

MRes Biomedical Research

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 intended as a reference point for prospective students, current students, external examiners and academic and support staff involved in delivering the programme and enabling student development and achievement.

Programme Information

Programme Title	Biomedical Research (Bacterial Pathogenesis and Infection) (Respiratory and Cardiovascular Science) (Microbiome in Health and Disease) (Epidemiology, Evolution and Control of Infectious Diseases) (Anaesthetics, Pain Medicine and Intensive Care) (Molecular Basis of Human Disease) (Data Science) (Toxicological Science)			
Award(s)	MRes			
Programme Code	A1BA			
Associateship	N/A			
Awarding Institution	Imperial College London			
Teaching Institution	Imperial College London			
Faculty	Faculty of Medicine			
Department	Department of Surgery and Cancer			
Mode and Period of Study	1 academic year, full-time			
Cohort Entry Points	Annually in October			
Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's Degree Characteristics			
Total Credits	ECTS:	90	CATS:	180
FHEQ Level	Level 7			
EHEA Level	2 nd cycle			
External Accreditor(s)	No			

Specification Details	
Student cohorts covered by specification	2016/17 entry
Person responsible for the specification	Prof Nigel Gooderham, Director of MRes Biomedical Research, Assistant Provost (Ac Pro), Professor of Molecular Toxicology and Dr Timothy Ebbels, Deputy Director of MRes Biomedical Research
Date of introduction of programme	2005/2006
Date of programme specification/revision	March 2017
Description of Programme Contents	
<p>The MRes in Biomedical Research offers advanced research training in a broad range of laboratory and computer-based biomedical science. The course embraces cutting edge developments in the field and by way of two mini research projects, students will experience some of the most technologically advanced approaches currently being applied to biomedical research. Specifically, the course will:</p> <ol style="list-style-type: none"> Provide an excellent background in biomedical research, and will integrate chemical, biological and physiological aspects in a unified approach. Derive and teach a mechanistic approach to the problems encountered in molecular and cellular biomedical science. Emphasise an investigative as well as an empirical approach to the practical problems encountered in experimental and human biomedical science. Impart theoretical and practical knowledge and competence that will prepare the student for employment in a variety of biomedical environments. <p>The programme is divided into streams, each of which offers a different research specialism within biomedical research, which is defined by the research project field (e.g. Data Science stream offers research projects in the area of 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:</p> <p>Biomedical Research (BMR) This stream is the main stream of this course. Students who are looking to get experience in research but are uncertain of the area/ field they wish to go into will find this course challenging and interesting as it offers a research training that covers a broad range of biomedical research techniques rather than being discipline-specific. Research projects on this stream reflect the breadth of biomedical research offered in the Faculty of Medicine.</p> <p>Bacterial Pathogenesis and Infection (BPI) This provides 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.</p> <p>Respiratory and Cardiovascular Science (RCVS)</p>	

This stream will provide 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 unique MRes stream course provides research training in microbiology, nutrition, hepatology and microbial signalling, as well as analytical technologies. Students will learn about multidisciplinary approaches to systemic understanding of the gut microbiome as well as developing new targets for disease prevention and treatment.

Epidemiology, Evolution and Control of Infectious Diseases (EECID)

This stream provides advanced research-based training in infectious disease epidemiology, mathematical modelling and statistics, genetics and evolution and computational methods. The emphasis of the course is in applying these methods within a vibrant inter-disciplinary environment. The course has a strong applied public health element strengthened through partnerships across the four faculties, with the Wellcome Trust Sanger Centre 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. This entails teaching on fundamental principles and molecular mechanisms, as well as providing exposure to key translational research projects in this area.

Molecular Basis of Human Disease (MBHD)

Modern biomedical research and drug discovery require a mechanistic understanding of disease pathways at the atomic level. There is an urgent need 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. This MRes course provides research training in a broad range of skills and knowledge ranging from structural biology, molecular imaging to clinical research with a focus on the molecular mechanisms of human diseases.

Data Science (DS)

The Data Science stream provides 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.

Toxicological Science (TS)

This stream provides research training in the toxicological sciences including chemical risk assessment, drug metabolism, and molecular toxicology. This is achieved by taking toxicology focussed research projects that have an emphasis on molecular approaches to understanding toxicology. The course is supported by a core programme that offers research training through tutorials, advanced technical workshops and journal clubs that all have a toxicology focus.

Learning Outcomes

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

Knowledge and understanding of:

Issues which are currently topical in molecular, cellular and physiological science;

1. Management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications;
2. Ethics of animal and human experimentation;
3. Intellectual property issues;
4. The principles and practice of modern molecular, cellular and physiological science through both theory and practical exposure;
5. Advanced practical techniques of molecular, cellular and physiological science;
6. Research techniques including information retrieval, experimental design, statistics, bioinformatics and laboratory safety.

Intellectual Skills (lateral and critical thinking, logic):**Able to:**

1. Critically evaluate current developments in the fields of molecular, cellular and physiological science using an integrated multidisciplinary approach involving a number of scientific disciplines;
2. Integrate and evaluate information;
3. Formulate and test hypotheses using appropriate experimental design and statistical analysis of data;
4. Plan, conduct and write-up two independent programmes of original research.

Practical Skills**Able to:**

1. Plan and execute safely a series of experiments;
2. Use laboratory methods to generate data;
3. Analyse experimental results and determine their strength and validity;
4. Prepare technical reports;
5. Give technical presentations;
6. Use the scientific literature effectively;
7. Use computational tools and packages.

Transferable Skills**Able to:**

1. Communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications;
2. Apply statistical and modelling skills;
3. Management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination;
4. Integrate and evaluate information from a variety of sources;
5. Transfer techniques and solutions from one discipline to another;
6. Use Information and Communications Technology;
7. Manage resources and time;
8. Learn independently with open-mindedness and critical enquiry;
9. Learn effectively for the purpose of continuing professional development.

Entry Requirements

Academic Requirement	Minimum 2:1 honours degree in an appropriate science subject from a UK university or non-UK equivalent.
Non-academic Requirements	N/A
English Language Requirement	IELTS 6.5 with a minimum of 6.0 in each element or equivalent.
<p>The programme's competency standards documents can be found at: http://www.imperial.ac.uk/students/academic-support/graduate-attributes/</p>	

Learning & Teaching Strategy	
Scheduled Learning & Teaching Methods	<ul style="list-style-type: none"> • Core cross-stream Tutorials and Seminars • Stream specific Tutorials and Seminars • Core cross-stream Technical Workshops • Stream specific Technical workshops • Stream-specific Journal Clubs
E-learning & Blended Learning Methods	<ul style="list-style-type: none"> • N/A
Project and Placement Learning Methods	<ul style="list-style-type: none"> • Research projects
Assessment Strategy	
Assessment Methods	<ul style="list-style-type: none"> • Coursework • Practical
Academic Feedback Policy	
<p>Feedback will normally be provided in line with Imperial College expectations. Details of the feedback arrangements are specified in the programme handbook and the virtual Learning Environment (Blackboard). Feedback may be provided in one of a number of formats, including:</p> <ul style="list-style-type: none"> • Oral (during or after lectures) • Personal (discussion with academics during office hours) • Interactive (problem solving tutorials) • Written (examiners comments on assessed work) <p>After each assessed element, provisional results will be provided to students as alpha-grades. Numerical results will be published after the meeting of the final Board of Examiners.</p>	
Re-sit Policy	
<p>The College's Policy on Re-sits is available at: www.imperial.ac.uk/registry/exams/resit</p>	
Mitigating Circumstances Policy	
<p>The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/registry/exams</p>	

Assessment Structure

Marking Scheme

The Pass Mark for all **postgraduate** taught course modules is 50%.

Students must pass all elements in order to be awarded a degree. For the MRes Biomedical Research, these elements are: a) project one, b) grant writing exercise, and c) project two.

Each research project contributes 50% to the final mark. The grant-writing exercise is a pass or fail element and although does not contribute to the overall final mark, it is a requirement of the award that it is passed. All marks will be 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%.

In order to be awarded a result of **merit**, a candidate must obtain an aggregate mark of 60% or greater.

In order to be awarded a result of **distinction**, a candidate must obtain an aggregate mark of 70% or greater.

Where appropriate, a Board of Examiners may award a result of merit where a candidate has achieved an aggregate mark of 60% or greater across the programme as a whole AND has obtained a mark of 60% or greater in each element with the exception of one element AND has obtained a mark of 50% or greater in this latter element.

Where appropriate, a Board of Examiners may award a result of distinction where a candidate has achieved an aggregate mark of 70% or greater across the programme as a whole AND has obtained a mark of 70% or greater in each element with the exception of one element AND has obtained a mark of 60% or greater in this latter element.

Module Weightings

Module	% Module Weighting
Project 1	50%
Grant Writing Exercise	0% (P/F)
Project 2	50%

Indicative Module List											
Code	Title	Core/ Elective	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practical	FHEQ Level	ECTS
	Project 1	CORE	20	188	792	1000	0%	50%	50%	7	40
	Grant writing exercise (includes core programme)	CORE	142	108	0	250	0%	100%	0%	7	10
	Project 2	CORE	25	183	792	1000	0%	50%	50%	7	40

Supporting Information

The Programme Handbook is available at:

<https://www.imperial.ac.uk/medicine/study/postgraduate/masters-programmes/mres-biomedical-research/>

The Module Handbook is available at:

<https://www.imperial.ac.uk/medicine/study/postgraduate/masters-programmes/mres-biomedical-research/>

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:

<http://www.imperial.ac.uk/about/governance/academic-governance/senate-subcommittees/>

The College's Academic and Examination Regulations can be found at:

<http://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".

<http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters-statutes-ordinances-and-regulations/>

Imperial College London is regulated by the Higher Education Funding Council for England (HEFCE)

<http://www.hefce.ac.uk/reg/of/>

Modifications

Introduction of new stream Toxicological Sciences	Programmes Committee	21 March 2017	PC.2016.70
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