

Programme Information		
Programme Title	Programme Code	HECoS Code
Biomedical Research Biomedical Research (Anaesthetics, Pain Medicine and Intensive Care) Biomedical Research (Bacterial Pathogenesis and Infection) Biomedical Research (Data Science) Biomedical Research (Epidemiology, Evolution and Control of Infectious Diseases) Biomedical Research (Microbiome in Health and Disease) Biomedical Research (Molecular Basis of Human Disease) Biomedical Research (Respiratory and Cardiovascular Science)	A1BA	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MRes	1 Calendar Year (12 months)	Full-time	Annually in October	90	180

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Medicine
Teaching Institution	Imperial College London	Department	Metabolism, Digestion and Reproduction
Associateship	Diploma of Imperial College (DIC)	Main Location(s) of Study	Hammersmith

External Reference	
Relevant QAA Benchmark Statement(s) and/or other external reference points	Biomedical Sciences
FHEQ Level	Level 7 – Master's
EHEA Level	2nd Cycle

External Accreditor(s) (if applicable)			
External Accreditor 1:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A

Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A

Specification Details	
Programme Lead	Professor Timothy Ebbels

Student cohorts covered by specification	2023-24 entry
Date of introduction of programme	2005-2006 entry
Date of programme specification/revision	August 23

Programme Overview

The MRes in Biomedical Research aims **to develop the future generation of leaders in biomedical research**. The course offers you advanced training in the practice of biomedical research across a broad range of laboratory and computer-based biomedical science. It embraces cutting edge developments in the field and by way of two mini research projects, you will experience some of the most technologically advanced approaches currently being applied to biomedical research. Specifically, the course:

- a. Provides you with an excellent background in biomedical research, and integrates chemical, biological and computational aspects in a unified approach.
- b. Will teach you a mechanistic approach to solving the challenges encountered in biomedical science.
- c. Emphasises an investigative as well as an empirical approach to the practical problems encountered in biomedical science.
- d. Gives you theoretical and practical skills and knowledge that will prepare you for employment in a variety of biomedical environments.

The programme is divided into streams, each of which offers a different research specialism within biomedical research. Each stream offers a portfolio of research projects tailored to its specialism (e.g. the Data Science stream offers research projects in the area of biomedical data science). The format of the streams and assessment methods are the same for all students. The content of the core programme is stream-specific and delivers discipline-specific research training that supports and informs the stream research projects and grant writing exercise.

Current streams offered are listed below.

Biomedical Research (BMR)

This stream is the **main stream** of this course. This stream is appropriate if you are seeking experience in research but are uncertain of the field you wish to go into, as it provides training that covers a broad range of biomedical research techniques, rather than being discipline-specific. Research projects on this stream reflect the full breadth of biomedical research conducted across the Faculty of Medicine.

Anaesthetics, Pain Medicine and Intensive Care (APMIC)

This stream is the first of its kind to provide advanced research training in this unique medical speciality. You will be taught fundamental principles, molecular mechanisms and clinical implications, as well as provided with exposure to key translational research projects in the area.

Bacterial Pathogenesis and Infection (BPI)

This stream provides you with a research training in fundamental aspects of bacterial pathogenesis. The emphasis is on molecular approaches to understanding infection, as a function of bacterial pathogenic strategy and physiology.

Data Science (DS)

The Data Science stream provides you with an interdisciplinary research training in analysis of 'big data' from modern high throughput biomolecular studies. This is achieved through core training in multivariate statistics, chemometrics and machine learning methods, along with research experience in the development and

application of these methods to real-world biomedical studies. There is an emphasis on handling large-scale data, from molecular phenotyping techniques such as metabolic profiling and related genomics approaches.

Epidemiology, Evolution and Control of Infectious Diseases (EECID)

This stream provides you with an advanced research-based training in infectious disease epidemiology, mathematical modelling and statistics, genetics, evolution and computational methods. The emphasis of the course is in applying these methods within a vibrant inter-disciplinary environment. The stream has a strong applied public health element, strengthened through partnerships across the four faculties, with the Wellcome Trust Sanger Institute in Cambridge, and with global public health agencies including Public Health England, US CDC and WHO.

Microbiome in Health and Disease (MHD)

This stream provides you with a research training in microbiome biology, nutrition, hepatology and microbial signalling, as well as analytical technologies. You will learn about multidisciplinary approaches to systemic understanding of the gut microbiome, as well as the development of new targets for disease prevention and treatment.

Molecular Basis of Human Disease (MBHD)

This stream provides you with a research training in a broad range of skills and knowledge ranging from structural biology and molecular imaging to clinical research, with a focus on the molecular mechanisms of human diseases. Modern biomedical research and drug discovery require a mechanistic understanding of disease pathways at the atomic level. The stream will train you to address clinically pressing problems through integrating structural biology and other analytical tools with biomedical and clinical research, from generating insights into disease mechanisms to defining new disease-linked pathways that will drive drug discovery and development for clinical applications.

Respiratory and Cardiovascular Science (RCVS)

This stream provides you with a research training in basic physiology and pathophysiology of the heart and lungs, with projects related to advancing our understanding of these processes.

Learning Outcomes

The programme will enable **you** to:

1. **Demonstrate** a deep understanding of biomedical research in your chosen area, with the ability to **conceptualise** and **explore** theories, data and methods relevant to the field.
2. **Master** laboratory and/or computational **skills** required to perform biomedical research.
3. **Employ** a range of information retrieval tools to **search** literature, databases and other sources, **critically analysing** this information to **develop** tractable research objectives.
4. **Design** a novel research project and **compose** a corresponding grant proposal, appropriate for submission to an academic funding body.
5. **Select and apply** appropriate computational and statistical techniques, **interpreting** the results with an awareness of limitations of the methods.
6. **Develop** an awareness of broader issues in biomedical research such as societal impact, ethics, cost, governance and academic integrity.
7. **Critically evaluate** your own and others' work, including an appreciation of novelty and significance.
8. **Independently organise** and **manage** research projects, building **resilience** to challenges inherent to the research profession.
9. **Perform** research within a multi-disciplinary **team** environment, developing leadership skills and **communicating** effectively with team members.
10. **Compose and deliver** lucid written, oral and visual science communications, which are effective at conveying the message to a variety of audiences.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at:

Entry Requirements

Academic Requirement	Minimum 2:1 honours degree in an appropriate subject from a UK university, or non-UK equivalent For further information on entry requirements, please go to www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/
Non-academic Requirements	N/A
English Language Requirement	Standard requirement Please check for other Accepted English Qualifications
Admissions Test/Interview	Admissions are conducted by each stream separately, with programme-wide oversight by the course directors. Decisions are made by a minimum of two admissions tutors, following review of applications. Short interviews are conducted for borderline applicants and for scholarship candidates.

Learning & Teaching Approach

The primary aim of the MRes in Biomedical Research is to teach the *practice of science*. Teaching of science itself is a secondary aim. Thus, the learning and teaching strategy is *constructively aligned* with learning objectives to focus on the knowledge, skills and abilities required by professional scientists in academia, government, industries and NGOs. Both teaching and assessment methods are *authentic* as far as possible, in that they reflect activities performed by biomedical scientists in their everyday professional life. The 3 assessed elements of the course - two 6-month research projects and a grant writing exercise – reflect the major activities undertaken by modern biomedical scientists. In addition, a core programme (approx. ½ day per week) exposes you to fields outside your immediate project area, including the state-of-the-art knowledge, cutting edge experimental techniques and computational approaches. The core programme also covers generic research skills, such as academic integrity, peer review, experimental design, statistics, bioinformatics, career planning and science communication, etc. Across the programme, a range of teaching methods are used including: laboratory work, computational work, tutorials, seminars, lectures, practical workshops, one-to-one demonstrations, group demonstrations, journal clubs, facility tours, debates and online material.

Assessment Strategy

Assessment Methods

In keeping with the aims of the programme and the intended learning objectives, a range of authentic methods for summative assessment are used. These include: (1) thesis in style of a technical report (project 1), (2) thesis in style of a scientific manuscript (project 2), (3) simulated grant application, (4) oral in the form of a poster presentation (project 1), (5) oral in the form of a conference talk (project 2), (6) practical work (both projects), (7) viva voce (both projects).

The following table maps the assessed elements to the programme level intended learning outcomes (ILOs).

	ILO	Projects	Grant
1	Demonstrate deep understanding of scientific area.	x	
2	Master laboratory and computational skills.	x	
3	Information retrieval from literature and other sources.	x	x
4	Design a research project.		x
5	Computational / statistical techniques.	x	
6	Broader issues in biomedical research.	x	x
7	Critical evaluation of own and others' work.	x	
8	Project management.	x	
9	Team work.	x	x
11	Science communication.	x	x

Note that while both projects assess broadly similar programme-level learning objectives, the module objectives for project 2 are at a higher level than project 1. For example, project 1 requires students to apply data analysis techniques, whereas project 2 requires them to be able to select appropriate techniques and be aware of their limitations. These deeper objectives ensure progression in the student's learning over the course of the programme.

Formative assessment which supports student learning is accomplished by (1) regular verbal and written feedback from project supervisors, (2) presentations by the student at group/lab meetings, (3) a formal mid-project appraisal with the supervisor, results of which are monitored and if necessary actioned by the course team, (4) verbal and written comments on the draft thesis from the supervisors, (5) feedback on grant ideas from experienced academics, and (5) peer feedback on the draft grant application from other students.

Assessment timings: Project 1 is assessed by a thesis (in the style of a technical report) and poster presentation at the end of the project. A minimum 5-day gap between the hand-in of the thesis and the poster presentation ensures time for students to prepare the poster. Project 2 is assessed by a thesis (in the style of a concise scientific manuscript) and an oral presentation at the end of the project. A minimum 5-day gap between the hand-in of the thesis and the oral presentation ensures time for students to prepare the talk. The grant writing exercise is assessed by a written grant application, handed in around the middle of project 2, significantly separated from other assessments.

All assessment is completed as coursework; there are no examinations.

The following table shows the contribution of each assessment to the module marks.

Module	Assessment					Total
	Thesis	Oral	Practical	Viva	Grant application	
Project 1	60%	20%	10%	10%		100%
Project 2	60%	20%	10%	10%		100%
Grant					100%	100%

The following table shows the contribution of each module to the final degree mark.

Module	Project 1	Project 2	Grant	Total
Contribution	45%	45%	10%	100%

Academic Feedback Policy

The College's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Re-sit Policy

The College's Policy on Re-sits is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Additional Programme Costs

This section should outline any additional costs relevant to this programme which are not included in students' tuition fees.

Description	Mandatory/Optional	Approximate cost
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Laptop computer	Optional	£200-500
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Programme Structure ¹					
Year 1 You will study all core modules.					
Code	Module Title	Core/ Elective	Group	Term	Credits
META70008	Project 1	Core	N/A	Autumn- Summer	40
META70007	Grant Writing Exercise	Core	N/A	Summer	10
META70009	Project 2	Core	N/A	Summer	40
Credit Total					90

¹ **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

Progression and Classification

The Pass Mark for all **postgraduate** taught course modules is 50.00%.

Students must pass all modules in order to be awarded a degree. These modules are: a) project 1, b) grant writing exercise, and c) project 2. Students must also complete the minimum requirement for Professional Skills courses and the online Plagiarism course.

Each research project contributes 50.00% to the final mark. The grant-writing exercise contributes 10.00% to the final mark. All marks are moderated by the External Examiners.

Award of a Masters Degree

To qualify for the award of a postgraduate degree you must have:

1. accumulated credit to the value of no fewer than 90 credits at Level 7
2. and no more than 15 credits as a Compensated Pass;
3. met any specific requirements for an award as outlined in the approved programme specification for that award.

Classification of Postgraduate Taught Awards

The College sets the Class of Degree that may be awarded as follows:

1. Distinction: 70.00% or above.
2. Merit: 60.00% or above but less than 70.00%.
3. Pass: 50.00% or above but less than 60.00%

For a Masters, your classification will be determined through:

- The Programme Overall Weighted Average meeting the threshold for the relevant classification band.

Your degree algorithm provides an appropriate and reliable summary of your performance against the programme learning outcomes. It reflects the design, delivery, and structure of your programme without unduly over-emphasising particular aspects.

Programme Specific Regulations

N/A

Supporting Information

The Programme Handbook is available upon enrolment.

The Module Handbook is available upon enrolment.

The College's entry requirements for postgraduate programmes can be found at:
www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/

The College's Quality & Enhancement Framework is available at:
www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance

The College's Academic and Examination Regulations can be found at:
www.imperial.ac.uk/about/governance/academic-governance/regulations

Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine".

www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/

Imperial College London is regulated by the Office for Students (OfS)
www.officeforstudents.org.uk/advice-and-guidance/the-register/

This document provides a definitive record of the main features of the programme and the learning outcomes that you may reasonably be expected to achieve and demonstrate if you take full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.