Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2025/26

Date created: 20/01/2025 **Last amended:** 20/01/2025 **Version no.** 1 **Date approved by EQED:**
Click or tap here to enter text.

1. Programme title(s) and code(s):

MSc in Bioinformatics and Molecular Genetics
PGDip in Bioinformatics and Molecular Genetics*
PGCert Bioinformatics *
Notes

* An award marked with an asterisk is only available as an exit award and is not available for students to register onto.

a) HECOS Code

HECOS Code	%
100345	50%
100869	50%

2. **Awarding body or institution:** University of Leicester

3. a) Mode of study Full-time

b) Type of study Campus-based

4. Registration periods:

MSc in Bioinformatics and Molecular Genetics
The normal period of registration is 1 year

The maximum period of registration 2 years

5. Typical entry requirements

Candidates with a first, upper second or lower second class honours degree (or equivalent) in the biological sciences or a related discipline will be considered.

Qualifications recognised as equivalent to a British University lower second-class degree (2.2) will also be considered, as will applicants who do not hold a bioscience degree but have significant and relevant industrial, professional, medical or veterinary experience. Such applicants will be considered on a case-by-case basis.

Students for whom English is not their first language are required to meet the minimum standard set by the University of Leicester (as specified in Senate Regulation 1: Regulations governing minimum entry qualifications and language requirements for taught programmes of study). This includes an IELTS minimum score of 6.5; a TOEFL iBT, minimum score of 90 or a Pearson Test of English (PTE) minimum score of 61.

6. Accreditation of Prior Learning

Accreditation of Prior Learning (APL) for exemption from modules is not accepted on this course

7. Programme aims

At the end of this programme, students should be able to:

- Understand the theory, and apply a wide range, of bioinformatics and molecular genetics techniques to bioscience research
- Develop expertise with critical analysis of scientific reports and report writing
- Develop group working skills in a range of practical and class-based environments
- Develop independent molecular genetic and bioinformatic research skills needed for a range of bioscience careers
- Develop skills for sourcing, reviewing and critically assessing the literature relevant to your scientific discipline
- Develop core knowledge and understanding of current literature in molecular genetics and bioinformatics

8. Reference points used to inform the programme specification

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- Education Strategy
- University Assessment Strategy [log in required]
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual)
- United Nations Education for Sustainable Development Goals
- Student Destinations Data

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9. Programme Outcomes

Unless otherwise stated, programme outcomes apply to all awards specified in 1. Programme title(s).

a) Discipline specific knowledge and competencies

i) Knowledge

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Demonstrate knowledge of contemporary research evidence and theories of molecular genetics.	Synchronous lectures, tutorials, practical classes, demonstrations, directed reading and project supervision.	Problem-solving activities, hands-on basic and advanced laboratory techniques incorporating demonstrations, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation and project laboratory performance, end of module examinations (written and computer-based).
Students should be able to: Apply cutting-edge molecular and cell biology techniques to genetics research.	Synchronous lectures, tutorials, practical classes, demonstrations and project supervision.	Problem-solving activities, hands-on basic and advanced laboratory techniques incorporating demonstrations, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation and project laboratory performance, end of module examinations (written and computer-based).
Students should be able to: demonstrate a core knowledge of the field of bioinformatics.	Lectures, tutorials, practical classes, demonstrations, directed reading and project supervision (MSc only).	Problem-solving activities, hands-on practical classes, online reading, multimedia instructional materials,	Written reports, project presentation, project dissertation, programming

		literature searching and self-assessment knowledge tests.	assignments, end of module examinations.

ii) Concepts

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Apply advanced skills of critical thinking, interpretation, analysis, evaluation, and explanation our current understanding of molecular genetics and its application.	Synchronous lectures, tutorials, practical classes, demonstrations, directed reading and project supervision (MSc only).	Problem-solving activities, hands-on basic and advanced laboratory techniques incorporating demonstrations, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation and project laboratory performance, end of module examinations (written and computer-based).
Students should be able to: Demonstrate comprehensive knowledge of the role of bioinformatics in modern biological sciences, with particular reference to data mining, data analysis and data interpretation.	Lectures, Drop-in sessions, Seminars, Targeted reading, Computer practical classes, Project supervision (MSc only)	Problem-solving activities, hands-on practical classes, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written reports, Programming assignments, Research project (MSc only), Dissertation (MSc only), end of module examinations, Computer-based exercises, Problem- based exercises

iii) Techniques

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Creatively apply a range of bioinformatics, molecular and cell biology techniques to investigate biological problems.	Laboratory practical classes, Drop-in sessions, Computer practical classes, Project supervision (MSc only), lectures and tutorials.	Problem-solving activities, hands-on basic and advanced laboratory techniques incorporating demonstrations, online reading, multimedia instructional materials,	Written practical reports, project presentation (MSc only), project dissertation and project laboratory performance (MSc only), end of module examinations (written and computer-based).

		literature searching and self-assessment knowledge tests.	
Students should be able to: Evaluate, synthesise and apply knowledge of laboratory safety procedures.	Laboratory practical classes, project supervision and lectures.	Demonstrations, online reading, multimedia instructional materials.	Written practical reports, project presentation, project dissertation and project laboratory performance, end of module examinations (written and computer-based).

iv) Critical Analysis

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Critically appraise data, critically analyse and review the literature and critically review web-based material.	Drop-in sessions, Seminars, Targeted reading, Computer practical classes, Project supervision (MSc only), Laboratory practical classes, project supervision, lectures and tutorials.	Problem-solving activities, hands-on wet and dry laboratory techniques, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written reports, project presentation (MSc only), project dissertation (MSc only), problem-based exercises and end of module examinations (written and computer-based).

v) Presentation

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Critically analyse and present experimental data using appropriate scientific conventions, and creatively engage in advanced scientific discourse to evaluate findings, justify	Lectures, tutorials, project supervision (MSc only).	Staff-led classroom discussion, writing practical reports, oral presentations	Written practical reports, project presentation and project dissertation (MSc only).

interpretations, and respond constructively to feedback.			

vi) Appraisal of evidence

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Critically select, evaluate, and creatively apply advanced data searching methodologies, employing appropriate analytical techniques to interpret complex datasets with intellectual independence and scholarly rigour	Lectures, workshops, tutorials, computer practical classes, project supervision (MSc only)	Problem-solving activities incorporating demonstrations, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation (MSc only) and end of module examinations.

b) Transferable Skills

i) Research Skills

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Independently formulate solutions to complex biological problems by designing, analysing, and interpreting experimental data, employing advanced statistical and bioinformatics approaches to address research questions with methodological rigour	Laboratory practical classes, Drop-in sessions, seminars, project supervision (MSc only), lectures and tutorials.	Problem-solving activities, hands-on laboratory techniques, online reading, multimedia instructional materials	Written practical reports, project presentation, project dissertation (MSc only) and project laboratory performance, end of module examinations.

Students should be able to: Apply a range of bioinformatics, molecular and cell biology techniques to investigate biological problems.	Practical classes, Drop-in sessions, seminars, project supervision (MSc only), lectures and tutorials.	Problem-solving activities, hands-on basic and advanced laboratory techniques incorporating demonstrations, online reading, multimedia instructional materials, literature searching and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation (MSc only) and project laboratory performance, end of module examinations.

ii) Communication skills

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Produce rigorous, plagiarism-free scientific reports and deliver high-quality oral presentations, demonstrating originality of thought, critical analysis of data, clarity of argument, and adherence to ethical and disciplinary conventions	Lectures, tutorials	Problem-solving activities incorporating demonstrations, online reading, multimedia instructional materials and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation (MSc only) and project laboratory performance (MSc only).

iii) Data Presentation

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Critically select and apply advanced statistical tests and image analysis techniques, employing presentation and graphical software to visually communicate complex data with precision and clarity.	Lectures, tutorials, Drop-in sessions, Seminars, practical classes and project supervision (MSc only).	Problem-solving activities incorporating demonstrations, online reading, multimedia instructional materials and self-assessment knowledge tests.	Written practical reports, project presentation, project dissertation (MSc only) and project laboratory performance (MSc only), Computer-based exercises, Problem- based exercises.

iv) Information Technology

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Critically evaluate and apply general, specialized, and bioinformatics computing tools to address complex biological research challenges, demonstrating advanced technical proficiency, problem-solving, and adherence to computational best practices.	Lectures, Drop-in sessions, Seminars, Computer practical classes, Project supervision (MSc only), tutorials and workshops.	Problem-solving activities incorporating demonstrations, online reading, multimedia instructional materials and self-assessment knowledge tests.	Written reports, Programming assignments, Research project (MSc only), Dissertation (MSc only), Problem- based examinations, Computer- based exercises, Problem-based exercises, project laboratory performance (MSc only).

v) Problem Solving

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Design and implement innovative solutions to complex biological problems by integrating laboratory-based quantitative analysis with advanced bioinformatics computation, demonstrating critical evaluation of methodological approaches and their limitations	Lectures, tutorials, Drop-in sessions, Seminars, Computer practical classes, project supervision (MSc only) and workshops.	Problem-solving activities incorporating demonstrations, online reading, multimedia instructional materials and self-assessment knowledge tests.	Written reports, Programming assignments, Research project (MSc only), Dissertation (MSc only), Problem- based examinations, Computer- based exercises, Problem-based exercises

vi) Working relationships

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Demonstrate the capacity to manage a project, time-management and organizational skills and be able to work effectively in a group/team.	Laboratory practical classes, Lectures, Drop-in sessions, Seminars, Targeted reading, Computer practical classes, Project supervision (MSc only)	Group-based practical work	Written reports, Programming assignments, Seminar presentation, Research project (MSc only), Dissertation (MSc only), Short-answer examinations, Problem- based examinations, Computer- based exercises, Problem-based exercises

vii) Managing learning

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Demonstrate intellectual independence in acquiring and applying advanced bioinformatics and laboratory skills, while systematically managing complex information to develop specialized expertise aligned with emerging research challenges	Lectures, Drop-in sessions, Seminars, practical classes, Targeted reading, Library and IT skills workshops and project supervision (MSc only).	Laboratory practicals incorporating demonstrations, directed reading, and multimedia instructional materials.	Written reports, Programming assignments, Seminar presentation, Research project (MSc only), Dissertation (MSc only), Problem-based exercises

viii) Career Management

Intended learning Outcome	Teaching methods	Learning Activities	Assessment Type
Students should be able to: Produce a professional cv, write applications, give presentations and be confident in applying for positions	Workshops by the Career Development Services unit, careers advice by personal tutors and project supervisors.	Writing, interview skills, case studies.	Student feedback at SSC's and student destination surveys. Project presentations

for either employment or further study.			

10. Progression points

This programme follows the standard Scheme of Progression set out in Senate Regulations – see the version of *Senate Regulation 6 governing postgraduate programmes* relevant to the year of entry.

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course.

11. Criteria for award and classification

This programme follows the standard scheme of postgraduate award and classification set out in Senate Regulations – see the version of *Senate Regulation governing postgraduate programmes* relevant to the year of entry.

12. Special features

Through teaching on this programme, you will progressively develop wet and dry laboratory experimental and critical analysis skills. You will begin by learning bioinformatics skills before progressing to in-depth wet laboratory training. In doing so, you will acquire the skills needed to become an independent laboratory researcher, irrespective of your initial level of experience.

The programme is designed to give you group working opportunities through the various taught laboratory, workshop and research project elements that are embedded in the programme. Importantly, the laboratory project will give you the opportunity to experience real research by working with a research group of your choice.

By enrolling of this programme, you will become part of our wider bioscience MSc cohort, providing opportunities to learn and socialize alongside your peers on other MSc programmes.

12a. Research-inspired Education

Students on this programme will advance through the four quadrants of the University of Leicester Research-inspired Education Framework as follows:

RiE Quadrant	Narrative
Research-briefed Bringing staff research content into the curriculum.	The programme is **Research-briefed** by providing a challenging learning experience that is informed by the cutting-edge research of contributing academics in our internationally recognised research departments.
Research-based Framed enquiry for exploring existing knowledge.	The programme is **Research based** as lectures and assessments will be based on real world research problems, methodologies and datasets, thereby ensuring that students are exposed to authentic research-based education throughout the programme.

Research-oriented Students critique published research content and process.	The programme is **Research-oriented** as students will be required to generate, analyse and critically appraise their own datasets, generated during wet and dry laboratory classes and wet and dry research projects. They will also receive guidance and support with critical appraisal of published research.
Research-apprenticed Experiencing the research process and methods; building new knowledge.	The programme is **Research-apprenticed** as students will receive training and support with working in wet and dry laboratory environments, generating and analysing their own datasets and preparing written reports for submission. In addition, students will be embedded in a wider research team during the project module, gaining hands-on experience in an academic research environment. Students will also gain experience with summarising and presenting findings in oral format.

As part of studying at a research-intensive university, students on this programme have the following extra or co-curricular opportunities available to them to gain exposure to research culture:

Our regular departmental research lectures are available for all students registered on this programme. The lectures showcase the interdisciplinary nature of cutting-edge scientific research. During their research project, students will be embedded in an academic research laboratory where they will work under the supervision of their principal investigator to develop and undertake their own extended research project.

Teaching on this programme will be research-informed (it draws consciously on systematic inquiry into the teaching and learning process itself) in the following way:

All programme module convenors work with the School of Biological Sciences to ensure that staff deliver educational best practice, informed through insights gained from teaching conferences, talks from external educational speakers and shared best practice.

The School supports all staff involved in teaching to gain an accredited Higher Education teaching qualification, in which they demonstrate their use of teaching theory to support their own practice and reflect on their current teaching and continuing professional development.

13. Indications of programme quality

Student feedback
External Examiners reports
Annual development review

14. External Examiner(s) reports

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for this programme can be found at exampapers@Leicester [log-in required]

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Appendix 1: Programme structure (programme regulations)

The University regularly reviews its programmes and modules to ensure that they reflect the current status of the discipline and offer the best learning experience to students. On occasion, it may be necessary to alter particular aspects of a course or module.

MSc in Bioinformatics and Molecular Genetics

Level 7/Year 1 Delivery Year 2025/26 Intake Month September Mode of Study Full Time Structure

Credit breakdown

Status	Year long	Semester 1	Semester 2
Core	n/a	60 credits	120 credits
Optional	n/a	n/a	n/a

180 credits credits in total

Core modules

Delivery period	Code	Title	Credits
Semester 1	BS7101	Gene and Genome Analysis	15 credits
Semester 1	BS7102	Proteins: Structure and Bioinformatics	15 credits
Semester 1	BS7105	Bioinformatics Programming and Advanced Topics in Bioinformatics	30 credits
Semester 2	MB7008	Core Laboratory techniques	30 credits
Semester 2	MB7212	Experimental Design in Molecular Genetics	15 credits
Semester 2	MB7213	Communicating Scientific Research	15 credits

Delivery period	Code	Title	Credits
Summer Term	MB7010	Masters Research Project	60 credits

This is an indicative list of option modules and not definitive of what will be available. Option module choice is also subject to availability, timetabling, student number restrictions and, where appropriate, students having taken appropriate pre-requisite modules.

Appendix 2: Module specifications

See postgraduate module specification database (Note - modules are organized by year of delivery) [login-require