# Programme specification

## 1. Overview/ factual information

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|---|---|
| **Programme/award title(s)** | MSc Biosciences |
| **Teaching Institution** | University Centre Leeds (UCLeeds) |
| **Awarding Institution** | The Open University (OU) |
| **Date of first OU validation** | August 2020 |
| **Date of latest OU (re)validation** | March 2023 |
| **Next revalidation** | |
| **Credit points for the award** | 180 |
| **UCAS Code** | application is direct to UCLeeds |
| **HECoS Code** | **Subject code 1 (100%) 100265 - biomedical sciences** |
| **Programme start date and cycle of starts if appropriate.** | September 2023 |
| **Underpinning QAA subject benchmark(s)** | Quality Assurance Agency. (2020) Characteristics Statement: Master's Degree. London: QAA.<br><br>Quality Assurance Agency for Higher Education. (2023) Subject Benchmark Statements **Biomedical Science and Biomedical Sciences.** Fifth edition. Gloucester: QAA<br><br>Quality Assurance Agency for Higher Education. (2023) Subject Benchmark Statements **Biosciences**. Fifth edition. Gloucester: QAA<br><br>Quality Assurance Agency for Higher Education. (2022) Subject Benchmark Statements **Chemistry**. Fifth edition. Gloucester: QAA |
| **Other external and internal reference points used to inform programme outcomes. For apprenticeships, the standard or framework against which it will be delivered.** | ST0759 Research Scientist Apprenticeship Standard |
| **Professional/statutory recognition** | n/a |
| **For apprenticeships fully or partially integrated Assessment.** | Partly |
| **Mode(s) of Study (PT, FT, DL, Mix of DL & Face-to-Face) Apprenticeship** | 3 modes: Full-time, part-time and mixed distance/face to face |
| **Duration of the programme for each mode of study** | FT: 12 months; PT: 24 months; mixed distance/face to face: 24 months |
| **Dual accreditation (if applicable)** | n/a |

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| **Date of production/revision of this specification** | May 2023 |

**Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.**

**More detailed information on the learning outcomes, content, and teaching, learning and assessment methods of each module can be found in the student module guide(s) and the students handbook.**

**The accuracy of the information contained in this document is reviewed by the University and may be verified by the Quality Assurance Agency for Higher Education.**

## 2.1 Educational aims and objectives

The Masters in Biosciences programme will give students an opportunity to study theoretical and practical aspects of a broad range of scientific disciplines at Master's level. Taught modules will help students to deepen their understanding of topics such as the organisation and functions of cells in a range of organisms, the molecular basis of disorders of the human body, the processes involved in developing new therapeutic agents and the ways in which medical diagnoses can help clinicians treat patients most effectively. Students will also study the impact of chemical and biochemical compounds on the environment, as well as the regulatory processes that are in place to limit potential damage caused by these.

The course will involve a large amount of laboratory practical work, allowing students to develop high-level skills in methods and technologies that are key to modern Bioscience research. For example, students will be able to practise laboratory techniques that are commonly used in cellular biology research.

The course will feature a 60-credit *Dissertation* module, supported by a 20 credit *Preparation for Research* module, which together will allow students to experience the planning (including literature searches and applying for ethical approval) and execution of a substantial self-directed research project. Through this, students will learn not only to utilise laboratory techniques to generate accurate and reliable data, but also how to manage time and shared resources in a busy working lab.

Throughout the course there will be an emphasis on the production, presentation and processing of data. Accurate and reliable measurements are critical in all scientific industries, and this course will emphasise the importance of data as well as teaching students how to evaluate the quality of data and manipulate it to draw valid conclusions. The *Bioinformatics and Data Analysis* module will support and enhance this, covering modern computer-based techniques for dealing with the large data sets that are increasingly common in Bioscience.

It aims to:

- Develop practitioners who have innovative approaches to the theory and practice of science
- Produce individuals who work in an evidence-led manner
- Develop a high level of ability in data analysis with critical evaluation to produce justified conclusions
- Produce postgraduates who can use existing information to inform decisions about the implementation of experimental procedures
- Enable postgraduates to manage, lead and respond to change
- Facilitate collaborative working
- Encourage postgraduates to formulate research priorities for the immediate future.
- Produce postgraduates who are able to plan and execute laboratory investigations independently and assess the results generated by these activities
- Produce postgraduates who are able to work independently and are confident and able problem solvers who can rise to meet challenges.

- Produce postgraduates who cultivate intellectual curiosity and intellectual independence through project-based, activity-orientated and self-regulated learning.

| 2.2 Relationship to other programmes and awards<br>(Where the award is part of a hierarchy of awards/programmes, this section describes the articulation between them, opportunities for progression upon completion of the programme, and arrangements for bridging modules or induction) |
|---|
| This course will provide a progression route to postgraduate study for students who complete our BSc Biomedical and Pharmaceutical Sciences programme.<br><br>It will also map to the Level 7 Research Scientist Apprenticeship Standard, and as such will provide a progression route for apprentices on level 3 or level 6 programmes. This meets the requirements of employers and the regional strategy to provide a talent pipeline of qualified personnel to supply STEM industries. |

| 2.3 For Foundation Degrees, please list where the 60 credit work-related learning takes place. For apprenticeships an articulation of how the work based learning and academic content are organised with the award. |
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| Apprentices will attend the University Centre on a day-release model over 2 years, studying for, and being assessed on, the academic content of taught modules in the same way as other students. The Level 7 Research Scientist Standard was developed by Trailblazers to provide staff development for the laboratory science staff. Apprentices will complete work-based research with their employer, monitored and supported by academic staff. The team have experience of working remotely with apprentices to deliver a project based in the workplace and have a range of learning opportunities which are accessible by the student such as a dedicated VLE site as well as regular remote meetings.<br>Staff at University Centre have experience of working with apprentices, employers and End Point Organisations. Apprentices will receive input on the apprenticeship and EPA, and will be prepared throughout their apprenticeship for end-point assessment. Delivery of the course will also highlight to apprentices (who will be able to access a separate range of resources through the VLE) where the course contributes to Competences and will establish awareness of the close links of delivery and assessment with EPA.<br>The Programme Manager and Assessor Trainer will work with apprentices to ensure achievement and will offer support in tutorials and taught sessions weekly. The Assessor Trainer will also be responsible for providing the link between the University Centre and the workplace, and will monitor and support progress towards EPA. This close linking between workplace and academic institution will provide a strong foundation on which to base acquisition of the academic qualification as well as the Standard.<br>Materials designed to support the evolution of the collaborative project involving the workplace will be used to ensure that targets are being met and progress continues at an appropriate rate.<br>Regular tutorial and review will provide support and will ensure that sufficient progress is being made.<br>Continuous feedback to workplace mentors and line managers on apprentice engagement and achievement will also promote achievement and allow the business organisation an awareness of how the taught elements map to the Standard. |

| 2.4 List of all exit awards |
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| Postgraduate Certificate (60 credits) - comprising exactly **three** of the modules listed below (total number of credits must be 60). Any combination of the listed modules may be part of the Postgraduate Certificate, so long as Diagnostic Techniques and Advanced Analytical Science are not both present. |

Postgraduate Diploma (120 credits) - comprising exactly **six** of the modules listed below (total number of credits must be 120). Any combination of the listed modules may be part of the Postgraduate Diploma, so long as Diagnostic Techniques and Advanced Analytical Science are not both present.

Master of Science (180 credits) - this can be from any combination of exactly **six** of the modules listed below which must include *either* Diagnostic Techniques *or* Advanced Analytical Science (but not both) **plus the Dissertation module** (total number of credits must be 180).

Modules:

- Advanced Concepts in Cellular Biology (20 credits)
- Molecular Biology and Genomics (20 credits)
- Bioinformatics and Data Analysis (20 credits)
- Toxicology and Environmental Change (20 credits)
- Preparation for Research (20 credits)
- *Advanced Analytical Science (20 credits) - may not be used in combination with Diagnostic Techniques*
- *Diagnostic Techniques (20 credits) - may not be used in combination with Advanced Analytical Science*

## 3. Programme structure and learning outcomes

The teaching for modules will be delivered on 2 days per week. There will also be significant private study for all modules. In order to complete the Dissertation module, students will initially be offered laboratory time for half a day per week and will be expected to conduct initial literature searches and plan their research outside of this time. In semester 2, one full day per week will be dedicated to laboratory work for the Dissertation module. Completion of the module may require students, at certain times throughout the year, to undertake laboratory work for more than 1 day per week. Access to laboratories for up to 5 consecutive days in a week will be provided at key points in the year so that students will be able to organise their time as is demanded by the nature of their research project. A full, detailed timetable of exactly when laboratories will be available to students will be provided.

**Programme Structure - LEVEL 7**

| Compulsory modules | Credit points | Optional modules | Credit points | compensatable? | Semester |
|---|---|---|---|---|---|
| Advanced Concepts in Cellular Biology (20 credits) | 160 | | | Yes | 1 |
| Molecular Biology and Genomics (20 credits) | | | | Yes | 1 |
| Bioinformatics and Data Analysis (20 credits) | | | | Yes | 1+2 |
| Toxicology and Environmental Change (20 credits) | | | | Yes | 2 |
| Preparation for Research (20 credits) | | | | Yes | 1 |
| Dissertation (60 credits) | | | | No | 1+2 |
| | | Advanced Analytical Science (20 credits) | | Yes | 2 |
| | | Diagnostic Techniques (20 credits) | 20 | Yes | 2 |

**Course Structure – Full Time**

2 days per week plus one further day for independent laboratory work as needed. This extra day would be a supervised session – but without formal teaching. The *Bioinformatics and Data Analysis* module will be delivered asynchronously online, however, this will be closely monitored and supported with regular tutorials.
The course runs over 36 week (30 weeks of teaching plus 6 weeks to allow for more lab time in Dissertation)

| semester | am | Day 1 | pm |
|---|---|---|---|
| 1 | Molecular Biology and Genomics | | Advanced Concepts in Cellular Biology |
| 2 | Toxicology and Environmental Change | | Advanced Analytical Science (OPTION) |
| | | | Diagnostic techniques (OPTION) |
| semester | am | Day 2 | pm |
| 1 | Preparation for Research | | Dissertation |
| | | | Tutorial |
| 2 | Tutorial | | |
| | Dissertation | | |


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**Course Structure – Part Time (Apprentices will follow this structure on day release. There is *no requirement* for apprentices to attend more than one day per week, but in the *second year* if extra time to work in our laboratories was deemed beneficial by tutors and the employer this would be offered for short periods as needed)**

**Year 1** - 1 day per week covering 80 credits of taught modules. There are 30 weeks in this year

| | | | |
|---|---|---|---|
| semester 1 | Molecular Biology and Genomics | | Advanced Concepts in Cellular Biology |
| 2 | Toxicology and Environmental Change | | Advanced Analytical Science (OPTION) |
| | | | Diagnostic techniques (OPTION) |

**Year 2** - 1 day per week plus further days for independent laboratory work *if required*. This extra time would be supervised – but with no formal teaching. Modules in year two, total 100 credits. The *Bioinformatics and Data Analysis* module will be delivered asynchronously online in year 2, however, this will be closely monitored and supported with regular tutorials. There are 36 weeks in this year (30 weeks of teaching plus 6 weeks to allow for more lab time in Dissertation)

| | | | |
|---|---|---|---|
| semester 1 | Preparation for Research | | Dissertation |
| | | | Tutorial |
| 2 | Tutorial | | |
| | Dissertation | | |


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**Course Structure – Blended online with summer school (Apprentices may follow this route on block release)**

Blended and block delivery will be used for students who would like to study our degree but are unable to attend the University Centre but can complete the theoretical part of the course online and could take part in an intensive summer school to catch up on the practical tasks and assignments involving practical tasks. We will ensure materials will be available on VLE and catch up sessions will be delivered at regular periods of time to allow students understanding of the topics and improve their ability to critically analyse the data obtained by literature research. The summer school will involve students attending University Centre daily sessions for a set period of time, necessary to allow the improvement or development of much needed practical skills. This period will end with a practical task in modules that have the laboratory report as part of their summative assessment. The total number of weeks of study will be the same as the PT mode (30 weeks in year 1 and 36 weeks in year 2)

**Year 1** - covering 80 credits of taught modules, mostly delivered online with some practical work and assessment through a summer school. There are 30 weeks in year 1

| | |
|---|---|
| Weeks 1-6 | Advanced Analytical Science (all content and assessment online)<br>OR<br>Diagnostic Techniques (all content and assessment online) |
| Weeks 7-12 | Toxicology and Environmental Change (all content and assessment online) |
| Weeks 13-18 | Advanced Concepts in Cellular Biology (all theoretical content delivered online – one assessment online, one assessment in summer school) |
| Weeks 19-24 | Molecular Biology and Genomics (all theoretical content delivered online – one assessment online, one assessment in summer school) |
| Weeks 25-30 | 6-week summer school<br>● Induction programme – lab safety and introduction to laboratory techniques and equipment<br>● Practical work in Advanced Concepts in Cellular Biology – including formative and summative assessment |

| | |
|---|---|
| | • Practical work in Molecular Biology and Genomics – including formative and summative assessment<br>• Face to face individual tutorials and progress monitoring |

**Year 2** - covering 100 credits, mostly delivered online with laboratory access for Dissertation research available at a summer school. There are 36 weeks in this year (30 weeks of teaching plus 6 weeks to allow for more lab time in Dissertation)

| | |
|---|---|
| Weeks 1-6 | Bioinformatics and Data Analysis (all content and assessment online) |
| Weeks 7-12 | Preparation for Research (all content and assessment online) |
| Weeks 13-24 | Dissertation<br>– initial planning and literature search<br>– thorough and detailed planning of all methods and protocols that are to be used<br>– all required equipment and chemicals identified and agreed with supervisor<br><br>Parts of the journal-style article will be written and must be submitted as a draft at this stage before laboratory work begins |
| Weeks 25-30 | 6-week summer school<br>● Refresher induction – lab safety and recap of laboratory techniques and equipment<br>● Intensive laboratory work for formal scientific report<br>● Face to face individual tutorials and progress monitoring |
| Weeks 30-36 | Write up period and preparation of final presentation |


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**Intended learning outcomes at Level 7 are listed below:**

**Postgraduate Certificate** – these are the learning outcomes that must be met for the award of Postgraduate Certificate (they are a subset of the learning outcomes for Master of Science and follow the same numbering scheme)

| Learning Outcomes – LEVEL 7 for award of **Postgraduate Certificate** | |
|---|---|
| **3A. Knowledge and understanding** | |
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| A2 – Critically evaluate recent advances in the production and analysis of chemical or biological data in relevant industrial contexts | ● Lectures<br>● Seminars and student-led discussions based on individual research tasks<br>● Problem classes and workshops<br>● Self-directed learning<br><br>**Assessment methods**<br>● Workshops with vocationally relevant essay style (or longer answers) question<br>● Seminar discussions with formal structure<br>● Poster and oral presentations including audience questions<br>● Production of formal scientific paper<br>● Presentation of results including plenary questions<br>● Formal written exam |

| **3B. Cognitive skills** | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| B2 - Construct conclusions by synthesising information from more than one source<br>B3 - Apply advanced knowledge to the solution of complex problems, including those in which there is no one unique solution | ● Lectures<br>● Seminars<br>● Problem classes and workshops<br>● Independent online learning<br><br>**Assessment methods**<br>● Seminar discussions with formal structure<br>● Poster and oral presentations with audience questions<br>● Data analysis tasks<br>● Case studies |

| | |
|---|---|
| | ● Production of formal scientific paper<br>● Presentation of results including plenary<br>● Formal written exam |

| 3C. Practical and professional skills | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| C1 - Plan and perform research tasks using up to date standard techniques and methodologies | • Self-directed learning<br>• Laboratory activities<br>• Demonstrations<br>• Simulations and interactive electronic activities including simulations of laboratory practical activities<br><br>**Assessment methods**<br>• Poster and oral presentations with audience questions<br>• Laboratory practical activities<br>• Reports in formal scientific style<br>• Data analysis tasks |

| 3D. Key/transferable skills | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| D2 - Use appropriate IT solutions to store, process and communicate data and research findings | • Self-directed independent learning<br>• Demonstration and self-development of specialist IT skills<br>• Laboratory activities<br>• Demonstrations<br>• Simulations and interactive electronic activities<br><br>**Assessment methods**<br>• Poster and oral presentations with audience questions<br>• Reports in formal scientific style<br>• Data analysis tasks<br>• Case studies<br>• Production of formal scientific paper<br>• Formal presentation of results including plenary |


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**Postgraduate Diploma** – these are the learning outcomes that must be met for the award of Postgraduate Diploma (they are a subset of the learning outcomes for Master of Science and follow the same numbering scheme)

| Learning Outcomes – LEVEL 7 for award of **Postgraduate Diploma** | |
|---|---|
| **3A. Knowledge and understanding** | |
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| A1 – Critically analyse and evaluate key areas of biological, biomedical, pharmaceutical and data sciences<br>A2 – Critically evaluate recent advances in the production and analysis of chemical or biological data in relevant industrial contexts<br>A3 - Draw upon a broad knowledge of practical techniques and methodologies used in biological, biomedical, pharmaceutical and data sciences to inform the planning or execution of research activities. | ● Lectures<br>● Seminars and student-led discussions based on individual research tasks<br>● Problem classes and workshops<br>● Self-directed learning<br>**Assessment methods**<br>● Workshops with vocationally relevant essay style (or longer answers) question<br>● Seminar discussions with formal structure<br>● Poster and oral presentations including audience questions<br>● Production of formal scientific paper<br>● Presentation of results including plenary questions<br>● Formal written exam |

| **3B. Cognitive skills** | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| B1 - Identify and critically analyse literature sources in order to evaluate scientific practices and relate them to own research.<br>B2 - Construct conclusions by synthesising information from more than one source<br>B3 - Apply advanced knowledge to the solution of complex problems, including those in which there is no one unique solution | ● Lectures<br>● Seminars<br>● Problem classes and workshops<br>● Independent online learning<br>**Assessment methods**<br>● Seminar discussions with formal structure<br>● Poster and oral presentations with audience questions<br>● Data analysis tasks<br>● Case studies<br>● Production of formal scientific paper<br>● Presentation of results including plenary<br>● Formal written exam |


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| 3C. Practical and professional skills | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| C1 - Plan and perform research tasks using up to date standard techniques and methodologies<br>C3 - Identify relevant information in published sources; compare and contrast information from different sources, including novel information generated from own research. | ● Self-directed learning<br>● Laboratory activities<br>● Demonstrations<br>● Simulations and interactive electronic activities including simulations of laboratory practical activities<br>**Assessment methods**<br>● Poster and oral presentations with audience<br>● Laboratory practical activities<br>● Reports in formal scientific style<br>● Data analysis tasks |

| 3D. Key/transferable skills | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| D2 - Use appropriate IT solutions to store, process and communicate data and research findings | ● Self-directed independent learning<br>● Demonstration and self-development of specialist IT skills<br>● Laboratory activities<br>● Demonstrations<br>● Simulations and interactive electronic activities<br>**Assessment methods**<br>● Poster and oral presentations with audience<br>● Reports in formal scientific style<br>● Data analysis tasks<br>● Case studies<br>● Production of formal scientific paper<br>● Presentation of results including plenary |


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**Master of Science**

| Learning Outcomes – LEVEL 7 for award of **Master of Science** | |
|---|---|
| **3A. Knowledge and understanding** | |
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| A1 – Critically analyse and evaluate key areas of biological, biomedical, pharmaceutical and data sciences<br>A2 – Critically evaluate recent advances in the production and analysis of chemical or biological data in relevant industrial contexts<br>A3 - Draw upon a broad knowledge of practical techniques and methodologies used in biological, biomedical, pharmaceutical and data sciences to inform the planning or execution of research activities. | ● Lectures<br>● Seminars and student-led discussions based on individual research tasks<br>● Problem classes and workshops<br>● Self-directed learning<br>**Assessment methods**<br>● Workshops with vocationally relevant essay style (or longer answers) question<br>● Seminar discussions with formal structure<br>● Poster and oral presentations with audience questions<br>● Production of formal scientific paper<br>● Presentation of results including audience questions<br>● Formal written exam |

| **3B. Cognitive skills** | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| B1 - Identify and critically analyse literature sources in order to evaluate scientific practices and relate them to own research.<br>B2 - Construct conclusions by synthesising information from more than one source<br>B3 - Apply advanced knowledge to the solution of complex problems, including those in which there is no one unique solution | ● Lectures<br>● Seminars<br>● Problem classes and workshops<br>● Independent online learning<br>**Assessment methods**<br>● Seminar discussions with formal structure<br>● Poster and oral presentations with audience questions<br>● Data analysis tasks<br>● Case studies<br>● Production of formal scientific paper<br>● Presentation of results including plenary<br>● Formal written exam |

| 3C. Practical and professional skills | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| C1 - Plan and perform research tasks using up to date standard techniques and methodologies<br>C2 - Manage, lead and respond to change individually and as part of a team<br>C3 - Identify relevant information in published sources; compare and contrast information from different sources, including novel information generated from own research.<br>C4 - Appraise laboratory procedures against standards of good ethical, environmental or sustainable practice | ● Self-directed learning<br>● Laboratory activities<br>● Demonstrations<br>● Simulations and interactive electronic activities including simulations of laboratory practical activities<br>**Assessment methods**<br>● Poster and oral presentations with audience questions<br>● Laboratory practical activities<br>● Reports in formal scientific style<br>● Data analysis tasks |

| 3D. Key/transferable skills | |
|---|---|
| **Learning outcomes:** | **Learning and teaching strategy/ assessment methods** |
| D1 - Plan, organise and manage independent projects, working individually and in cooperation with others<br>D2 - Use appropriate IT solutions to store, process and communicate data and research findings<br>D3 - Summarise and report on research findings in written and oral formats | ● Self-directed independent learning<br>● Demonstration and self-development of specialist IT skills<br>● Laboratory activities<br>● Demonstrations<br>● Simulations and interactive electronic activities<br>**Assessment methods**<br>● Poster and oral presentations with audience questions<br>● Reports in formal scientific style<br>● Data analysis tasks<br>● Case studies<br>● Production of formal scientific paper<br>● Formal presentation of results including plenary |

**4. Distinctive features of the programme structure**

- **Where applicable, this section provides details on distinctive features such as:**
  - where in the structure above a professional/placement year fits in and how it may affect progression
  - any restrictions regarding the availability of elective modules
  - where in the programme structure students must make a choice of pathway/route
- **Additional considerations for apprenticeships:**
  - how the delivery of the academic award fits in with the wider apprenticeship
  - the integration of the 'on the job' and 'off the job' training
  - how the academic award fits within the assessment of the apprenticeship

We believe we have developed a uniquely cross-disciplinary, practical-based offering that has been developed with input from many local companies and will develop the knowledge and skills of students in areas of both biology and chemistry that are valued by employers. A broad and practical-skills-focussed course like this is not available from any local competitors.

The programme places an emphasis on the balance between core scientific theory and skills, setting both into industry-relevant contexts, informed by discussion with a number of employers. It aims to produce students with the tools to succeed in employment with appropriate transferable skills, as specified by our industrial contacts. These are regularly updated and feed into delivery. There is an outstanding range of opportunities to develop practical scientific experience valued by sectors such as chemical, environmental, bioscience or biotechnology industries. The programme aims to generate confident hands-on postgraduates with a can-do attitude and understanding of business landscape and economic environment of specialist scientific employers.

Unlike traditional courses at other institutions, almost all of our teaching takes place in laboratories, with very little delivery in classrooms. We strongly believe that the use of practical activity-led teaching in most of the modules sets this course and its students apart from the majority (where most teaching will be in lecture theatres and classrooms, supplemented by laboratory-based teaching in separate sessions).
We believe the proposed course offers a unique level of support from staff who all have expertise in their field plus academic and industrial research experience, but have roles in the University Centre that are very student-first and teaching-focussed. Students will benefit from an environment in which there will be high levels of contact time with staff. They will have a high degree of autonomy in designing their own research projects (within constraints of budget and availability of suitable supervisors). Assessments in the research-based modules will allow students to experience a comprehensive range of the key activities involved in

research, including literature surveys, writing grant proposals, obtaining ethical authorisation to conduct research, and communicating research findings through authoring journal articles and preparing conference presentations. All of these activities will involve developing a range of transferable skills (criticality, budgeting, time management, negotiating skills, written and verbal communication using specialist vocabulary) that will be equally valuable to students whether their future is academic or industrial.

We consulted carefully with a range of employers to ensure that both the theoretical content and the practical experience that is delivered fits their requirements, ensuring that our postgraduates have the best chance of being well-equipped to compete for jobs in the science sector.

The range of modules will offer an excellent opportunity to work across disciplines, providing an innovative and contemporary way of developing scientific skills. This is particularly well-evidenced in the Toxicology and Environmental Change, Preparation for Research and Dissertation core modules, through which students will gain experience of techniques specific to both bioscience and chemical laboratories.

The balance of applied bioscience, environmental science and chemistry also sets this programme apart from many others, providing opportunities for students to progress into industries requiring some chemical knowledge. This would not be possible for postgraduates of equivalent courses from local competitors where there is not the opportunity to study any chemistry. This has also been cited by employers as a reason for their choosing to offer apprenticeships through the department.

**Key Learning & Teaching Strategy and Methods**

Students will attend the University Centre on two days per week but will be expected to conduct a significant amount of independent self-driven learning outside of this time. In order to complete the lab work for the Dissertation module, students may wish to use the laboratories on days that they are not timetabled for taught sessions. Supervised access to the laboratories will be provided at key times throughout the year.

In their time at the University Centre, lectures will be used to introduce topics and provide guidance as to the nature of the independent study that is required. Progress will be monitored through group workshops and tutorials in which material will be discussed and formative assessment activities undertaken. Almost all teaching will be in laboratories and much of this time will be used to demonstrate and practice the use of equipment and standard techniques of relevance to the topics under discussion. Students will also have supervised laboratory time in which they will be expected to conduct their own research.

The use of guest speakers in some modules will provide an industrial perspective on some topics and will raise awareness of the range of activities undertaken in local scientific organisations - inspiring students and placing the theory that is being learned firmly in a real-world context.

The use of specially designed joint teaching-laboratory spaces allows for a mix of practical and theoretical based delivery. Some sessions will involve a blend of short, traditional expositions and lecture-style presentations interspersed with practical activities designed to reinforce or extend the material that has been presented. Other sessions will involve longer, investigative practical activities. Students will be directed to particular chapters of textbooks or journal articles to read prior to teaching sessions, and there will also be videos, interactive quizzes, lecture notes and simulations of laboratory activities available for study before and after taught sessions.

In this way students will have the opportunity to learn and discover for themselves new information using a wide variety of methods. They will also be regularly performing laboratory activities commonly employed in industry with the aim of increasing their competence and confidence in working safely and effectively in a laboratory environment.

The University Centre, and particularly the HE Science team, have a strong background in using technology to enhance learning. A rich and accessible single point of access for all material has been developed using the VLE - which has some services, such as Turnitin, embedded and also links seamlessly to other platforms such as Google Classrooms and Sites.

As well as providing access to written materials, videos, interactive quizzes and simulations, the VLE will provide a central place in which all work will be submitted (through links to Turnitin). Students will be directed to use the VLE also as a means of communication through the embedded forums, wikis, blogs and instant messaging facilities.

Students will be taught to use common IT tools such as word processing and spreadsheet programmes in order to produce documents to meet standards of scientific writing. They will also regularly make use of more specialist pieces of software (e.g. '*R*', *Python* or *SPSS*) in order to analyse data to reach valid conclusions. Use of all of these will be incorporated into theory and practical teaching and students will be expected to use them in producing assessed work.

The qualification will support delivery of the Level 7 Research Scientist delivered in a day release model over a period of 2 years. Apprentices would complete 3 or 4 (dependent on year) modules per year in the University Centre, plus work-based research with their employer as part of their occupation duties. In addition, apprentices will be supported in their work-based research project in preparation for the end point assessment. (This is not part of the academic qualification and is only offered to apprentices)

For these and other part-time students, learning materials and online activities will be available through our VLE, and a robust support system will be in place. Full-time students will also be able to access these resources.

**Key Assessment Strategy and Methods**

To exploit the expertise and research experience of staff, students will be assigned a tutor as a research partner who will support and develop the student's benchwork and attitude to the bench. Students will work in small groups as well as individually mirroring the experience of laboratory practice in academia and industry

Regular formative assessment activities with feedback from staff, e.g. workshops, seminar discussions, presentations (poster and oral), seminar activities (such as "lab meetings"), laboratory practical activities and critical data analysis, will provide students with opportunities to monitor their own progress and prepare for summative assessment. Summative assessment tasks will be varied (including practical activities, written tests, presentations, reports, case studies, annotated bibliographies and formal exams) and deadlines will be spread throughout the year.

Pair and small group activities will be regularly used in all modules, allowing students to improve their communication and teamwork skills. Short presentations by students will form part of the body of formative and summative assessment activities, increasing student confidence in speaking and presenting to an audience, who will ask questions.
Formative assessment will begin very early in the course, with short basic tests increasing in demand over the weeks. This is in order to identify any students who may need extra support.

Some formative assessment will be delivered via the VLE and will provide instant feedback. Preparation for practical activities will be available in the form of virtual experiments or videos. Real and simulated practical activities will also provide data and the processing of this provides another opportunity for formative assessment with feedback on both the quality of the data collected, and how this may be improved, and the way in which it is displayed and manipulated to form conclusions.

The range of summative assessment types provides the opportunity for all students to demonstrate the knowledge and skills that they have acquired throughout the course of their studies. The mix of practical and written assessment, including formal examinations, will provide evidence to employers of the level of laboratory skills and other abilities (such as teamwork, communication skills, ethical integrity, etc.) that a student has developed, whilst also enabling any students who wish to progress onto Ph.D. research to demonstrate the required level of laboratory competence and ability to manage a substantial research project.

Examinations have been included as part of the varied set of assessment methods as they are still widely used across the sector. Our students will be expected by employers to have experience of demonstrating their ability to apply knowledge under exam conditions.

For apprentices, there will be continuous assessment of Competences specified in the Level 7 Standard which begin with the programme and culminate in a rigorous range of end point assessment articles. These include a portfolio of work (comprising a problem-solving project report, presentation with questioning, and professional discussion). Additional tutorial time with a qualified assessor will be added at the end of each academic year to support apprentices in their preparation for end-point assessment as well as tutorial time with a qualified Assessor Trainer during the academic course on a regular basis.

| 5. Support for students and their learning. |
| --- |
| Students will be assessed either very early or even before the beginning of the course to identify any additional support needs.<br><br>A detailed induction programme has been designed specifically for Masters students to introduce them to the key features of the course, the methods of working such as use of the VLE and safe working practice in the laboratories and the academic requirements of assessment at level 7. The structure and regulations of the course will be explained at this point in addition to a skills scan and advice on academic skills and library support. Students will be introduced to the learning support officer and made aware of the support available and how to access it.<br><br>Induction will also include activities to give students hands-on experience of using the University Centre IT systems, laboratory equipment and facilities whilst also being engaging and providing opportunity for students to interact socially and become comfortable with the environment.<br><br>This induction programme will take place over a single day and will be offered to both full-time and part-time students.<br><br>Each student (whether full-time or part-time) will be allocated a tutor for regular tutorials and personal development planning. The personal tutor will also provide pastoral care, plus the department has a coach who will provide ancillary support where needed. Additional learning support is provided by a dedicated University Centre learning support officer.<br><br>These arrangements will be implemented in the first term and continued throughout all years of study.<br><br>Part-time students will have access to support materials through the VLE and will be able to contact staff for support remotely using the VLE and other communication tools through email and One File. Regular tutorials, and the ability to contact a tutor electronically, will also provide support and a means for signposting other forms of support should they be needed.<br><br>Apprentices will receive additional support in the workplace through their mentors and work-based assessors. Each apprentice is attached to a designated Assessor Trainer who records achievement and provides preparation for End Point throughout the course including use of mini-mock assessments for each Competence. |

Academic support beyond the delivery of modules will be provided by staff, aided by study skills support tutors. This will be tailored to the needs of each student - challenging the highest achieving to go even further whilst providing support for those struggling in any areas. Staff holidays are managed, wherever possible, to ensure at least one person is available during vacations.

The library and librarian will provide a range of services to help students in finding information and producing high quality work that complies with set academic standards. Sessions will be delivered on simple academic online searching as well as more comprehensive literature search strategies, understanding and avoiding plagiarism and correct referencing style.

Apprentices, who would be attending the University Centre on one day per week, will have access to an increasing range of textbooks available remotely as e-books. A small number of vital texts that cannot be accessed remotely will be provided as hard copies for apprentices to use outside the University Centre. The academic librarian will be available remotely through email and other electronic systems to provide support and guidance in a timely manner.

Support for preparation for the end-point assessment will be built into the apprenticeship timetable.

6. Criteria for admission
*(For apprenticeships this should include details of how the criteria will be used with employers who will be recruiting apprentices.)*

| | **Typical offer** | **Minimum Offer** |
|---|---|---|
| **Degree:** | 2(ii) or better BSc (Hons) in Biomedical Science or related discipline | Level 6 qualification in relevant subject |
| **GCSE English:** | Requested but not required if IELTS 5.5 or above held | |
| **IELTS:** | 5.5 or above | |
| **International qualifications:** | Equivalent to Level 6 in relevant subject | |
| **Mature applicants:** | We welcome applications from mature* applicants who may not have met the academic criteria, but who can demonstrate potential academic ability and a wealth of experience in their chosen field. Candidates in this category and otherwise are likely to be interviewed to assess their suitability for the course and may be asked to provide a portfolio of evidence to support their application.<br><br>**21 years and over at the start of the course* | |
| **RPL claims:** | The course structure actively supports claims for Recognition of Prior Certified Learning (RPCL) or Recognition of Prior Experiential Learning (RPEL) | |

| | |
|---|---|
| 7. Language of study | English |

| | |
|---|---|
| | |

| 8. Information about non-OU standard assessment regulations (including PSRB requirements) |
|---|
| n/a |

| 9. For apprenticeships in England End Point Assessment (EPA). |
|---|
| The programme can be used to support achievement of the Level 7 Research Scientist Standard , delivered in a day release model over a period of 2 years where students will complete 3 or 4 modules per year of study to achieve the MSc and allow completion of project work in preparation for end point assessment (EPA). EPA for this Standard requires a project report, presentation and questioning (based on a work-based project) and professional discussion underpinned by a portfolio of evidence. In line with our department's experience of offering other Science Standards, additional support will be scheduled in, within tutorial time, within the teaching timetable and with an assessor at the end of each academic year. The evidence will be collated on the OneFile platform.<br><br>Support for students begins at recruitment where students complete initial tests to assess any additional needs for support. Induction contains an introduction to the structure and regulations of the course in addition to a skills scan and advice on academic skills and library support (with research and referencing). Students receive individual support through tutorial and are assigned a pastoral tutor, who will meet each student once per half term in addition to being the first port of call when a support need arises. All students have access to welfare and may access specialist support through the learning support mentor. The VLE supports students with further resources and extension and is available 24/7 anywhere with internet access and contains not only module specific areas but additional sites to support apprentices including tutorial resources, academic skills area and preparation for EPA. The nature of the VLE allows each individual apprentice to access a bespoke remote delivery system tailored to their needs and timely progress.<br><br>Students who are attending only one day within the college week (as do the current apprentices) are supported by strong communications between the teaching team, work-based assessor and the workplace. At least weekly communication takes place so that any issues are picked up and addressed as they begin. This includes attendance reporting as well as performance and behaviour (as enshrined within the Standard). The crucial requirement for apprentice success is the cohesive and coherent interaction of the college team with the workplace.<br><br>Students are taught in specialist laboratories using a mixture of lecture, practical and workshop activities with access to specialist tutorial and additional resources including the course textbook and VLE sites. Tutors on the programme are highly qualified and experienced subject specialists with industry experience, which allows a comfortable and targeted working relationship based on common knowledge and outlook. |

End point assessment (EPA) requires the students to have gained knowledge and training and to be able to produce evidence of this. EPA is performed by an external assessor appointed by the end point assessment organisation (EPO) selected by the employer. and the requirements to progress to the end point and to succeed are determined by the EPO. EPA will be supported by close working of the teaching team with the work-based assessor and use of a range of teaching materials offered through the VLE, including opportunities to develop material for the portfolio in addition to interactive activities to develop and test knowledge in preparation for end point. The team has extensive experience of developing these resources for lower level Standards and has received excellent feedback on their utility and availability by this route.

## 10. Methods for evaluating and improving the quality and standards of teaching and learning.

In addition to the Annual Programme Monitoring process the following mechanisms are in operation:

- Peer Review
- Annual Planning
- Peer Observation
- Student module reviews
- Tutor module reviews
- Enrolment and induction reviews
- Course Committee meetings
- Pathway Committee meeting
- Student Pathway meetings

## 11. Changes made to the programme since last (re)validation

There have been no minor or major modifications to the programme

Annexe 1: Curriculum map

Annexe 2: Teaching and Learning Map

Annexe 3: Assessment Map

Annexe 4: Curriculum mapping against the apprenticeship standard or framework (delete if not required.)

Annexe 5: Notes on completing the OU programme specification template

## Annexe 1 - Curriculum map

This table indicates which study units assume responsibility for delivering (shaded) and assessing (✓) particular programme learning outcomes.

| Level | Study module/unit | A1 | A2 | A3 | B1 | B2 | B3 | C1 | C2 | C3 | C4 | D1 | D2 | D3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | Molecular Biology and Genomics | ✓ | | | | | ✓ | ✓ | | | | | | ✓ |
| | Advanced Concepts in Cellular Biology | ✓ | ✓ | | | ✓ | | ✓ | | | | ✓ | | |
| | Bioinformatics and Data Analysis | | ✓ | ✓ | | | ✓ | | | ✓ | | | ✓ | |
| | Toxicology and Environmental Change | ✓ | ✓ | | ✓ | | ✓ | | | | ✓ | ✓ | | |
| | Preparation for Research | | | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | ✓ | |
| | Dissertation | | | ✓ | | ✓ | | ✓ | ✓ | | | | | ✓ |
| | Advanced Analytical Science (option) | | | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | |
| | Diagnostic Techniques (option) | | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | |

## Annexe 2 – Teaching and Learning Map

**Level 7**

| | Methods | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Module Titles** | Lectures | Case Studies | Skills workshops | Practicals (design and production sessions) | Group activities | Guest speakers | Independent / E Learning/ On-line forums | (Problem Classes) |
| Molecular Biology and Genomics | X | | X | X | X | | | |
| Advanced Concepts in Cellular Biology | X | X | | X | | X | X | |
| Bioinformatics and Data Analysis | | X | X | | X | | X | X |
| Toxicology and Environmental Change | X | X | | X | X | | X | X |
| Preparation for Research | X | | X | | | X | X | |
| Dissertation | | | X | X | | | | |
| Advanced Analytical Science (option) | X | | | X | X | | X | X |
| Diagnostic techniques (option) | X | | | X | X | | X | X |

**Annexe 3a – Assessment Map - FT mode**

| | Methods | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Module Titles** | Laboratory report (GLP standard) | Research project report | Journal-style article | Research proposal | Literature review | Data analysis | Presentation | Conference style Poster | Case study | Annotated bibliography |
| Molecular Biology and Genomics | | 60%, wk15 3600 words | | | 40% wk7 2400 words | | | | | |
| Advanced Concepts in Cellular Biology | 50%, wk13 3000 words | | 50%, wk9 3000 words | | | | | | | |
| Bioinformatics and Data Analysis | | | | | | 40% wk 29 2400 words or eq | | | 60%, wk17 3600 words | |
| Toxicology and Environmental Change | | | | 60%, wk30 3600 words | | | | 40%, wk20 (equiv. to 2400 words) | | |
| Preparation for Research | | | | 70%, wk10 4200 words | | | | | | 30%, wk5 1800 words |
| Dissertation | | | 70%, wk34 6000 words | | | | 30%, wk36 10 min + 5min for Qs | | | |
| Advanced Analytical Science (option) | | | | | | 60%, wk23 3600 words | | | 40%, wk30 eq to 2400 words | |
| Diagnostic Techniques (option) | 60%, wk23 3600 words | | | | | | 40%, wk30 10 min + 5min for Qs | | | |


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**Annexe 3b – Assessment Map - PT mode**

**Year 1**

| | Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Module Titles** | Laboratory report (GLP standard) | Research project report | Journal-style article | Research proposal | Literature review | Data analysis | Presentation | Conference style Poster | Case study |
| Molecular Biology and Genomics | | 60%, wk15<br>3600 words | | | 40% wk7<br>2400 words | | | | |
| Advanced Concepts in Cellular Biology | 50%, wk13<br>3000 words | | 50%, wk9<br>3000 words | | | | | | |
| Toxicology and Environmental Change | | | | 60%, wk30<br>3600 words | | | | 40%, wk20<br>(eq to 2400 words) | |
| Advanced Analytical Science (option) | | | | | | 60%, wk23<br>3600 words | | | 40%, wk30<br>eq to 2400 words |
| Diagnostic Techniques (option) | 40%, wk23<br>2400 words | | | | | | 40%, wk30<br>10 min + 5min for Qs | | |

**Year 2**

| | Methods | | | | | | |
|---|---|---|---|---|---|---|---|
| **Module Titles** | Journal-style article | Research proposal | Literature review | Data analysis | Presentation | Case study | Annotated bibliography |
| Bioinformatics and Data Analysis | | | | 40% wk 29<br>2400 words or eq | | 60%, wk17<br>3600 words | |
| Preparation for Research | | 70%, wk10<br>4200 words | | | | | 30%, wk5<br>1800 words |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dissertation | 70%, wk34<br>6000 words | | | | 30%, wk36<br>10 min + 5min for Qs | | |

**Annexe 3c – Assessment Map - block/blended mode**

**Year 1**

| | Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Module Titles** | Laboratory report (GLP standard) | Research project report | Journal-style article | Research proposal | Literature review | Data analysis | Presentation | Conference style Poster | Case study |
| Molecular Biology and Genomics | | 60%, wk30<br>3600 words | | | 40% wk24<br>2400 words | | | | |
| Advanced Concepts in Cellular Biology | 50%, wk28<br>3000 words | | 50%, wk18<br>3000 words | | | | | | |
| Toxicology and Environmental Change | | | | 60%, wk12<br>3600 words | | | | 40%, wk10<br>(eq to 2400 words) | |
| Advanced Analytical Science (option) | | | | | | 60%, wk4<br>3600 words | | | 40%, wk6<br>eq to 2400 words |
| Diagnostic Techniques (option) | 40%, wk4<br>2400 words | | | | | | 40%, wk30<br>10 min + 5min for Qs | | |

**Year 2**

| | Methods | | | | | | |
|---|---|---|---|---|---|---|---|
| **Module Titles** | Journal-style article | Research proposal | Literature review | Data analysis | Presentation | Case study | Annotated bibliography |
| Bioinformatics and Data Analysis | | | | 40% wk 6<br>2400 words or eq | | 60%, wk4<br>3600 words | |
| Preparation for Research | | 70%, wk12<br>4200 words | | | | | 30%, wk9<br>1800 words |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dissertation | 70%, wk34<br>6000 words | | | | 30%, wk36<br>10 min + 5min for Qs | | |

## Annexe 4 - Curriculum mapping against the Apprenticeship Standard

This table indicates which study units assume responsibility for delivering (shaded) and assessing (✓) particular knowledge, skills and behaviours.

| | | Apprenticeship Standard | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Level** | **Study module/unit** | **K1** | **K2** | **K3** | **K4** | **K5** | **K6** | **K7** | **K8** | **S 1** | **S 2** | **S 3** | **S 4** | **S 5** | **S 6** | **S 7** | **S 8** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** |
| 7 | Molecular Biology and Genomics | | | | ✓ | | | | | | ✓ | | | | ✓ | ✓ | | | | | | | | ✓ |
| | Advanced Concepts in Cellular Biology | ✓ | | ✓ | | | | ✓ | | | ✓ | | | ✓ | | | ✓ | | | | | ✓ | | |
| | Bioinformatics and Data Analysis | | | | | ✓ | ✓ | | | | | | | | ✓ | | | | | | | | ✓ | |
| | Toxicology and Environmental Change | ✓ | | ✓ | | | | | | | | | ✓ | ✓ | | | | | | ✓ | | | ✓ | |
| | Preparation for Research | | ✓ | | | | ✓ | ✓ | ✓ | | | ✓ | | | | ✓ | | ✓ | ✓ | | ✓ | | | |
| | Dissertation | ✓ | ✓ | | | ✓ | | | ✓ | | | | ✓ | ✓ | | | | ✓ | ✓ | | | | | |
| | Options: | | | | | | | | | | | | | | | | | | | | | | | |
| | Advanced Analytical Science | | | | | | | | | ✓ | | | | | ✓ | | | | | | | | | ✓ |
| | OR | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Diagnostic Techniques | | | | | | | | | ✓ | | | | | ✓ | | | | | ✓ | | | | | |