2025 年暑期国际课程项目

International Summer Course Program

中国药科大学教务处

国际课程汇总表

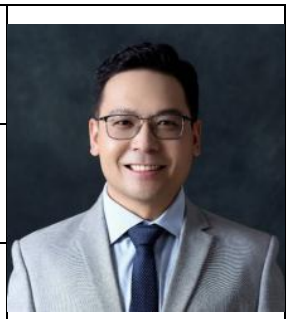
序号	开课单位	任课教师	任课教师所属院校	职称	课程名（英文）	课程名（中文）	教学模式
1	药学院	Haichen Nie (聂海晨)	普渡大学药学院、美国梯瓦制药公司 Purdue University College of Pharmacy Teva Pharmaceuticals	Associate Director; Adjunct Associate Professor	Introduction to Industrial Pharmacy	工业药剂概论	线下
2	生命科学与技术学院	Zhiguo Zhou (周治国)	美国堪萨斯大学	助理教授	Health Data Analysis	健康数据分析	线下
3	工学院	Liangting Lin	香港理工大学 The Hong Kong Polytechnic University	副教授	Radiobiology	放射生物学	线下
4	基础医学与临床药学学院	Xin Wang	英国曼彻斯特大学 The University of Manchester	Professor	Cutting-edge Technology in Cardiovascular Pharmacology	心血管药理学前沿技术	线下

5	国际处	Christos Tapeinos	英国曼彻斯特大学 University of Manchester	Academic (Teaching and Research) Lecturer	Introduction to drug delivery	药物递送入门	线下
6	国际处	①Akhil Jain ②Ayse Latif	英国曼彻斯特大学 University of Manchester	Lecturer	Transforming Cancer Medicine: Innovation (including AI) and Global Perspectives in Drug Development	癌症医学转型：药物开发的创新（包括 AI）和全球视角	线下
7	国际处	Natalie Hughes	新西兰奥塔哥大学 University of Otago	Professor	Drug Delivery Systems for pharmaceuticals	药品给药系统	线下
8	国际处	孙哲	日本顺天堂大学 Juntendo University	Junior Associate Professor	Interdisciplinary Applications of Date Science in Healthcare	数据科学与医疗健康的交叉应用	线下

目录

Introduction to Industrial Pharmacy
工业药剂概论

开课单位：药学院

<table>
<tr><td rowspan="5">任课教师
Instructor’s Information</td><td>姓　　名
Name</td><td colspan="2">Haichen Nie (聂海晨)</td><td rowspan="3">  </td></tr>
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Email</td><td>niehaichen@gmail.com</td></tr>
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Teva Pharmaceuticals</td></tr>
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Resume of Instructor

聂海晨博士在美国梯瓦制药公司研发领导着一个负责开发生物制品药物制剂并评估新型辅料在各种剂型中应用的团队。在加入梯瓦之前，聂博士曾在默克公司和艾伯维公司工作，专注于制剂和工艺开发。他毕业于普渡大学药学院，获得博士学位，并在制剂开发、工艺优化及商业

化生产方面拥有丰富的经验。此外，聂博士还担任普渡大学药学院的兼职副教授，为药学博士和博士研究生授课，并指导研究生的研究工作。聂海晨被选为普渡大学药学院 2025 年度杰出青年职业成就奖的获得者，以表彰他在药学领域所做出的贡献。

Dr. Haichen Nie is an Associate Director at Teva Pharmaceuticals, leading a team that develops formulations for biologics drug products and evaluates the application of novel excipients in various dosage forms. Before joining Teva, Dr. Nie worked at Merck and AbbVie, focusing on formulation and process development. He received his Ph.D. from Purdue University College of Pharmacy and possesses extensive experience in formulation development, process optimization, and commercial manufacturing. Dr. Nie also works as an Adjunct Associate Professor at the College of Pharmacy, teaching Pharm.D. and Ph.D. students and mentoring graduate student research. Haichen was selected as the recipient of Purdue University College of Pharmacy's 2025 Outstanding Early Career Award, acknowledging his impact on pharmaceutical sciences.

工作早期，聂博士成功推动了多个新药候选品进入临床试验并实现商业化。他在药学期刊上发表了超过 35 篇经同行评审的论文，被引用次数超过 1000 次，还获得了多项专利，并为书籍撰写了章节。聂博士曾担任多家知名药学期刊的编辑顾问委员会委员。此外，他还于 2021 年至 2023 年间担任美国药物科学家协会（AAPS）科学项目委员会制剂方向负责人，以及 AAPS 辅料分会主席。同时，聂博士还是美国药典专家委员会的领导成员，并在 2023 财年荣获美国药典杰出贡献奖。2023 年，国际药用辅料理事会授予聂博士 Henk De Jong 工业辅料技术研究成就奖，以表彰他在辅料技术及药学科学中创新辅料应用方面做出的重大贡献。

Throughout his early career, Dr. Nie successfully drove the advancement of multiple new drug candidates into clinical trials and commercialization. He has

authored over 35 peer-reviewed publications in pharmaceutical journals with more than 1,000 citations, and has been granted several patents and contributed to book chapters. Dr. Nie has served on the Editorial Advisory Boards of multiple highly regarded pharmaceutical journals. He also served as the Formulation Track Leader for the American Association of Pharmaceutical Scientists (AAPS) Scientific Programming Committee and as Chair of the AAPS Excipient Community from 2021 to 2023. Additionally, Dr. Nie is an Expert Committee Leader for the U.S. Pharmacopeia and was honored with the USP Award for Outstanding Contribution to Standards FY2023. In 2023, Dr. Nie received the Henk De Jong Industrial Research Achievement Award in Excipient Technology from the International Pharmaceutical Excipients Council in recognition of his significant contributions to excipient technology and innovative excipient applications in pharmaceutical sciences.

Course Description

《工业药剂概论》课程主要介绍药物发现、临床前和临床制剂开发、生产以及不同剂型的质量控制等关键环节。

The Introduction to Industrial Pharmacy course provides an overview of key aspects of drug discovery, preclinical and clinical formulation development, manufacturing, and quality control across various dosage forms.

本课程将涵盖药物固体剂型，重点介绍如何使用综合分析方法选择药物活性成分的合适固态形式。同时，还将介绍多晶型、溶剂化物、无定形、晶体习性、成核、相转变、溶解和稳定性等基本概念。此外，课程将探讨各种分析技术，解释药物分析和物理表征的理论与实践概念。学生将深入了解如何在药物产品开发中合理选择并高效应用现代分析仪器。课程还将概述蛋白质制剂开发和无菌药品生产，包括蛋白质制剂的分析方法、生物物理表征以及辅料在制剂开发中的关键作用。

The course will cover pharmaceutical solid dosage forms, with a focus on selecting the appropriate solid-state form of a drug substance using

comprehensive analytical methods. Fundamental concepts such as polymorphism, solvates, amorphous forms, crystal habits, nucleation, phase transformations, dissolution, and stability will also be introduced. Additionally, the course will explore various analytical technologies, explaining both the theoretical and practical concepts of pharmaceutical analysis and physical characterization. Students will gain insights into the rational selection and efficient application of modern analytical instruments in drug product development. The course will also provide an overview of protein formulation development and sterile drug product manufacturing, including analytical methods for protein formulations, biophysical characterization, and the critical role of excipients in formulation development.

通过本课程，学生将学会如何有效选择适当的分析方法，并为开发以患者为中心的药物产品打下坚实的基础。学习材料将指导学生如何在制药行业内设计和优化不同的剂型和配方。

Through this course, students will learn how to effectively select appropriate analytical methods and build a strong foundation for developing patient-centric drug products. The learning materials will guide students in designing and optimizing different dosage forms and formulations within the pharmaceutical industry.

Syllabus（初步计划）

Dates	Topics
7/7/2025	Course Overview, Introduction of Pharmaceutical Solids
7/8/2025	Introduction Physical Characterizations
7/9/2025	Introduction to Protein Formulation Development
7/10/2025	Case study, Problem-solving, and Group presentations I

7/11/2025	Case study, Problem-solving, and Group presentations II (as needed)

NOTES: One guest speaker will join the group discussion (TBD).

Health Data Analysis
健康数据分析

开课单位：生命科学与技术学院

<table>
<tr><td rowspan="4">任课教师
Instructor’s
Information</td><td>姓　　名
Name</td><td colspan="2">Zhiguo Zhou (周治国)</td><td rowspan="3">  </td></tr>
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Email</td><td>zgzhou2013@gmail.com</td></tr>
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Assessment Method</td><td>作业+考试</td></tr>
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Resume of Instructor

周治国，博士，现任美国堪萨斯大学医学中心生物统计与数据科学系助理教授，可靠智能与医学创新(RIMI Lab)实验室负责人，同时也是堪萨斯大学癌症中心的副研究员和堪萨斯大学阿尔莫茨海姆研究中心和堪萨斯精准医学研究所的研究员。分别于 2008 年和 2014 年获得西安电子科技大学学士和博士学位，并在 2013 年到 2014 年在荷兰莱顿大学访问学习。从 2014 年 12 月起，在美国德州大学西南医学中心放疗系担任博士后研究员，并于 2017 年 9 月晋升为研究型讲师。加入堪萨斯大学之前，从 2019 年到

2022 年在中密苏里大学担任助理教授。他已经发表超过 100 篇期刊和会议文章， 是两个国际期刊的编委和一个期刊的客座副主编，以及 20 多个期刊的审稿人，并且担任过多个国际会议的分会主席。目前的研究方向为可靠人工智能，机器学习和深度学习，影像组学，治疗结果预测，临床诊断支持，医学影像处理，病理分析等。教授多门课程，涉及人工智能（医学），健康数据科学，计算机等方向。

Course Description

Medical information systems (MIS) are essential tools of modern medicine. Healthcare data scientists must construct MIS and process the information contained in MIS. This course provides an overview of current MIS, such as electronic health record systems, clinical decision support systems, and medical imaging systems. The course will focus on theories and methodologies that support MIS construction and information processing as well as analysis, including artificial intelligence, machine learning and deep learning, knowledge representation and uncertainty reasoning, natural language processing, statistics, and medical imaging. At the end of this course, students will understand how these methodologies work and how to use these methodologies to construct MIS, process information and analyze data.

医学信息系统（MIS）是现代医学中不可或缺的工具。健康数据科学家需要构建 MIS 并处理其中包含的信息。本课程概述当前的 MIS，包括电子健康记录系统、临床决策支持系统和医学影像系统。课程重点介绍支持 MIS 构建、信息处理和分析的理论与方法，包括人工智能、机器学习与深度学习、知识表示与不确定性推理、自然语言处理、统计学以及医学影像。通过本课程的学习，学生将理解这些方法的原理，并掌握如何运用这些方法来构建 MIS、处理信息和分析数据。

Syllabus

Chapter 1: Introduction to Health Data Analysis

Chapter 2: Structured Data – Descriptive Analysis

Chapter 3: Structured Data – Predictive Analysis I

Chapter 4: Structured Data – Predictive Analysis II

Chapter 5: Structured Data – Predictive Analysis III

Chapter 6: Structured Data - Knowledge based Predictive Analysis

Chapter 7: Unstructured Data - Medical images – Acquisition

Chapter 8: Unstructured Data - Medical images - Transformation and Filtering

Chapter 9: Unstructured Data - Medical images – Restoration

Chapter 10: Unstructured Data - Medical images – Segmentation

Chapter 11: Unstructured Data - Medical images – Radiomics

Chapter 12: Unstructured Data - Medical images - Deep Learning in Medical Image

Chapter 13: Unstructured Data - Natural Language Processing - Part I

Chapter 14: Unstructured Data - Natural Language Processing - Part II

Chapter 15: Unstructured Data - Natural Language Processing - Part III

Radiobiology
放射生物学

开课单位：工学院

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Email</td><td>Lt.lin@polyu.edu.hk</td></tr>
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Resume of Instructor

林亮廷博士，专注于肿瘤核治疗及细胞应激反应的研究超过十年。他持有台湾医疗放射专业执照和辐射操作认证，并在香港作为辐射专业人员注册。林博士的学术背景包括在台湾阳明大学获得医学放射技术学士学位，以及后续在同校取得核子医学与分子生物学博士学位。完成台北荣民总医院干细胞研究室的博士后工作后，他在国际制药公司仁新医药（BLTE）担任高级研发科学家。

2017 年，林博士加入香港理工大学，担任医疗科技与信息学系助理教授，并于 2023 年晋升为副教授，同时承担放射医学本科课程负责人及医学

影像与放射科学硕士课程的副负责人。

教学方面，秉持“无缝沟通”理念，融合放射学专业经验，整合在线演示、视频编辑与互动技术，提升师生交流。采用混合教学模式，创新运用 CatchBox®无线麦克风、Mentimeter 互评系统，增强线上线下参与；通过 Zoom 分组讨论与课件协同编辑促进主动学习。推动课程国际化，与亚太高校及医院合作引入尖端放疗技术，更新教材融入社交媒体元素。持续优化教学策略，实现师生双向成长，助力学生成为独立医药从业者。

Course Description

This subject aims to provide students with an introductory knowledge of physical and biological processes of radiation. The physical aspects include the attenuation and absorption processes of ionizing radiation in media and dose distributions. The biological aspects include the radiation effects on cellular, tissue, and whole-body levels and how living tissues respond to radiation, such as the molecular mechanisms of DNA repair, radiation biological effects, and the determining factors of radiation sensitivity.

这门课程旨在为学生提供辐射物理和生物过程的入门知识。物理方面包括电离辐射在介质中的衰减和吸收过程以及剂量分布。生物方面包括辐射对细胞、组织和整个身体水平的影响以及活组织对辐射的反应，例如 DNA 修复分子机理、辐射生物效应、以及辐射敏感度决定性因素等。

Syllabus

1) **Basic principles of radiobiology**

2) **Interaction processes of radiation with living cells**

Dependence on nature and atomic number, radiation energies

Processes leading to radiation damage

Direct and indirect effects

Effects on cells, tissues, and organs

3) **Classification of biological effects of radiation and their implications for radiation protection**

Somatic and genetic effects

Stochastic and deterministic effects

Acute and late effects

4) **Whole body radiation effect**

5) **Dose response curves and dose survival curves**

6) **Linear energy transfer and relative biological effectiveness**

7) **Factors affecting radiosensitivity**

8) **Exam**

1. 放射生物学的基本原理

2. 辐射与活细胞的相互作用过程

1）对物质和原子序数的依赖，辐射能量的影响

2）导致辐射损伤的机制

3）直接作用和间接作用

4）辐射对细胞、组织和器官的影响

3. 辐射生物效应的分类及其对辐射防护的意义

1）躯体效应和遗传效应

2）随机性效应和确定性效应

3）急性效应和远期效应

4. 全身照射效应

5. 剂量-反应曲线和剂量-存活曲线

6. 线性能量传递和相对生物有效性

7. 影响放射敏感性的因素

8. 考核

Cutting-edge Technology in Cardiovascular Pharmacology
心血管药理学前沿技术

开课单位：基础医学与临床药学学院

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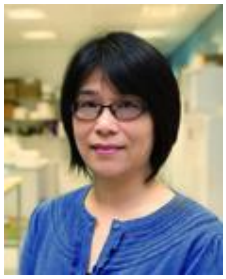
Name</td><td colspan="2">Xin Wang</td><td rowspan="3">  </td></tr>
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Title</td><td>Professor</td><td>邮箱地址
Email</td><td>Xin.wang@manchester.ac.uk</td></tr>
<tr><td>最终学位
Degree</td><td>PhD</td><td>任职单位
Work Place</td><td>Cardiovascular Sciences Division, Faculty of Biology, Medicine and Health
The University of Manchester</td></tr>
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7 月 11 日</td><td>考核方式
Assessment Method</td><td>小组汇报＋学生提交一篇课后报告</td></tr>
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Resume of Instructor

王欣教授，英国曼彻斯特大学生物医学卫生学部分子心血管终身讲席教授，心血管系科研主任。长期从事心血管疾病机制及药物靶点转化研究，英国医学科学基金评审专家。近年来发表 SCI 论文 60 余篇，包括 Circulation, Circulation Research，Nature Communications，Hypertension, JAHA 和 elife 等专业顶级期刊，参与撰写二部英文专著，研究领域涉及多项心血管及药理前沿方向，包括信号分子调控机制，转基因技术，光控遗传技术，基因编辑技术，天然产物及小分子合成，

Protac/Dubtac 技术。实验室已培养四十余名硕士、博士、博士后和访问学者。王欣教授同时担任 International Journal of Drug Discovery and Pharmacology 主编，British Journal of Pharmacology 高级编委，Cardiovascular Research 执行编委，中国协和医科大学客座教授，南京医科大学客座教授。

Course Description

This course primarily focuses on applying cutting-edge technologies in cardiovascular pharmacology. Topics include stem-cell/cardiac organoid culture, photo-controlled genetic manipulation, CRISPR/Cas9 system, adenovirus-associated virus-based gene therapy, Protac/Dubtac technology in cardiovascular diseases. Additionally, the course covers the design of scientific research papers and techniques for manuscript writing.

本课程主要涉及心血管药理学前沿技术，干细胞及类器官技术，光控遗传技术基因编辑，CRISP/Cas9 技术和腺病毒基因治疗技术，蛋白降解/稳态控制技术在心血管疾病及药物研发的应用，并安排科研论文思路设计及论文写作技巧。

Syllabus

Day 1

Current progress in Cutting-edge Technology in cardiovascular pharmacology 心血管药理学前沿技术概述

Day 2

1) Transgenic and optogenetic approach in cardiovascular research 基因改造和光遗传学在心血管研究中的应用

2) The use of iPS cells/organoids in cardiovascular drug development 干细胞技术/类器官在心血管药物研发中的应用

Day 3

1) CRISPR/Cas9 approach in research and drug development/ CRISPR/Cas9 基因敲除技术在药物研发中的应用

2) AAV9 gene therapy in cardiovascular research/AAV9 基因治疗技术在心血管研究中的应用

3）Protac/Dubtac 技术

Day 4

1) Cutting-edge Technology in Cardiovascular Pharmacology and critical thinking-Tutorial unit 1 for critical analysis of research problems 心血管药理学前沿技术与深度阅读 1-互动学习-科研问题的关键性分析

2) Cutting-edge Technology in Cardiovascular Pharmacology and critical thinking-Tutorial unit 2 for research project design 心血管药理学前沿技术与深度阅读-2 撰写研究计划

Day 5

Cutting-edge Technology in Cardiovascular Pharmacology and critical thinking-Tutorial unit 3 (option) for research & practice 心血管药理学前沿技术与深度阅读 3-研究实践讲解

Introduction to drug delivery
药物递送入门

开课单位：国际处

任课教师 Instructor's Information	姓　　名 Name	Christos Tapeinos		
	性　　别 Gender	Male		
	国　　籍 Nationality	Greek		
	职称/职务 Title	Lecturer	邮箱地址 Email	Christos.tapeinos@manchester.ac.uk
	最终学位 Degree	University degree in Materials Science with an MSc and a PhD in the same field Docent in Pharmaceutical Nanotechnology	任职单位 Work Place	University of Manchester
课程信息 Course Information	授课对象 Open to	本科生	学　时 Class Hour	24
	授课时间 Lecture Schedule	7 月 5 日-11 日	考核方式 Assessment Method	Discussions (debates) Quizzes Reflection assay Group presentation

Resume of Instructor

Dr. Christos Tapeinos, a Lecturer in Pharmaceutical Sciences at the University of Manchester, integrates teaching and research expertise in drug delivery and nanomedicine. He has developed and delivered courses on how medicines are formulated and administered, covering topics such as pharmaceutical

technologies (e.g., powder flow, implants, inhalers, and topical formulations) and smart nanomedicines, including stimuli-responsive systems. His engaging teaching style simplifies complex concepts through clear explanations, case studies, and real-world applications, helping students connect theory with practice.

Dr. Tapeinos teaches second-, third-, and fourth-year pharmacy students, as well as fourth-year chemistry students, and has played a key role in developing enquiry-based learning modules. Alongside his lectures, he actively supports students through these modules and practical sessions. As the Divisional Lead for Practical Skills, he has developed and led several new practicals, enhancing hands-on learning experiences.

He has supervised numerous undergraduate, master's, and PhD students, guiding them in applying drug delivery principles to real-world challenges. His research focuses on advanced drug delivery systems, including targeted therapies and biodegradable platforms for treating glioblastoma and pancreatic cancer. He has published over 34 peer-reviewed papers, accumulating nearly 2,000 citations. He has secured more than £500,000 in research funding from prestigious organizations such as the EU MSCA, Royal Society, EPSRC, and Wellcome Trust. He also collaborates internationally with leading universities and research centers in biomaterials, nanotechnology, and pharmaceutical sciences.

Beyond his academic research and teaching, Dr. Tapeinos organizes an annual summer school at the University of Manchester for high school students from disadvantaged backgrounds, aiming to inspire and equip them with the knowledge and confidence to pursue careers in pharmaceutical sciences and biomedical research.

Course Description

This 24-hour summer school provides an engaging and accessible introduction to modern drug delivery systems, focusing on smart nanomedicines, implants, inhaled formulations, and semi-solid drug formulations. The course is

designed for undergraduate and graduate students and early-career researchers interested in how medicines are formulated and delivered in the body.

Through interactive lectures, case studies, and discussions, participants will explore key concepts such as controlled drug release, long-acting therapeutics, nanoparticle-based drug carriers, stimuli-responsive systems, and targeted therapies. The course will also cover real-world applications of drug delivery technologies in treating diseases like cancer and neurodegenerative disorders.
By the end of the course, students will have a strong foundational understanding of drug delivery principles and how advanced materials and nanotechnologies are shaping the future of medicine.

Syllabus

Course Modules and Schedule

Day 1: Fundamentals of Drug Delivery (6 hours)

Session 1: Introduction to Drug Delivery (2 hours)

- Overview of drug delivery systems and their significance
- Routes of administration: advantages and challenges
- Pharmacokinetics (ADME) and bioavailability

Session 2: Oral, Inhaled, and Topical Drug Delivery (4 hours)

- Oral drug delivery: controlled vs. immediate-release formulations, impact of particle size on solubility and absorption
- Inhaled formulations: dry powder inhalers (DPIs), metered-dose inhalers (MDIs), and pulmonary drug deposition
- Semi-solid formulations (creams and gels): absorption mechanisms, formulation design, and clinical applications

Assessment: Short quiz and case study analysis

Day 2: Implants and Nanomedicines (6 hours)

Session 3: Implants and Injectable Drug Delivery (2 hours)

- Biodegradable and non-biodegradable implants
- Long-acting injectables and depot formulations

Session 4: Introduction to Nanomedicines (4 hours)

- Nanoparticle-based drug delivery: liposomes, micelles, polymeric nanoparticles
- Passive vs. active targeting mechanisms
- Case study: Liposomal doxorubicin in cancer therapy

Assessment: Concept mapping and group discussion

Day 3: Smart Nanomedicines and Stimuli-Responsive Systems (6 hours)

Session 5: Smart Drug Delivery and Stimuli-Responsive Systems (3 hours)

- Characteristics of smart drug delivery systems
- External vs. internal stimuli for controlled drug release (pH, temperature, light, ultrasound)
- pH-sensitive nanoparticles for tumour-targeted drug release

Session 6: Theranostics and Gene Delivery (3 hours)

- Theranostics: integration of therapy and diagnostics in nanomedicine
- Gene delivery systems: viral vs. non-viral carriers
- Lipid nanoparticles in mRNA vaccine delivery

Assessment: Quick quiz and structured group debate

Day 4: Future Trends and Final Project (6 hours)

Session 7: Emerging Technologies in Drug Delivery (3 hours)

- AI-driven approaches for drug formulation and optimisation
- 3D-printed pharmaceuticals and personalised drug delivery
- Microbiome-based drug delivery strategies

Session 8: Final Project and Presentations (3 hours)

- Group project: Designing an innovative smart drug delivery system
- Presentation of project outcomes and discussion
- Peer review and instructor feedback

Assessment: Final project evaluation and peer-reviewed presentation

Transforming Cancer Medicine: Innovation (including AI) and Global Perspectives in Drug Development

癌症医学转型：药物开发的创新（包括 AI）和全球视角

开课单位：国际处

<table>
<tr><td rowspan="5">任课教师
Instructor’s
Information</td><td>姓　　名
Name</td><td colspan="2">Akhil Jain
Ayse Latif</td><td rowspan="3"> 
  </td></tr>
<tr><td>性　　别
Gender</td><td colspan="2">Male
Female</td></tr>
<tr><td>国　　籍
Nationality</td><td colspan="2">Indian (require visa)
Cypriot (does not require visa)</td></tr>
<tr><td>职称/职务
Title</td><td>Dr Jain - Lecturer in Drug Delivery
Dr Latif - Lecturer in Pharmaceutical Sciences</td><td>邮箱地址
Email</td><td>Akhil.jain@manchester.ac.uk
Ayse.latif@manchester.ac.uk</td></tr>
<tr><td>最终学位
Degree</td><td>PhD
PhD .</td><td>任职单位
Work Place</td><td>University of Manchester, Division of Pharmacy and Optometry, Manchester, UK</td></tr>
<tr><td rowspan="2">课程信息
Course
Information</td><td>授课对象
Open to</td><td>本科生</td><td>学 时
Class Hour</td><td>24</td></tr>
<tr><td>授课时间
Lecture Schedule</td><td>7 月 5 日-11 日</td><td>考核方式
Assessment Method</td><td>Formative Assessment – Student presentations
Summative Assessment - Quizzes</td></tr>
</table>

Resume of Instructor

Dr Ayse Latif (Lecturer in Pharmaceutical Sciences and Principal

Investigator):

I am an experienced molecular biologist, and dedicated my career to advancing translational cancer research through biomarker discovery and innovative drug development. My work focuses on identifying predictive, prognostic, and pharmacogenetic biomarkers for women's cancers and pancreatic cancer, bridging preclinical insights to clinical applications. Further, my research aims to advance knowledge on the role of cancer cell metabolism and metabolic reprogramming in tumor initiation, progression, and metastasis, with the ultimate goal of translating these discoveries into patient benefit. I have a robust publication record in internationally renowned journals such as Clinical Cancer Research and Clinical Pharmacology and Therapeutics (https://orcid.org/0000-0002-7245-8729). In 2014, I was recognized for excellence with a University Exceptional Performance Award (2014). Further, I secured the competitive Investing in Success Award (2018, enabling my secondment to Moffitt Cancer Centre in USA), MRC-DTP studentships (in 2022 and 2025) and The Dowager Countess Eleanor Peel Trust Medical Grant (2020), while generating critical preliminary data that underpinned large-scale grants such as the Breast Cancer Campaign and MRC awards.

In addition to my research, I have extensive teaching and mentoring experience (for year 1-4 undergraduate, masters and PhD students), spanning GTA roles as a student to current role as a Lecturer, including national-level curriculum delivery at UCL. I am an UK Higher Education Academy certified* (2017) educator skilled at adapting content to diverse learning levels and interdisciplinary audiences ranging from biology, chemistry, pharmacy, pharmaceutical sciences, microbiology to optometry. I have a track record of classroom, and practice-led teaching that span cutting-edge fields like cancer biology, sustainable drug design, experimental therapeutics and biomarker discovery. These experiences are complemented by leading practical and case-study sessions, and developing and managing interdisciplinary curricula. Further, I use my published pedagogic research on student learning preferences (presented at a national education conference) to customize development of

assessments and curricula for each student cohort and ensure that materials are tailored to optimize engagement and understanding. Further, my ability to customize materials dynamically during sessions, ensures that students at all levels, stay engaged and achieve their learning goals.

Before becoming a Lecturer in 2019, I completed my postdoctoral research at the University of Manchester (2010–2018), focusing on advancing knowledge on women's cancers, novel therapeutic discovery and development, and pre-clinical testing cancers. Due to my contributions, I have been promoted (by merit) to Research Fellow in 2018. I earned my PhD through a Prevent Breast Cancer Fellowship (charity based competitive funding) at the University of Manchester (2007-2010), focusing on GWAS variants and their impact on cancer risk and pharmacogenetics. I hold both a bachelor's and a master's degree in biology and molecular biology, respectively, both obtained in Turkey.

* a prestigious UK credential that recognizes excellence in teaching and student support.

Dr Akhil Jain (Lecturer in Drug Delivery and Principal Investigator):

I am a Lecturer in Drug Delivery at the University of Manchester, with a research vision centred on Electro-Pharmacy. I have published 27 peer-reviewed articles, including nature nanotechnology, and holds an international patent. My research, funded by prestigious organizations such as the MRC and Royal Society of Chemistry, has secured over £120k, with a pending £1.9 million from EPSRC, UK. My work explores bioelectronics and nanomedicine for precise therapeutic interventions, exploiting my expertise in quantum nanotechnology, electrochemistry, and drug delivery to pioneer next-generation healthcare solutions.

In addition to my research, I am actively involved in undergraduate and postgraduate teaching. At the University of Manchester, I deliver lectures on nanomedicine and advanced drug delivery for second, third and fourth year MPharm students and contributes to 1-4-year Enquiry-Based Learning (EBL) cases. I have also designed and led practical modules, including nano-micro

formulation and powder flow lab sessions. Previously, at the University of Nottingham, I taught Biomaterials and Bioelectronic Medicine for MRes students, along with undergraduate and postgraduate courses in nanobiotechnology and advanced drug delivery. His teaching philosophy integrates hands-on learning with real-world applications, fostering critical thinking and innovation in pharmaceutical sciences. Beyond academia, I have experience in outreach and mentorship, organizing public engagement activities (placement host for the In2STEM, UK programme) and running a summer course in the UK aimed at inspiring students from diverse backgrounds to explore careers in pharmaceutical sciences and bioelectronics.

Before joining the University of Manchester in 2024, I completed my postdoctoral research at the University of Nottingham (2018–2024), focusing on bioelectronics for the treatment of hard-to-treat cancers. I earned my PhD through a CONACyT fellowship at the National Autonomous University of Mexico and the University of California, San Diego, in 2018, specializing in advanced materials for enhanced tumor delivery, multimodal imaging, and photodynamic therapy. I hold both a bachelor's and a master's degree in biotechnology, both obtained in India.

Course Description

This summer school offers a unique opportunity to explore the cutting-edge intersection of innovative cancer research, pharmaceutical sciences and drug delivery. It is designed for students passionate about drug discovery, drug delivery, and the future of medicine whom are also interested to learn about various sectors in pharmaceutical industry or academia.

To maximize student development, this program combines interactive lectures, expert interviews, hands-on activities, self-study and collaborative discussions to provide a comprehensive understanding of fundamental challenges and opportunities in developing and delivering innovative cancer therapies.

Program Highlights:

Expert-Led Lectures and Interviews: Learn from leading experts in cancer biology, drug discovery, delivery and testing.

Hands-On Activities: Engage in simulations, case studies, and group projects to apply theoretical knowledge to real-world scenarios.

Collaborative Learning/Discussions: Work in teams to design drug development plans, present findings, and receive constructive feedback.

Global Perspectives: Compare and contrast drug discovery and delivery trends in China with global efforts, highlighting the role of emerging technologies in overcoming challenges.

Who Should Attend?

This program is ideal for undergraduate students in **pharmaceutical sciences, biology, chemistry, biomedical engineering**, or related fields who are interested in cancer research, drug development and delivery, and the transformative potential of emerging technologies in medicine.

Syllabus

Session 1: Welcome and Orientation

Lecture #1: Introduction to the programme and expectations

Activity: Scientific Speed Dating

Live Poll#1: To assess student background, expectations and learning preferences

Quiz#1: To assess core knowledge on drug discovery, development and drug delivery

Session 2:

Lecture #2: Introduction to cancer

Discussion & Activity (1): Most common cancers & cancers with unmet need in China

Session 3:

Lecture #3: Conventional and innovative cancer treatments and their outcomes
Discussion & Activity (2): Critical assessment of current cancer therapies in China

1 hour self-study time to go over material

Session 4:
Lecture #4: Introduction to Drug Discovery
Discussion #1: Drug discovery trends in China and its comparison to global trends

Session 5:
Expert Interview #1: Drug Discovery Challenges
Discussion #2: Challenges in drug discovery process in China and globally
Discussion #3: Emerging technologies (AI) and their use in overcoming challenges in drug discovery

Session 6:
Lecture #5: Introduction to Target Discovery
Discussion and Activity (3): Critical Assessment of most targetable cancer hallmarks in China and its comparison to global efforts

1 hour self-study time to go over material

Session 7:
Lecture #6: Drug Design
Hands on activity #1: Drug design simulation using available computer programmes (eg. molecular docking).

Session 8:
Enquiry Based Learning #1: Cancer Target Discovery and Challenges

Session 9:

Lecture #7: Drug Delivery Systems

Enquiry Based Learning #2: Case study on designing a drug delivery system.

1 hour self-study time to go over material

Session 10:

Lecture #8: Brief summary of learning highlights

Discussion #4: Open Q&A session.

Quiz#2: to assess core knowledge on drug discovery pipeline and drug delivery

Session 11:

Lecture #9: Nanomedicine: Nanoparticles in Medicine

Discussion #5: Discussion on a well-known cancer nanomedicine

Session 12:

Enquiry Based Learning #3: Nanoparticle-based drug delivery system for cancer.

1 hour self-study time to go over material

Session 13:

Student Presentations #1: Students will be assessed and will receive constructive feedback on their work.

Session 14:

Lecture #10: Future Medicine: Bioelectronic Medicine.

Hands on Activity #2: Hands on experience with “electric orange”.

Session 15:

Lecture #11: Preclinical Testing

Discussions #6: Identify factors important for moving a drug to clinical trials

1 hour self-study time to go over material

Session 16:

Lecture #12: Clinical Trials

Quiz#3: To assess background knowledge on clinical trials

Discussion #7: Challenges for clinical trials in China and how these compare to global challenges

Session 17:

Expert Interview #2: Clinical Trials

Discussion #8: Clinical trial paper that is relevant to EBL#4

Quiz#4: To assess background knowledge on clinical trials

Session 18:

Enquiry Based Learning #4: Designing a Cancer Clinical Trial

Decision-making scenario - students choose trial parameters.

1 hour self-study time to go over material

Session 19:

Lecture #13: Future Trends in Drug Delivery

Discussion #9: Emerging trends in drug delivery in China and Globally (e.g., smart drug delivery systems, personalized medicine, AI).

Session 20:

Enquiry Based Learning #5: Designing a Drug Development & Delivery Plan

Discussion and Activity (4): Students work in teams to create a simplified drug development plan for their target in their selected cancer type and complete their presentation.

Session 21:

Student Presentations #2: Students will be assessed and will receive constructive feedback on their work.

1 hour self-study time to go over material

Session 22:

Lecture #14: Career Opportunities in Pharmaceutical Sciences (R&D, regulatory affairs, clinical research).

Discussion #10: How would increase in cancer incidence influence pharmaceutical sciences industry in China and globally? How would Chinese government investment and AI tool development will impact the field (esp considering their help in overcoming challenges in drug discovery)?

Session 23:

Lecture #15: Overview of skills for pharmaceutical sciences career opportunities in China and globally

Hands on Activity#3: Students

- to check their CV against the skills required for their desired career path
- to devise a plan for obtaining future opportunities to make their CV globally competitive?

Discussion #11: Discuss these plans for future development?

**1 hour self-study time to go over material **

Session 24:

Lecture #16: Overview of learning outcomes

Live Poll#2: Feedback on the sessions and summer school overall

Celebrate students' achievements

Programme Analytics:

Total 24 sessions composed of following aspects:

16 Lectures

2 expert interviews

5 enquiry based learning

2 student presentations

11 Discussion sessions

4 quizzes

4 presentation related activity

3 hands-on activity

2 live polls

7 independent study hours are integrated throughout the programme to support student learning.

Drug Delivery Systems for pharmaceuticals

药品给药系统

开课单位：国际处

任课教师 Instructor's Information	姓　　名 Name	Natalie Hughes		
	性　　别 Gender	Female		
	国　　籍 Nationality	New Zealand		
	职称/职务 Title	Professor	邮箱地址 Email	natalie.hughes@otago.ac.nz
	最终学位 Degree	BPharm, BSc, PhD	任职单位 Work Place	University of Otago
课程信息 Course Information	授课对象 Open to	本科生	学　时 Class Hour	24
	授课时间 Lecture Schedule	7 月 5 日-12 日	考核方式 Assessment Method	assignment

Resume of Instructor

Professor Hughes has a pharmacy degree and a PhD in drug delivery. Her teaching and research interests center around optimizing drug delivery through formulation innovation and pharmacokinetic evaluation. She has published 100 international review publications and is inventor on patents for ketamine-controlled release oral dosage form. She has taught pharmacy and pharmaceutical science undergraduate students for 30 years in New Zealand.

Course Description

How are bioactive molecules (drugs) converted into easy-to-use medicines?

This course introduces students to the physiological factors of the body and physiochemical properties of the bioactive compound (drug) and delivery system that influence drug release and entry into the body.

Specifically, a student will learn how to do the following:

- Describe how the anatomy and physiology of an organ/route (parenteral, oral, transdermal, ocular, pulmonary, nasal and buccal) can influence delivery of a bioactive [substance].
- Explain the mechanism of release of bioactives [substances] from dosage forms into body and how these can be altered to enhance drug absorption.
- Discover how delivery systems are designed to allow administration of bioactives [substances] via the parenteral (injection), oral, transdermal, ocular, pulmonary, nasal and buccal routes.
- Introduce pharmacokinetic aspects of dosage form design for product development.

Syllabus

Section One: Introduction to drug delivery? Discover how bioactive molecules are formulated into dosage forms, what properties of drugs are important to understand to develop dosage forms for medications.

(3 lectures (3 hours) + one discussion workshop (2 hours))

Section Two: Review the anatomy and physiology of absorptive sites in the body; understand bioavailability and the main components of dosage regimens (dose and frequency of administration) for medicines.

(5 lectures (5 hours) and one discussion workshop (2 hours))

Section Three: Examples of dosage form design: parenteral (injectables); oral; buccal; pulmonary; nasal; ocular topical and transdermal.

(5 lectures (5 hours) and one discussion workshop (2 hours)).

Section Four: How pharmacokinetics (time course of bioactive in the body) of new dosage forms are evaluated in product development.
(5 lectures (5 hours))

Interdisciplinary Applications of Data Science in Healthcare
数据科学与医疗健康的交叉应用

开课单位：国际交流合作处

任课教师 Instructor's Information	姓　　名 Name	孙哲		
	性　　别 Gender	男		
	国　　籍 Nationality	中国		
	职称/职务 Title	Junior Associate Professor	邮箱地址 Email	z.sun.kc@juntendo.ac.jp
	最终学位 Degree	理学博士	任职单位 Work Place	日本顺天堂大学
课程信息 Course Information	授课对象 Open to	本科	学　时 Class Hour	16
	授课时间 Lecture Schedule	2025.7.5-2025.7.11	考核方式 Assessment Method	课后作业

Resume of Instructor

孙哲，先后在日本庆应义塾大学，横滨市立大学学习并获得理学博士学位。2015 年加入日本国立理化学研究所脑科学综合研究中心（中心主任为诺奖获得者利根川进教授）先后任研究助理，研究员。2017 年到 2020 年任信息系统本部 POST-K 超算项目组研究员。2020 年开始到现在任光量子科学研究中心研究员。2021 年同时并任名古屋大学医学院全职助理教授。2021 开始在顺天堂大学医学院任兼职讲师，2023 年开始将被任命为正在组建的顺天堂大学健康数据科学学院终身职教员，独立 PI。孙哲博士在 2017 年加入了日本文部省富岳超级计算机工程，负责基于百亿亿次超级计算机的人类大脑的模拟研究工作，该研究旨在 E 级超级计算机-富岳上实现人类全

脑回路的模拟工作。2024 年开始到现在作为唯一中国籍研究代表承担日本脑计划 Brain MINDS 计划中‘数字脑’重点课题。

Sun Zhe studied at Keio University and Yokohama City University in Japan and obtained a PhD in Science. In 2015, he joined the Brain Science Comprehensive Research Center of the National Institute of Physical Chemistry in Japan (led by Nobel laureate Professor Toshiyuki Tone) and served as a research assistant and researcher. From 2017 to 2020, served as a researcher in the POST-K supercomputing project team of the Information Systems Headquarters. I have been a researcher at the Optical Quantum Science Research Center since 2020. In 2021, he also served as a full-time assistant professor at Nagoya University School of Medicine. Starting from 2021, I will work as a part-time lecturer at the School of Medicine of Shuntian University. Starting from 2023, I will be appointed as a lifelong teacher and independent PI at the School of Health Data Science of Shuntian University, which is currently being established. Dr. Sun Zhe joined the Fukuyama Supercomputing Project of the Ministry of Education, Culture, Sports, Science and Technology of Japan in 2017, responsible for the simulation research of the human brain based on billions of supercomputers. The research aims to simulate the entire human brain circuit on the E-class supercomputer Fukuyama. Since 2024, I have been the only Chinese research representative to undertake the key project of 'Digital Brain' in the Japanese Brain MINDS program.

Course Description

本课程共 16 学时，分为三个主要模块：

1. 数据科学与医疗健康的交叉应用

- 探讨如何运用人工智能、机器学习和深度学习技术分析医疗健康数据，挖掘数据背后的价值，推动医疗决策与个性化诊疗的发展。

2. 计算科学在医疗健康领域的应用

• 重点讲解超级计算机技术和传感器技术在医疗健康中的应用，包括大规 模数据处理、实时监测与智能诊断等前沿技术。

3. 计算神经科学与人工智能的发展

• 分析近年来计算神经科学的进展及其与人工智能的融合，讨论未来在医疗健康领域中的创新应用前景。

This 16-lesson course is structured into three main modules:

1. Interdisciplinary Applications of Data Science in Healthcare

• This module focuses on leveraging artificial intelligence, machine learning, and deep learning techniques to analyze healthcare data, uncover hidden insights, and enhance decision-making and personalized treatment strategies.

2. Computational Science in Healthcare

• It emphasizes the application of supercomputing technologies and sensor developments in healthcare, covering topics such as large-scale data processing, real-time monitoring, and intelligent diagnostics.

3. Advancements in Computational Neuroscience and Artificial Intelligence

• This section explores the recent developments in computational neuroscience and its integration with artificial intelligence, discussing innovative prospects for future applications in the healthcare sector. will be placed on regulatory requirements from major agencies such as the FDA, EMA, and NMPA, as well as global quality standards (GMP, ICH guidelines). The course will also cover emerging trends and challenges in the industry. Students will apply their knowledge of quality and regulation in the critical evaluation of industry documentation. They will also be equipped with the skills required for the development of industry-relevant protocols.

Syllabus

7 月 8 日（第 1 天）：数据科学在医疗健康中的应用 – 6 课时

1. 课程导入与数据科学基础概述
   - 介绍课程目标、安排以及数据科学的基本概念。
2. 医疗健康数据的特性与预处理
   - 探讨医疗数据的收集、清洗及其特殊挑战。
3. 人工智能与机器学习在医疗数据分析中的应用
   - 讲解常见算法及其在医疗数据中的应用实例。
4. 深度学习在医疗影像与诊断中的案例分析
   - 分析具体案例，展示深度学习如何辅助医学影像诊断。
5. 小组讨论：数据科学在医疗健康中的挑战与机遇
   - 分组讨论当前技术应用中的难点及未来发展方向。
6. 总结与答疑
   - 回顾当日内容，解答学生疑问，做好知识衔接。

7 月 9 日（第 2 天）：计算科学在医疗健康中的应用 – 5 课时

1. 计算科学与超级计算技术概述
   - 介绍计算科学基本原理及超级计算机在医疗领域的作用。
2. 超级计算在医疗大数据处理中的应用
   - 探讨大规模数据处理和复杂计算任务在医疗中的实际应用。
3. 传感器技术与实时监测在医疗健康中的实践
   - 讲解传感器及物联网技术如何实现实时健康监控。
4. 小组讨论：前沿技术在医疗健康中的应用与挑战
   - 小组交流各自对超级计算与传感器技术未来应用的见解。
5. 案例分析与答疑
   - 结合具体案例，巩固理论知识，并解答疑难问题。

7 月 10 日（第 3 天）：计算神经科学与人工智能的应用 – 5 课时

1. 计算神经科学的基本概念与发展历程

• 介绍神经科学研究的发展和计算方法在其中的应用。

2. 脑科学数据分析方法及挑战

• 探讨神经数据采集、处理与分析中的关键技术与难点。

3. 人工智能在神经科学研究中的应用

• 分析 AI 技术如何推动脑科学研究和临床应用。

4. 小组讨论：计算神经科学与人工智能的融合及未来趋势

• 小组探讨二者结合带来的新机遇和可能遇到的技术挑战。

5. 学生展示、总结与课程反馈

• 邀请学生分享讨论成果，总结课程重点，收集反馈意见。

English Syllabus (16 Lessons)

July 8 (Day 1): Applications of Data Science in Healthcare – 6 Sessions

1. Course Introduction & Overview of Data Science Fundamentals

• Introduce course objectives, schedule, and basic concepts of data science.

2. Characteristics and Preprocessing of Healthcare Data

• Discuss data collection, cleaning, and the unique challenges of healthcare data.

3. Applications of AI and Machine Learning in Analyzing Healthcare Data

• Present common algorithms and their practical applications in healthcare.

4. Case Study: Deep Learning in Medical Imaging and Diagnosis

• Analyze real-world examples showing how deep learning aids medical diagnostics.

5. Group Discussion: Challenges and Opportunities in Data Science for Healthcare

• Engage in group discussions to explore current challenges and future trends.

6. Summary & Q&A Session

- Review the day's content and address student questions.

July 9 (Day 2): Applications of Computational Science in Healthcare – 5 Sessions

1. Overview of Computational Science & Supercomputing Technologies

- Introduce the principles of computational science and the role of supercomputers in healthcare.

2. Supercomputing in Processing Healthcare Big Data

- Explore how large-scale computing handles complex healthcare data.

3. Sensor Technologies and Real-time Monitoring in Healthcare

- Discuss practical applications of sensors and IoT for real-time health monitoring.

4. Group Discussion: Cutting-edge Technologies in Healthcare – Applications and Challenges

- Share insights on the future impact and challenges of supercomputing and sensor technologies.

5. Case Analysis & Q&A Session

- Analyze specific case studies to reinforce learning and clarify doubts.

July 10 (Day 3): Applications of Computational Neuroscience & AI – 5 Sessions

1. Introduction to Computational Neuroscience: Concepts & Evolution

- Overview of the development and key concepts in computational neuroscience.

2. Brain Data Analysis Methods and Associated Challenges

- Discuss techniques for analyzing neural data and the inherent challenges.

3. AI Applications in Neuroscience Research

- Examine how AI is revolutionizing neuroscience research and clinical practices.

4. Group Discussion: Integrating Computational Neuroscience and AI – Future Prospects

- Explore the synergy between neuroscience and AI and discuss emerging

trends.

5. Student Presentations, Course Wrap-up & Feedback

• Students present discussion outcomes, followed by a course summary and feedback session.