Programme Information		
Programme Title	Programme Code	HECoS Code
Biomedical Research Biomedical Research (Bacterial Pathogenesis and Infection) Biomedical Research (Respiratory and Cardiovascular Science) Biomedical Research (Microbiome in Health and Disease) Biomedical Research (Epidemiology, Evolution and Control of Infectious Diseases) Biomedical Research (Anaesthetics, Pain Medicine and Intensive Care) Biomedical Research (Molecular Basis of Human Disease) Biomedical Research (Data 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	Medicine
Associateship	N/A	Main Location(s) of Study	South Kensington Campus
External Reference			
Relevant QAA Benchmark Statement(s) and/or other external reference points		Biomedical Sciences (No specific masters benchmark available)	
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	Dr Timothy Ebbels
Student cohorts covered by specification	2020-21 entry
Date of introduction of programme	2005-2006 entry
Date of programme specification/revision	December 18

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.

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.

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.

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.

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.

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.

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.

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.

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: www.imperial.ac.uk/students/academic-support/graduate-attributes

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 https://www.imperial.ac.uk/study/pg/apply/requirements/pgacademic/
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 oversite 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) technical report (project 1), (2) scientific manuscript (project 2), (3) simulated grant application, (4) poster presentation (project 1), (5) oral presentation (project 2), (6) practical work (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.

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/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

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
Laptop computer	Optional	£200-500

Programme Structure[1]					
Year 1 **Students study all core modules.**					
Code	Module Title	Core/ Elective	Group	Term	Credits
	Project 1	Core	N/A	1-2	40
	Grant Writing Exercise	Core	N/A	3	10
	Project 2	Core	N/A	3	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 is a Pass or Fail element. It does not contribute to the overall final mark, but must be passed for award of the degree. All marks are moderated by the External Examiners. **Final Degree Classifications** In order to be awarded a result of **pass**, a candidate must obtain an aggregate mark of at least 50.00%. In order to be awarded a result of **merit**, a candidate must obtain an aggregate mark of 60.00% or greater, AND must obtain a mark of 60.00% or greater in one project, AND must obtain a mark of 50.00% or greater in the other project. In order to be awarded a result of **distinction**, a candidate must obtain an aggregate mark of 70.00% or greater, AND must obtain a mark of 70.00% or greater in one project, AND must obtain a mark of 60.00% or greater in the other project. Please find the full Academic Regulations at https://www.imperial.ac.uk/about/governance/academic-governance/regulations/ Please follow the prompts to find the set of regulations relevant to your programme of study.
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/pg/apply/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 a typical student may reasonably be expected to achieve and demonstrate if s/he takes 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.

Modifications			
Description	**Approved**	**Date**	**Paper Reference**
N/A	N/A	N/A	N/A