Queen Mary
University of London

Programme Specification (PG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and title:	Master of Science (MSc) Bioinformatics
Name of interim award(s):	PGCert, PGDip
Duration of study / period of registration:	12 months (FT); 24 months (PT)
Queen Mary programme code(s):	C1U1
QAA Benchmark Group:	N/A
FHEQ Level of Award:	Level 7
Programme accredited by:	N/A
Date Programme Specification approved:	
Responsible School / Institute:	School of Biological and Behavioural Studies

Schools / Institutes which will also be involved in teaching part of the programme:

School of Biological and Behavioural Sciences

Collaborative institution(s) / organisation(s) involved in delivering the programme:

Programme outline

Bioscience is increasingly data driven, as new bioanalytical techniques deliver ever more data about genes, proteins, metabolites and the interactions between them. Bioinformatics is the discipline tasked with turning all this data into useful information and new biological knowledge, a discipline in which there is a serious shortage of trained people. Without assuming any prior informatics experience, this course gets biologists up to speed with essential bioinformatics skills and provides the opportunity to apply these in a cutting edge research project. This is achieved through a combination of lectures, extensive guided practical sessions, a group software development project and an individual research project.
The course is taught by QMUL academics who are actively engaged in developing bioinformatics tools and applying them in areas such as genome sequencing, proteomics, evolution, ecology, psychology, cancer, diabetes and other diseases. We have an extensive network of academic and industrial collaborators around the UK and in Europe, who contribute to teaching, cosupervise projects and provide employment opportunities.

Programme highlights:
- New course, covering the very latest tools and techniques.
- Delivered by experts in the development and application of bioinformatics techniques.
- An innovative group project, collaborating with peers to build new bioinformatics solutions.
- Providing the skills and experience that employers and PhD supervisors need.

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- A six month individual thesis project tackling a real world bioinformatics challenge.
- Flexible modes of study: full time, part time, campus-based or online.

Aims of the programme

The aim of the programme is to provide graduates from biology and biomedicine with the computational skills that are not taught at undergraduate level but are rapidly becoming essential as the life sciences become ever more data driven.

Through doing this, the programme produces graduates who:
- Have practical problem solving skills that prepare them for employment.
- Meet a strong local, national and international need for scientists with strong computational skills.
- Are better prepared for pursuing a research career, having performed a substantial individual project.

What will you be expected to achieve?

Student who successfully complete the MSc programme should be able to:

Academic Content:	
A 1	Define the field of bioinformatics and related fields such as genomics, systems biology and software engineering.
A 2	Demonstrate a deep knowledge of, and proficiency in, existing bioinformatics databases and tools for a range of different data types and biological applications.
A 3	Demonstrate a deep knowledge of, and proficiency in, key statistical and algorithmic underpinnings of common bioinformatics analyses.
A 4	Demonstrate a deep knowledge of, and proficiency in, the key technical skills (e.g. software development or "coding") required to produce new bioinformatics resources.

Disciplinary Skills - able to:	
B 1	Demonstrate a critical awareness of current developments in bioinformatics, and critically evaluate new developments as they arise.
B 2	Devise solutions to data analysis problems using existing tools and databases.
B 3	Develop novel software to solve or automate biological data analysis problems for which suitable existing tools do not exist.
B 4	Conduct data-driven research by utilising existing bioinformatics tools or producing new tools, as appropriate.

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Attributes:		
C 1	Communicate relevant concepts, both orally and in writing, to academics and practitioners from within the bioinformatics community, and from other disciplines that rely on bioinformatics.	
C 2	Demonstrate a range of personal and professional transferable skills in project design and management, teamworking, report writing, software development, communication and presentation skills.	

How will you learn?

Traditional lectures are used impart key concepts and knowledge. These lectures are supported by online materials on QMPlus, including links to relevant resources and further reading. Extensive hands-on practical sessions cement the knowledge from the lectures and allow students to become proficient and confident in the use of bioinformatics tools introduced in the lectures. Individual support from teaching staff is available throughout these practical sessions. Practical coursework assignments are designed to allow students to further hone their skill through private study, with the completed coursework being assessed and detailed individual feedback returned to each student.

Substantially longer practical bioinformatics assignments form the focus of the group project module and the individual thesis project. These give students the opportunity to develop key transferable skills in team working, communication and research while simultaneously improving their technical competence.

How will you be assessed?

Continual assessment is used throughout the course, with the specific mode of assessment for each module selected according to the nature of the module content. Modules 1-4 will all involve a substantial individual practical assessment, e.g. to analyse a dataset and produce a report; produce a piece of software; etc. This will be carried out within the private study week, with individual feedback provided to each student during the following module.

Assessment of the group project comprises a mixed of assessments, including a software design and documentation task that is marked per group and two individual assessments: a presentation and a reflective piece of written work.

The research project is assessed by the project thesis and an end of project presentation.

How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

The first four modules are intended to impart key knolwedge and skills. These are each taught over three weeks, with an intensive combination of lectures and computer-based practicals in the first two weeks, followed by a week of private study in which to complete a substantive piece of assessed work.

There then follows a group project in which the students work together in small teams (~4 people per team) for six weeks to design and implement a piece of bioinformatics software to meet a specification provided. The aim of this exercise is to reinforce the students' understanding of the technical concepts covered in the first four modules, and to gain valuable experience of working with other people on a complex technical project.

Finally, each student carries out an individual research project. The aim of this project is to apply the technical and transferable skills gained during the taught modules to a pertinent research question involving the management and/or analysis of biological data.

The MSc culminates in a public symposium at which each student delivers a presentation about what they achieved during their research project.

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Programme Title: MSc Bioinformatics

Academic Year of Study   FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
AI and Data Science in Biology	BIO720P	15	7	Compulsory	1	Semester 1
Unix and analysis of large genomic datasets	BIO726P	15	7	Compulsory	1	Semester 1
Coding for Bioscientists	BIO722P	15	7	Compulsory	1	Semester 1
Statistics for Biologists	BIO724P	15	7	Compulsory	1	Semester 1
Bioinformatics Software Development Group Project	BIO727P	30	7	Compulsory	1	Semester 2
Bioinformatics research project	BIO702P	90	7	Compulsory	1	Semesters 2 & 3

What are the entry requirements?

Potential students are expected to have a minimum of a second class honours degree in a relevant subject such as biology, biochemistry, medicine, or genetics. Preference will be given to candidates with an upper second class or first class degree. Individuals with relevant professional qualifications or other relevant experience and qualifications will also be considered. English Language proficiency is required at the standard level for PGT S&E entry (IELTS 6.5, TOEFL 92, PTE Academic 62).

How will the quality of the programme be managed and enhanced? How do we listen to and act on your feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between schools/institutes and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each school/institute operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in the committee's work in a number of ways, such as through student membership, or consideration of student surveys.

All schools/institutes operate an Annual Programme Review of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Taught Programmes Action Plan (TPAP) which is the summary of the school/institute's work throughout the year to monitor academic standards and to improve the student experience. Students' views are considered in this process through analysis of the NSS and module evaluations.

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What academic support is available?

The School runs a substantive induction programme specifically for its MSc intake each year.

Module organisers are the first point of academic contact for advice and support during the taught component.

Project supervisors are allocated once project topics have been decided upon.

The Programme Director acts as the coordinator of all programme activities, supported by staff of the SBCS Administrative Office.

If there is requirement for further advice or support, then one of the School's Senior Academic Advisors or the Director of Taught Programmes may be consulted.

Programme-specific rules and facts

Students wishing to be awarded the PG Certificate in Bioinformatics must complete the four modules listed as taking place in Semester 1.

How inclusive is the programme for all students, including those with disabilities?

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:
• Finding out if you have a specific learning difficulty like dyslexia
• Applying for funding through the Disabled Students' Allowance (DSA)
• Arranging DSA assessments of need
• Special arrangements in examinations
• Accessing loaned equipment (e.g. digital recorders)
• Specialist one-to-one "study skills" tuition
• Ensuring access to course materials in alternative formats (e.g. Braille)
• Providing educational support workers (e.g. note-takers, readers, library assistants)
• Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links with employers, placement opportunities and transferable skills

The Programme Director has excellent links with individuals in both academic and industry who recruit bioinformaticians in the UK and across Europe. Indeed, many of his former students have gone on to work in key employers of bioinformatics graduates, including the Sanger Institute, the European Bioinformatics Institute (EBI), GlaxoSmithKline, Philips, Nature Publishing Group, Unilever, financial services companies, tech startups and various universities.

These links are augmented by those of other colleagues, both within SBCS and in other parts of the College.

Programme Specification Approval

Person completing Programme Specification:

Dr AR Leitch

Queen Mary
University of London

Programme Title: MSc Bioinformatics

Person responsible for management of programme: | Dr AR Leitch

Date Programme Specification produced / amended by School / Institute Education Committee: | 6 Jan 2022

Date Programme Specification approved by Taught Programmes Board: |