

Programme Information		
Programme Title	Programme Code	HECoS Code
Applied Genomics	A3K1.3	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc	1 Calendar Year (12 months)	Full-Time	Annually in October	90	180
PG Dip (only Exit Award)*	10 months	Full-Time	N/A	60	120
PG Cert (only Exit Award)*	4 months	Full-Time	N/A	30	60

All students must apply to and join the MSc

* May only be offered to students in exceptional circumstances at the discretion of the Board of Examiners

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Medicine
Teaching Institution	Imperial College London	Department	Medicine
Associateship	None	Main Location(s) of Study	Hammersmith Hospital
External Reference			
Relevant QAA Benchmark Statement(s) and/or other external reference points		Master's Degrees in Medicine Master's Degrees in Chemistry	
FHEQ Level		Level 7 - Master's	
EHEA Level		2nd Cycle	
External Accrator(s) (if applicable)			
External Accrator 1:	None		
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	Aida Martinez-Sanchez and Alejandra Tomas-Catala
Student cohorts covered by specification	2022-23 entry
Date of introduction of programme	October 17
Date of programme specification/revision	September 22

Programme Overview
<p>The programme structure will essentially take you through a pipeline that is used in modern biological and medical research, whereby you work through how putative therapeutic targets may be identified through the analysis of large data sets (Omics). You will then explore how a set of molecular and cellular biology toolkits can be used to assess potential mechanisms through which these therapeutic targets may lead to disease (and possible strategies to circumvent the disease-causing mechanism) in vitro and how disease pathways can be modelled using in vivo systems and samples of human origin.</p> <p>During the first three taught modules, you will attend seminars and lectures that will introduce you to new concepts in modern biomedical research. You will be provided with a wide range of materials and assist in practical sessions that will give you the opportunity to improve your analytical skills and reinforce your knowledge. You will also be engaged in the critical assessment of published information through group activities, including journal clubs.</p> <p>Team-based learning (TBL) will be used for some group activities and practical sessions, which allow you to be formatively or summatively assessed both as an individual and as part of a team. TBL sessions will be tailored to each module in the first two modules. A typical TBL session will consist in three parts: (i) an iRAT (individual readiness assurance test) in which you will individually perform a multiple-choice test, (ii) a tRAT, in which you will respond to the same questionnaire in groups and (iii) a second team application activity (tAPP) that will include short/scenario-based questions or problem-solving activities. The tAPP exercise will be generally performed following a discussion with the lecturer leading the TBL session aimed to clarify and consolidate concepts debated during the session. A peer-review questionnaire will be used to provide continuous feedback on your individual and group performance. Peer-to-peer assessment will help with the development of team-work skills and also provide opportunities to practise giving constructive feedback.</p> <p>The third module "In vivo modelling and use of human material and data" will be assessed by 1 TBL (33% of the module and 1 Scenario-based exam (67% of the module).</p> <p>Group activities provide an efficient means for us to spend time with you, clarifying complex concepts, and giving you regular and prompt feedback, which will enable you to get the most of this programme. The first TBL activity is run as a formative exercise to ensure you are familiar with the process before attempting one that is graded.</p> <p>You will then apply the knowledge gained throughout the taught modules to write a literature review, which may take the form of a grant or PhD proposal. You will be asked to identify a topic in medical research that interests you, take stock of the current state of the field, identify a problem that requires resolution, and design a programme of research to address that problem. This will also allow you to gain experience in scientific writing. Your presentation skills will also be boosted by presenting your findings through a poster session.</p> <p>This programme also includes a two-week intensive opportunity to work on a mini-research project, train in essential, commonly used, molecular and cellular biology laboratory techniques and data analysis. You will also spend a week doing several activities related to scientific career progression and development.</p> <p>Ultimately, you will participate in a 6-month research project, which will culminate in an MSc thesis and oral assessment. During these 6 months, you will become a member of a host lab and undertake innovative research that can be experimental or computational, depending on your interests. This provides a great opportunity for you to gain new skills, highly relevant for a PhD or to find a job in science outside academia.</p> <p>Under exceptional circumstances, students may be awarded a Postgraduate Diploma (PGDip) as an exit award. You will need to undertake the course work for Modules 1, 2, 3, 4 and 5 and 7, and pass the associated</p>

assessments. Students may also be awarded a Postgraduate Certificate (PGCert) as an exit award. You will need to undertake the course work for Modules 1, 2 and 3 (taught modules) and pass the associated assessments.

Learning Outcomes

Upon successful completion of the MSc programme, you will be able to:

1. Investigate advanced concepts of functional genomics and cell biology to elucidate mechanisms of complex biological phenomena.
2. Interpret large datasets to formulate appropriate research hypotheses.
3. Identify approaches and methodologies (*in silico*, *in vitro* and *in vivo*) available to manage complex and ambiguous data and test hypothesis.
4. Critically evaluate and discuss published research.
5. Work as a part of a team, embracing different perspectives to solve problems and generate creative solutions.
6. Produce publication standard scientific writing.
7. Apply and adapt state-of-the-art techniques used in the context of functional genomics and cell biology to study complex diseases.
8. Plan and carry out experiments independently and creatively.
9. Critically analyse data outputs and assess the significance of the outcomes.
10. Communicate effectively within a professional scientific setting.
11. Assess personal impact and how it can contribute effectively in the workplace. Positively handle risk, uncertainty, failure, and success.
12. Manage time and resources efficiently while performing research in a scientific environment.

To achieve a Postgraduate Diploma (PG Dip) award, under exceptional circumstances, you will need to realize learning outcomes 1 to 5, which will be achieved with modules 1-3, outcome 7, achieved with Module 4 and outcomes 6, 10 and 11, achieved with Modules 5 and 7.

To achieve a Postgraduate Certificate (PG Cert) award, under exceptional circumstances, you will need to achieve learning outcomes 1 to 5, which will be achieved with Modules 1-3.

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	Normally a UK Honours Degree at 2:1 or equivalent in Chemistry, Biochemistry, Physiology, or related Biomedical Science discipline For further information on entry requirements, please go to https://www.imperial.ac.uk/study/pg/apply/requirements/pgacademic/
Non-academic Requirements	Applicants who do not meet the academic requirements above but who have substantial relevant industry experience may be admitted following completion of a "Special Qualifying Exam" (SQE)
English Language Requirement	Standard requirement Please check for other Accepted English Qualifications
Admissions Test/Interview	Students might be invited to attend a post-application interview (face to face or via skype)

The programme's competency standards documents can be found at: TBC

Learning & Teaching Approach

This programme uses active learning to maximize your participation and encourage dialogue with your lecturers and colleagues. Learning is achieved through a combination of small group activities and online teaching methods. Sessions will be delivered in teaching rooms, research facilities, research labs and computing rooms. We aim for you to experience a scientific environment within academia, which encourages real debate and exchange of ideas.

Learning and Teaching will be delivered through:

1. Seminars/Lectures, (Modules 1-3) led by top scientists at Imperial and other research institutes such as the Crick. Links to videos, papers and other online resources will be provided via Blackboard ahead of following lectures to consolidate the learning.
2. Journal clubs in the form of TBL that will allow you to study and discuss in depth novel biomedical concepts by interacting with your classmates and lecturers.
3. Practicals/demonstrations, led by specialist working at Imperial, which will give you the opportunity to observe and understand how state-of-the-art equipment works.
4. Laboratory, hands-on sessions, in small groups to maximize interactions
5. Online tests and activities to reinforce your knowledge and help you in areas you find more difficult. For example, videos and tutorials on essential laboratory skills and an in-house generated online course in statistics and data analysis using R.
6. Online shared lab books that are accessible by both students and lecturers, so you quickly learn how to track your lab activity in an efficient manner. These lab books will be shared via OneNote and will provide an effective mean for communication between students and teachers.
7. Literature review sessions in which a lead teacher will help you prepare your proposal.
8. Laboratory project within a research group at Imperial. You will use this time to investigate a relevant biomedical question by using different approaches, as agreed with the supervisor, and participating in normal lab activities as a member of the group.
9. PhD grant proposal preparation and discussion with a research supervisor at Imperial. You will use this time to identify a research question that could constitute a program of research for a PhD and prepare a full proposal.

Overall Workload

This is split between face-to-face sessions with lecturers, independent study and group learning. Actual contact hours may vary between modules, the total expected study time is 2250 hours across the year.

Typically, during the first 6 months of the programme (theoretical modules), you will spend 15-30% of the time (an average of 255 hours) in face-to face sessions with lecturers (lectures, seminars, practicals).

During the last 6 months of the programme (Laboratory project), you will spend ~ 80% (~ 900 hours) of your time in the laboratory, performing experiments and/or computational assays and analysing data, while the rest of the time will be spent writing your project report.

Assessment Strategy

Assessment Methods

You will be assessed by a variety of assessment methods that will include TBL (Team Based Learning) sessions, written reports (literature review, research-lab mini project (Module 4) and main research project (Module 6), oral presentations of posters and power-point slides, electronic lab book and scenario-based questions.

Formative sessions will be held at different points during the development of the course in similar formats to that of summative sessions.

TBL will only be used throughout Modules 1-3 for summative assessment. In terms of assessment of each TBL session, iRAT will account for 70% of your grade and the two team activities 12.5% each. The peer-review questionnaire will account for 5% of the grade.

The first module “Introduction to multi-omics research” will be assessed by 4 summative TBLs that together will account for the 16.7% of the overall marks for the course. Each TBL will be tailored to cover different contents of the module.

The second module “Non-coding RNAs, gene editing and in vitro modelling” will be assessed by 3 summative TBLs that together will account for 8.3% of the overall marks for the course. Each TBL will be tailored to cover different contents of the module.

The third module “In vivo modelling and use of human material and data” will be assessed by 1 TBL (33% of the module) and 1 Scenario-based exam (67% of the module). Both assessments, together, will account for 8.3% of the overall marks for the course.

The fourth module “Core and professional skills” will be assessed by a combination of a written report (50% of the module), an Oral examination in the format of a lab-meeting (25%), electronic lab-book (12.5%) and partner feedback (12.5%) and will account for 8.3% of the overall marks of the course.

The fifth module “Literature review/grant proposal” will be assessed *via* a poster presentation (50% of the module) and a literature review report (50%) and will account for 8.3% of the overall marks of the course.

The sixth module “Experimental/computational disease modelling research project” will be assessed by a combination of a research project thesis (50%), a 15-minute presentation using power-point (10%) and a 30-minute oral examination (40%) and will account for 50% of the overall marks of the course.

The seventh module “PhD grant proposal” will be assessed by a combination of a written PhD grant proposal (80%) and a 15-minute presentation using power-point (20%) and including 5 minutes of questions and answers and will account for 16.7% of the overall marks of the course*.

The assessment has been designed to align with the learning objectives of the course and each independent module and to prepare you to face real-world problems.

*This is an elective Module that will only be undertaken, instead Module 6, under exceptional circumstances with the aim of awarding a PGDip. To obtain the overall mark, the weight of Modules 1-5 and 7 will be adjusted according to the final ECT load.

Academic Feedback Policy

Feedback will be provided on assessment within two weeks of completion. Regular feedback will be provided throughout the programme in a number of formats, including:

1. Oral (during or after lectures)
2. Personal (discussion with academics during office hours and with personal tutors on a regular basis)
3. Interactive (team-based learning activities, practicals and study groups)
4. Peer (during team-based learning sessions)
5. Written (solutions/model answer to coursework)

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 following will be normally applied:

Where a student fails an individual piece of assessment, they will be given one further opportunity to resubmit the relevant piece of assessed work within a month of failing the assessment. A re-assessment will be marked as fail or pass capped at 50%.

Due to the nature of assessment on the programme (which includes practicals and group assessment), re-sit students may be asked to complete an alternative piece of assessment. This is because it may not be possible to re-run the original assessment e.g. the assessment for group assessment within a TBL session. In such instances, an alternative and appropriate mode of assessment will be chosen from one of the assessment methods that are already in use in the course e.g. an extended version of the individual assessment in a TBL session as per the example above. The decision to set an alternative form of assessment will be made at the discretion of the Board of Examiners who will ensure the alternative assessment will test the student’s ability to demonstrate the same learning outcomes as the original assessment.

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
Equipment and course materials	Mandatory	Provided
Personal Protection Equipment for experiments	Mandatory	Provided
Attendance to Diabetes UK professional conference (Taking place in March, during Module 6). This conference is of particular interest to students doing a research project in metabolism or a related subject, since our Section is leading in this field.	Optional (to be decided by the student and the project supervisor)	Registration is free for students. Location (within the UK) varies each year and students are expected to cover their own costs of travel and accommodation.

Programme Structure ¹					
Year 1 – FHEQ Level 7 Students study all core modules. All modules are core					
Code	Module Title	Core/ Elective	Group*	Term	Credits
META70001	Introduction to Multi-omics Research	Core		1	15
META70002	Non-coding RNAs, Gene Editing and <i>In Vitro</i> Modelling	Compulsory		1	7.5
META70003	In Vivo Modelling and Use of Human Material and Data	Compulsory		2	7.5
META70004	Core and Professional Skills	Compulsory		1,2	7.5
META70005	Literature Review / Grant Proposal	Compulsory		1,2	7.5
META70006	Disease Modelling Research Project	Core		2,3	45
META70026	PhD grant proposal**	Elective		2,3	15*
Credit Total					90

* 'Group' refers to module grouping (e.g. a group of electives from which one/two module(s) must be chosen).

* See "Curriculum map" at the end of this document for further information on Programme Structure

** Module is elective and will only be offered under exceptional circumstances, instead of Module 6, to achieve a PG Dip award.

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

Award of a Postgraduate Certificate (PG Cert)

To qualify for the award of a postgraduate certificate a student must have a minimum of 30 credits at Level 7. See below for details (Programme Specific Regulations).

Award of a Postgraduate Diploma (PG Dip)

To qualify for the award of a postgraduate diploma a student must have:

1. accumulated credit to the value of no fewer than 60 credits at level 7 or above of which no more than 15 credits may be from credit level 6;
2. no more than a total of 15 credits as Compensated Fail, please see "Specific Regulations" below for specific rules for compensation
3. met the specific requirements for an award as outlined below (Programme Specific Regulations)

Award and Classification for Postgraduate Students

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

4. accumulated credit to the value of no fewer than 90 credits at level 7 or above of which no more than 15 credits may be from credit level 6;
5. no more than a total of 15 credits as Compensated Fail, please see "Specific Regulations" below for specific rules for compensation;
6. met the specific requirements for an award as outlined below (Programme Specific Regulations)

Programme Specific Regulations

Rules of progression:

Pass

A student must:

- Achieve an aggregate mark of at least 50.00% in each module. A student may be compensated in modules up to the value of 7.5 ECTS with a qualifying mark of at least 40.00%.
- Achieve an aggregate mark of at least 50.00% for the programme.

Merit

A student must:

- Achieve an aggregate mark of at least 50.00% in each module. A student may be compensated in modules up to the value of 7.5 ECTS with a qualifying mark of at least 40.00%.
- Achieve an aggregate mark of at least 60.00% in the module 'Experimental disease modelling Research Project'
- Achieve an aggregate mark of at least 60.00% for the programme.

Distinction

A student must:

- Achieve an aggregate mark of at least 50.00% in each module. A student may be compensated in modules up to the value of 7.5 ECTS with a qualifying mark of at least 40.00%.
- Achieve an aggregate mark of at least 70.00% in the module 'Experimental disease modelling Research Project'

Achieve an aggregate mark of at least 70.00% for the programme.

The Postgraduate Diploma (PGDip) is an exit award only and may only be offered to students in exceptional circumstances (such as health or family issues) at the discretion of the Exam board. To be awarded a PG Dip the student will need to achieve an aggregate mark of at least 50% in modules 1, 2, 3, 4, 5 and 7. A student may be compensated in modules up to the value of 7.5 ECTS with a qualifying mark of at least 40%.

The Postgraduate Certificate (PGCert) is an exit award only and may only be offered to students in exceptional circumstances (such as health or family issues) at the discretion of the Exam board. To be awarded a PG Cert the student will need to achieve an aggregate mark of at least 50.00% in modules 1 ("Introduction to Multi-omics Research"), 2 ("Non-coding RNAs, Gene Editing and *In Vitro* Modelling") and 3 ("In Vivo Modelling AND Use of Human Material and Data").

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.

Supporting Information

The Programme Handbook is available at: TBC

The Module Handbook is available at: TBC

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

Curriculum map

The map represents the duration of each module (full colour boxes) per weeks and their distribution in Terms 1-3. Checked boxes indicate that a few scattered sessions will be taking place in the indicated period of time. These will normally correspond to preparatory tutorials, explanatory sessions, consolidation sessions and/or deadlines for written reports. This is only for guidance and might change according to space and lecturer’s availability throughout the year.

Programme Timeline

	Term 1											Christmas closure			Term 2											Term 3																																							
Week:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42																							
Module 1	Introduction to multi-omics research <small>22nd-29th October</small>				Introduction to multi-omics research <small>7th-25th November</small>																																																												
Module 2					Non-coding RNA <small>21st Oct - 4th Nov</small>							Non-coding RNA, gene editing and in vitro modelling <small>28th Nov - 12th Dec</small>																																																					
Module 3																							In vivo modelling and use of human material and data <small>22nd January - 30th February</small>																																										
Module 4	Welcome week																						Core and Professional skills <small>22nd February - 3rd March</small>																																										
Module 5		[Checked]		[Checked]					[Checked]			LR <small>15th-16th Dec</small>												Literature Review (LR) <small>9th-20th January</small>																																									
Module 6																																		Experimental/Computational disease modelling research project <small>March-September</small>																															