretation of the question.



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23.2. Years 3 & 4 (Sophister Years), Year 5 and Scholarship Exam

Guidelines on awarding grades for essays and examination answers in the Sophister years, the 5th year and the Scholarship examination

Class	Mark Range	Criteria
I	90-100	IDEAL ANSWER; showing insight and originality and wide knowledge. Logical, accurate and concise presentation. Evidence of reading and thought beyond course content. Contains particularly apt examples. Links materials from lectures, practicals and seminars where appropriate.
	80-89	OUTSTANDING ANSWER; falls short of the 'ideal answer either on aspects of presentation or on evidence of reading and thought beyond the course. Examples, layout and details are all sound.
	70-79	MAINLY OUTSTANDING ANSWER; falls short on presentation and reading or thought beyond the course, but retains insight and originality typical of first class work
II	65-69	VERY COMPREHENSIVE ANSWER; good understanding of concepts supported by broad knowledge of subject. Notable for synthesis of information rather than originality. Sometimes with evidence of outside reading. Mostly accurate and logical with appropriate examples. Occasionally a lapse in detail.
	60-64	LESS COMPREHENSIVE ANSWER; mostly confined to good recall of coursework. Some synthesis of information or ideas. Accurate and logical within a limited scope. Some lapses in detail tolerated.
III	55-59	SOUND BUT INCOMPLETE ANSWER; based on coursework alone but suffers from a significant omission, error or misunderstanding. Usually lacks synthesis of information or ideas. Mainly logical and accurate within its limited scope and with lapses in detail.
	50-54	INCOMPLETE ANSWER; suffers from significant omissions, errors and misunderstandings, but still with understanding of main concepts and showing sound knowledge. Several lapses in detail.
F1	45-49	WEAK ANSWER; limited understanding and knowledge of subject. Serious omissions, errors and misunderstandings.
	40-44	VERY WEAK ANSWER; a poor answer, lacking substances with some relevant information. Information given may not be in context, but may contain passages and words, which indicate some understanding of the topic.



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F2	0-39	FAILURE; inadequate answer, with little or no substance or understanding and with vague or little knowledge relevant to the question. Could also be taken as a response to the misinterpretation of the question.
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24. GUIDELINES FOR STUDENTS AT EXAMINATIONS and CONDUCT AT EXAMINATIONS

Guidelines for students regarding the processes before, during, and after examinations are available on the Academic Registry website: <https://www.tcd.ie/academicregistry/exams/exam-guidelines/> . This includes 'Conduct of Examinations'.



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

CONDUCT OF EXAMINATIONS

Except as provided for below, Candidates for examination are forbidden during an examination to do or to attempt to do, any of the following: to have in their possession or consult or use any books, papers, notes, memoranda, mobile phones or written or electronic material of any nature, or to copy from or exchange information with other persons, or in any way to make use of any information improperly obtained.

Where the examination is of such a nature that materials are provided to the Candidates, or where the Candidates are allowed by the rules of that examination to have materials in their possession, then Candidates may of course make use of such materials, *but only of such materials*, and the general prohibition above continues to apply in respect of any and all other materials.

Where Candidates have the prior written permission of the examiner(s), of the Dean of Undergraduate Studies (Senior Lecturer) or the Dean of Graduate Studies, or of the Disability Service, to have materials in their possession during an examination, then Candidates may of course make use of such materials, *but only of such materials*, and the general prohibition above continues to apply in respect of any and all other materials.

Where Candidates are allowed to bring personal belongings into the examination venues upon condition that such belongings are stored in an area – such as the back of the venue – away from the area in which the Candidates are sitting their examinations, then Candidates may bring personal belongings into the hall, provided that they are placed in the indicated area *and are not returned to by the Candidates* until they have finished their examinations and are leaving the hall.

Any breach of this regulation is regarded as a major offence for which a Candidate may be expelled from the University.

Candidates must not leave the hall before the time specified for the examination has elapsed, except by leave of the invigilator.

Examinations or other exercises which are part of continuous assessment are subject to the same rules as other College examinations. Where submitted work is part of a procedure of assessment, plagiarism is similarly regarded as a major offence and is liable to similar penalties.