

## Programme Specification: Undergraduate

### For students starting in Academic Year 2023/24

#### 1. Course Summary

<b>Names of programme and award title(s)</b>	Master in Biochemistry (MSci) Master in Biochemistry (MSci) with International Year (see Annex for details) Master in Biochemistry (MSci) with Work Placement Year (see Annex for details)
<b>Award type</b>	Single Honours (Masters)
<b>Mode of study</b>	Full-time
<b>Framework of Higher Education Qualification (FHEQ) level of final award</b>	Level 7
<b>Normal length of the programme</b>	4 years; 5 years with either the International Year or Placement Year between years 2 and 3
<b>Maximum period of registration</b>	The normal length as specified above plus 3 years
<b>Location of study</b>	Keele Campus
<b>Accreditation (if applicable)</b>	n/a
<b>Regulator</b>	Office for Students (OfS)
<b>Tuition Fees</b>	<p><b>UK students:</b> Fee for 2023/24 is £9,250*</p> <p><b>International students:</b> Fee for 2023/24 is £18,800**</p> <p>The fee for the international year abroad is calculated at 15% of the standard year fee</p> <p>The fee for the work placement year is calculated at 20% of the standard year fee</p>

**How this information might change:** Please read the important information at <http://www.keele.ac.uk/student-agreement/>. This explains how and why we may need to make changes to the information provided in this document and to help you understand how we will communicate with you if this happens.

\* These fees are regulated by Government. We reserve the right to increase fees in subsequent years of study in response to changes in government policy and/or changes to the law. If permitted by such change in policy or law, we may increase your fees by an inflationary amount or such other measure as required by government policy or the law. Please refer to the accompanying Student Terms & Conditions. Further information on fees can be found at <http://www.keele.ac.uk/studentfunding/tuitionfees/>

\*\* We reserve the right to increase fees in subsequent years of study by an inflationary amount. Please refer to the accompanying Student Terms & Conditions for full details. Further information on fees can be found at <http://www.keele.ac.uk/studentfunding/tuitionfees/>

#### 2. What is an Integrated Master's programme?

Integrated master's awards - which are common in science, mathematics and engineering - are delivered through a programme that combines study at the level of a bachelor's degree (with honours) with study at master's level. As such, a student graduates with a master's degree after a single four-year programme of study. The MSci Biochemistry programme allows you to specialise more or less exclusively in Biochemistry, and develop enhanced research skills.

### **3. Overview of the Programme**

The Keele MSci Biochemistry programme provides a broad and varied coverage of modern biochemistry, where you will investigate the most exciting areas of 21st Century life science and medical research. Studying life at the molecular level offers the opportunity to investigate the core topics in the life sciences today, from unlocking the secrets of the human genome to the individually tailored molecular therapies of the future, developing a deeper understanding of important structure-function relationships such as how knowledge of the three-dimensional structure of biological macromolecules gives us insight into diverse biochemical processes and how this can inform rational drug design. The Keele Biochemistry programme places particular emphasis on human and mammalian biochemistry, especially as it relates to health and disease. As well as developing core knowledge in the subject, supported with a comprehensive laboratory programme, you will also develop a range of key transferable and employability skills related to the critical evaluation of scientific literature, effective communication in a variety of formats and teamwork. Additional opportunities, such as the applied life sciences placement, study abroad and a range of final year optional modules give you greater flexibility to tailor the structure and content of your programme to own interests and career goals.

The MSci fourth year of study is designed to enable you to enhance your employability through the development of advanced problem solving and communication skills. You will further develop independent learning and enhanced research skills in the critical evaluation of scientific literature and in the design and conduct of an authentic research study.

Distinctive features of the course include:

- A contemporary curriculum, with a focus on biochemistry and molecular biology in health and disease, and a research-focused level 7 year with an extended MSci research project;
- Innovative and relevant assessments, designed to foster creativity;
- A core laboratory programme delivered in well-equipped modern laboratories and a wide range of third year research projects and fourth year extended MSci research projects;
- The Undergraduate Student Research Conference and MSci Conference, giving you the opportunity to present the outcomes of your year research projects in the context of a realistic research conference experience;
- The option to take an Applied Life Sciences Placement between level 5 and level 6;
- The option to include study abroad either as a semester abroad at level 5 or an International Year between level 5 and level 6;
- The opportunity to study a language alongside your programme

### **4. Aims of the programme**

The broad aims of the programme are to:

- provide you with core knowledge, understanding and skills relevant to biochemistry;
- produce skilled and motivated graduates who are suitably prepared for further study or for employment within or outside their field;
- cultivate interest in the biosciences, particularly at the cellular and molecular level, within a caring and intellectually stimulating environment;
- promote the development of a range of employability skills, for use in all areas where numeracy and an objective, scientific approach to problem-solving are valued;
- promote the development of independent research skills to an advanced level in the acquisition and analysis of scientific data and the critical evaluation of scientific literature, to show originality in the application of knowledge;
- enable you to specialise in Biochemistry to a masters level through a four year integrated Masters programme, developing key skills and programme outcomes to an advanced level.

### **5. What you will learn**

The intended learning outcomes of the programme (what students should know, understand and be able to do at the end of the programme), can be described under the following headings:

- Subject knowledge and understanding
- Subject specific skills
- Intellectual skills
- Key or transferable skills (including employability skills)

## **Subject knowledge and understanding**

Successful students will be able to demonstrate knowledge and understanding of:

- the chemistry that underlies biological process and their study, including chemical and thermodynamic principles applied to biochemical catalysis and the role of enzymes and other proteins in determining the function and fate of cells and organisms.
- the essential features of cell metabolism and its control, developing from a broad understanding of core processes related to cellular respiration and photosynthesis to the application of this in context to acquired and inherited disease
- the principles that determine the three-dimensional structure of biological macromolecules (including nucleic acids, proteins and carbohydrates) and be able to explain detailed examples of how structure enables function, including the application of this knowledge in context to drug design
- the molecular basis of genetics and gene expression, including the structure, arrangement, expression, and regulation of genes, and relevant experimental methods for their study and/or manipulation
- the structure, function and organisation of a wide range of cell types (both prokaryotic and eukaryotic), including subcellular organelles and transport processes
- the signal transduction mechanisms of extra- and intra-cellular receptors in cell signalling pathways controlling cellular activities and how these can be investigated experimentally the innate and adaptive immune system, including the main cell types involved,
- the structural basis for pathogen recognition and key effector functions related to host defence and experimental methods for their study or manipulation
- experimental methods for the investigation of relevant areas of biochemistry and molecular biology, including the scientific method, hypothesis-driven investigation and the critical nature of evidence and scientific debate
- current developments in biochemistry and molecular biology, including areas of ethical or public concern

In addition, MSci Biochemistry students will be able to demonstrate knowledge and understanding of:

- the principles and applications of cutting-edge research methodologies and techniques in the study of Biochemistry and wider Biosciences to an advanced level
- the context of their extended research project in relation to on-going research activity in their field of study and the wider biosciences

## **Subject specific skills**

Successful students will be able to:

- evaluate scientific literature with a full and critical understanding, while addressing such questions as content, context, aims, objectives, quality of information, and its interpretation and application
- attain competence in a range of laboratory techniques and employ a variety of methods (including computational studies related to bioinformatics and the use of small molecule and macromolecular databases) in investigating, acquiring, recording and analysing information relevant to biochemistry and molecular biology
- design, conduct, analyse, report and evaluate biochemical experiments, acknowledging an awareness of the validity, accuracy, calibration, precision and reproducibility of results
- work safely and responsibly in the laboratory with awareness of standard procedures such as risk assessment, COSHH, relevant health and safety regulations
- recognise philosophical and ethical issues relevant to the subject, including those relating to animal welfare and procedures for obtaining informed consent
- apply scientific method, planning an analytical skills to carry out a research project
- apply biochemical understanding to familiar and unfamiliar problems

Additionally at level 7 (MSci students):

- develop an understanding of the processes involved in research dissemination and the acquisition of research funding
- critically evaluate current literature and complex methodologies to an advanced level in relevant areas of contemporary biochemistry

## **Intellectual skills**

Successful students will be able to:

- assess the merits of contrasting theories, paradigms, concepts or principles and develop reasoned arguments
- identify, analyse and solve problems by a variety of methods, either individually and/or cooperatively
- make critical interpretations, evaluations and judgements of data
- obtain, analyse and summarise several lines of subject-specific evidence to formulate and test

- hypotheses, with critical interpretation of quantitative and qualitative research findings
- take responsibility for their own learning and reflect upon that learning
- construct grammatically correct documents in an appropriate academic style using and referencing relevant ideas and evidence
- understand the importance of academic and research integrity

Additionally at level 7 (MSci students):

- develop a greater awareness of research impact and the processes involved in research dissemination and the acquisition of research funding

### **Key Employability skills**

Successful students will be able to:

- develop an adaptable, flexible, sustainable and effective approach to learning and study, including time management, creativity and intellectual integrity
- acquire, analyse, synthesise, summarise and present information and ideas from a wide range of sources: textual, numerical, verbal, graphical
- prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques, statistical programmes, spreadsheets and programs for presenting data visually
- use the internet and other electronic sources effectively and critically as a means of communication and a source of information
- cite and reference work in an appropriate manner, ensuring academic integrity and the avoidance of plagiarism whether intentional or not
- communicate effectively to a variety of audiences by written, spoken and graphical means using appropriate techniques and scientific language
- develop skills necessary for self-managed and lifelong learning, including working independently, organisational, enterprise and knowledge transfer skills
- work with others to identify and achieve collaborative goals and responsibilities and perform in a respectful manner that is accepting of the viewpoints and opinions of others
- motivate themselves and sustain that motivation over an extended period of time
- identify and work towards targets for personal, academic and career development

Additionally at level 7 (MSci students):

- develop greater autonomy in the planning and implementation of tasks associated with their research project and taking responsibility for their workload

We are committed to developing not only your intellectual, but also personal and professional skills. Alongside our innovative programme, Keele University offers a wide range of enriching activities that offer added value and aim to maximise your potential. Further information can be found at:

<http://www.keele.ac.uk/journey/>

## **6. How is the programme taught?**

Diversity, flexibility and inclusivity is at the heart of our Education Strategy. Your Student Voice helps us to shape what we do and we include students, local employers and professional bodies in our decision-making process.

The delivery of our programme will include the following types of activities:

**Digital material:** Traditional 'lectures' are often redesigned for online consumption, giving you more flexibility to decide how, when and where to study. This can include provision of short videos, directed reading, key learning outcomes and Forms that allow you to ask questions anonymously.

**Campus-based tutorials and workshops.** Often designed to support online lectures. Tutorials and workshops help promote social learning, develop a sense of community and give you an opportunity to deepen your understanding of core issues, ask questions, reflect on your own learning, and discuss content with other students and your tutors. Other workshops will also support data analysis and report writing, including IT literacy, as well as supporting you in developing skills in computational and bioinformatic analysis.

**Laboratory practicals.** A comprehensive laboratory programme covering a diverse range of modern biochemical and molecular techniques designed to train you in the skills needed for a career in biochemistry. The programme will also develop skills in experimental design through enquiry-based learning and will ensure you develop both independent and team-based skills.

**Case-based learning (CBL) tutorials.** Students are expected to play a full part and, often, to lead these discussions. In particular, case-based learning (CBL) is a student-centred style, based on case studies that

help you contextualise content taught across others modules, and is incorporated into two core modules. These sessions will also develop skills such as leadership, communication and evidence-based problem solving.

**Live, online tutorials, workshops and drop-in sessions** . Often used to host plenary sessions. These plenary sessions are optional, added value and may cover topics common to all students such as: note taking and meet your alumni at Level 4; IT and data analysis at Level 5 and writing retreats and careers at Level 6.

**Independent study.** Based on directed reading from text books, research papers and research reviews to support your learning of the core material and deepen your understanding of the subject.

**Life Sciences Double Experimental Project** (with research skills assessment) gives you the opportunity to undertake a piece of independent experimental research supervised and supported by a member of staff.

**MSci study at level 7.** This will further develop your research skills in the critical evaluation of scientific literature and an extended research project will give you the opportunity to design and conduct an in-depth research project in an area of Biochemistry, including formulating a complete research strategy and producing a grant proposal. Research skills in these areas will also be developed in a series of research seminars and journal club-style presentations/discussion in an Advanced Research Techniques module.

Apart from these formal activities, students are also provided with regular opportunities to talk through particular areas of difficulty, and any special learning needs they may have, with their Academic Mentors or by contacting module lecturers on a one-to-one basis.

## 7. Teaching Staff

University life is not just about the content of your degree. It is also an opportunity to network, to speak to people working in fields that excite you. Here in Life Sciences, you will meet a diverse range of staff that you can see by using the following link: (<https://www.keele.ac.uk/lifesci/people/>).

We also invite speakers from the School of Pharmacy, School of Medicine and the University Hospitals of North Midlands to enrich your learning.

Our staff include world-leading researchers, clinical practitioners and experts in learning and teaching. As part of their training, all staff complete post-graduate courses on learning and teaching. Some take this to Masters level and beyond, choosing to specialise in pedagogic research to ensure that our programmes are taught to the very highest standards. Members of the School of Life Sciences hold recognised or accredited teaching qualifications and the majority are Fellows or Associates of the Higher Education Academy (HEA), whilst a number are Senior Fellows of the HEA. Several Life Sciences' staff members have been awarded Keele's prestigious Excellence in Teaching and Learning awards and several were awarded a KeeleSU Education Award for Academic Mentoring.

The University will attempt to minimise changes to our core teaching teams, however, delivery of the programme depends on having a sufficient number of staff with the relevant expertise to ensure that the programme is taught to the appropriate academic standard. Staff turnover, for example where key members of staff leave, fall ill or go on research leave, may result in changes to the programme's content. The University will endeavour to ensure that any impact on students is limited if such changes occur

## 8. What is the structure of the programme?

The academic year is divided into two taught semesters. Each semester will generally have twelve weeks of teaching followed by three weeks of final assessments. Details of each semester can be found using the following link: <https://www.keele.ac.uk/students/academiclife/keydates/>. Our programme is organised into discrete modules. Each module is assessed independently and awarded a set number of credits (usually 15 or 30). A 15-credit module equates to 150 hours of student work. Some modules are compulsory and you are required to complete them. Others are optional, giving you some choice in what you want to study.

At Level 4 and 5 students take 105 credits of compulsory modules. The remaining 15 credits may either be used to take a Global Challenge Pathway, a language module or the optional modules listed below. Information about Global Challenge Pathways can be found after the module lists for Level 5.

At level 6, a range of optional modules are offered, allowing you to specialise in those areas of the programme that interest you the most. The research focus of the MSci level 7 year means this is largely independent study in nature, where you will work closely with your academic supervisor in semester 1 in the formulation of the research strategy, literature review and grant proposal, and in semester 2 you will work full-time on completing the research project, develop higher-level research skills.

For further information on the content of modules currently offered, please visit: <https://www.keele.ac.uk/recordsandexams/modulecatalogue/>

A summary of the credit requirements per year is as follows.

Year	Compulsory	Optional		Electives	
		Min	Max	Min	Max
Level 4	105	0	15	0	15
Level 5	105	0	15	0	15
Level 6	45	75	75	0	0
Level 7	120	0	0	0	0

## Module Lists

### Level 4

Compulsory modules	Module Code	Credits	Period
Chemistry for Bioscience	LSC-10056	15	Semester 1
Biochemistry	LSC-10064	30	Semester 1
Professional Skills for Biochemists	LSC-10068	30	Semester 1-2
Core Practical Skills	LSC-10087	0	Semester 1-2
Molecular Cell Biology	LSC-10066	30	Semester 2

Optional modules	Module Code	Credits	Period
Science & Society	NAT-10001	15	Semester 1-2

### Level 4 Module Rules

LSC-10087 is a compulsory, zero-credit module. All lab-work across this Level of study will be coordinated through this module and assessed within other credit-bearing modules across the year where appropriate. This module also provides helpful academic support and development material that provide added value to enhance your overall student experience.

*NB: Global Challenge Pathways (GCPs)* - students at Level 4 and Level 5 in 2023/24 have the option of taking a Global Challenge Pathway, which includes one 15-credit module in each year of the degree. Information on GCPs is shown under the Level 5 modules below.

### Language modules

Students on this programme will also be able to study language modules offered by the Language Centre, as part of a Global Challenge Pathway. You can enrol on either a Modern Language module [more information available at this [link](#)] (Semester 1 only) or Teaching English to Speakers of Other Languages (TESOL) (Semesters 1 and 2) module (ENL-10053).

If you choose a Modern Language, you will automatically be enrolled on a Semester 2 Modern Language module as a continuation of your language of choice. Undertaking a Modern Languages module in Semester 2 is compulsory if you wish to continue to the language GCP the following academic year.

### Level 5

<b>Compulsory modules</b>	<b>Module Code</b>	<b>Credits</b>	<b>Period</b>
Gene and Protein Engineering	LSC-20003	15	Semester 1
Molecular, Cellular and Structural Immunology	LSC-20015	15	Semester 1
Microbes, Viruses and Parasites	LSC-20073	15	Semester 1
Practical Skills in Bioscience	LSC-20107	0	Semester 1-2
Metabolism in Health and Disease	LSC-20016	15	Semester 2
Research and Analytical Skills	LSC-20056	15	Semester 2
Cell Signalling	LSC-20085	15	Semester 2
Drug design	LSC-20087	15	Semester 2

<b>Optional modules</b>	<b>Module Code</b>	<b>Credits</b>	<b>Period</b>
Human Genetics	LSC-20050	15	Semester 1

## Level 5 Module Rules

LSC-20107 is a compulsory, zero-credit module. All lab-work across this Level of study will be coordinated through this module and assessed within other credit-bearing modules across the year where appropriate. This module also provides helpful academic support and development material that provide added value to enhance your overall student experience.

## Global Challenge Pathways (GCPs)

Students at Level 4 and Level 5 in 2023/24 have the option of taking a Global Challenge Pathway, which includes one 15-credit module in each year of the degree. Students at Level 5 will continue the Global Challenge Pathway they started at Level 4.

Global Challenge Pathways offer students the chance to fulfil an exciting, engaging route of interdisciplinary study. Choosing a pathway, students will be presented with a global issue or 'challenge' which directly relates to societal issues, needs and debates. They will be invited to take part in academic and external facing projects which address these issues, within an interdisciplinary community of students and staff. Students completing a Global Challenge Pathway will receive recognition on their degree certificate.

<b>Digital Futures</b>	<p>The Digital Futures pathway offers you the opportunity to become an active contributor to current debates, cutting-edge research, and projects with external partners, addressing both the exciting potential and the challenges of disruptive digital transformation across all spheres of life.</p> <p>Part of a diverse and interdisciplinary pathway community, you will engage in exciting, impactful collaborative project work in innovative formats. Engaged in real-world scenarios, you will use digital technology and creativity to promote inclusive, empowering, and sustainable change at local and global levels.</p> <p><b>Level 4 Module: A digital life: challenges and opportunities (GCP-10005)</b></p> <p><b>Level 5 Module: Digital World - People, Spaces, and Data (GCP-20005)</b></p>
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<b>Climate Change &amp; Sustainability</b>	<p>Through the Climate Change &amp; Sustainability pathway you will develop the skills, understanding and drive to become agents of change to tackle climate change and wider sustainability challenges.</p> <p>You will work with international partners to explore climate change and sustainability in different international contexts; lead your own projects to drive real change in your communities; and be part of educating others to help achieve a more sustainable future.</p> <p><b>Level 4 Module: Climate Change and Sustainable Futures: Global Perspectives (GCP-10009)</b></p> <p><b>Level 5 Module: Climate Change and Sustainability: Action and Activism (GCP-20009)</b></p>
<b>Social Justice</b>	<p>Students on this pathway will embark on a reflective journey drawing upon decolonising, feminist, and ethical perspectives on social justice, forging transformative outputs as agents of change.</p> <p>You will enter a dialogue with local, national, and international partners from Universities, NGOs, International Human Rights Committees. You will engage with key societal challenges, for example Covid 19 as a social crisis with impact on gender and racial identities. The pathway will allow you to monitor and critically evaluate policies and human rights treaties, and produce and disseminate digitally fluent, international and sustainable project findings.</p> <p><b>Level 4 Module: Reflections on Social Injustices, Past and Present (GCP-10003)</b></p> <p><b>Level 5 Module: Strategic Interventions for Social Justice (GCP-20003)</b></p>
<b>Enterprise &amp; the Future of Work</b>	<p>If we are to achieve the promise of Sustainable Development Goals, solve the climate crisis and take advantage of the changes that the digital revolution provide, we need to understand the power of enterprise and prepare for future contexts of work, creativity and disruption.</p> <p>Supporting you to be part of future-facing solutions, this pathway will give you the ability to make judgements on the utilisation of resources, labour and capital. It will support you in developing creative, original thinking, allowing you to collaborate on projects that persuade and effect change, setting you up to thrive in future environments of work and innovation.</p> <p><b>Level 4 Module: Enterprise and the Future of Work (GCP-10007)</b></p> <p><b>Level 5 Module: Enterprise and the Future of Work: Collaborate to Innovate (GCP-20007)</b></p>
<b>Global Health Challenges</b>	<p>By taking the global health challenge pathway you will develop solutions to improve the health and quality of life for particular people and communities, engaging with these groups to co-design interventions.</p> <p>This pathway will provide you with skills that go beyond a focus on health and will allow you to develop your ability to work in a team and lead change in society. The knowledge, skills and work experience will complement your core degree and enhance your career opportunities and graduate aspirations.</p> <p><b>Level 4 Module: Key concepts and challenges in global health (GCP-10001)</b></p> <p><b>Level 5 Module: Using Evidence to Improve Global Health (GCP-20001)</b></p>



**Languages & Intercultural Awareness**

An understanding of language and culture opens the doorway to understanding what happens, why it happens and how you can make a difference. Why learn Russian now? How will an understanding of intercultural values impact on global development? How can you use English to work your way around the world? Importantly - how do language and culture impact on the UN Sustainability Goals?

The Languages and Intercultural Awareness pathway offers you four distinct strands.

The Language Specialist: Become a specialist in one of our languages and graduate with a degree title that includes '... with competency in (Language)'.  
The Language Taster: Explore a new language every year

The Certificate in TESOL (Teaching English to Speakers of Other Languages): Train to teach English as a Foreign Language, gain a globally recognised teaching qualification and work with asylum seekers and refugees.

The Intercultural Explorer: Explore cultural practices around the world and discover how the power of language and culture can be forces for breaking down barriers and achieving intercultural understanding, but how they can also be used to create political and social barricades.

**Modules available:**

**The Language Specialist:**

Any Semester 1 Language Module (the level at which you enter will be determined by your previous language learning experiences).

**The Language Taster:**

Any Semester 1 Language Module (the level at which you enter will be determined by your previous language learning experiences)

**The Certificate in TESOL:**

ENL-10053 TESOL 1

ENL-20007 TESOL 2

**The Intercultural Explorer:**

ENL-10057 The stories we live by

ENL-20009 Who do you think you are?

Information on Global Challenge Pathways can be found here:

<https://www.keele.ac.uk/study/undergraduate/globalchallengepathways/>

**Language modules**

You can enrol on the continuing Modern Language module [more information available at this [link](#)] (Semester 1 only) or the continuing TESOL (Semesters 1 and 2) module (ENL-20007).

If you choose a Modern Language, you will automatically be enrolled on a Semester 2 Modern Language module as a continuation of your GCP Modern Language of choice. Undertaking a Modern Languages module in Semester 2 is compulsory if you wish to continue to the language GCP the following academic year.

**Level 6**

<b>Compulsory modules</b>	<b>Module Code</b>	<b>Credits</b>	<b>Period</b>
Case Studies in Biotechnology	LSC-30051	15	Semester 1
Bioinformatics and Science Communication	LSC-30057	15	Semester 1-2
Medical Glycobiology (Level 6)	LSC-30065	15	Semester 2

<b>Optional modules</b>	<b>Module Code</b>	<b>Credits</b>	<b>Period</b>
Structural Biology & Macromolecular Function	LSC-30016	15	Semester 1
Advances in Medicine	LSC-30028	15	Semester 1
Human Parasitology	LSC-30036	15	Semester 1
Tropical Biology Field Course	LSC-30066	15	Semester 1
Biology of Disease - ISP	LSC-30015	15	Semester 1-2
Double Applied Life Sciences Placement - ISP	LSC-30038	30	Semester 1-2
Life Sciences Double Experimental Project (with research skills assessment)	LSC-30045	30	Semester 1-2
Cancer Biology	LSC-30061	15	Semester 2

## **Level 6 Module Rules**

Optional module selection (Level 6): students must take 30 credits of ISP (Independent Study Project) - either LSC-30038 (if taking the placement year) or LSC-30045. The remaining 45 credits of options should then be selected from the other optional modules available.

## ***Level 7***

<b>Compulsory modules</b>	<b>Module Code</b>	<b>Credits</b>	<b>Period</b>
Advanced Research Topics in Biochemistry	LSC-40061	30	Semester 1
Literature Review and Grant Proposal	LSC-40065	30	Semester 1
MSci Extended Research Project	LSC-40063	60	Semester 1-2

## **Learning Outcomes**

The table below sets out what students learn in the programme and the modules in which that learning takes place. Details of how learning outcomes are assessed through these modules can be found in module specifications.

## ***Level 4***

<b>Subject Knowledge and Understanding</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
the chemistry that underlies biological process and their study, including chemical and thermodynamic principles applied to biochemical catalysis and the role of enzymes and other proteins in determining the function and fate of cells and organisms.	Chemistry for Bioscience - LSC-10056 Biochemistry - LSC-10064 Molecular Cell Biology - LSC-10066 Relevant examples will be expanded in CBL session associated with LSC-10068
the essential features of cell metabolism and its control, developing from a broad understanding of core processes related to cellular respiration and photosynthesis to the application of this in context to acquired and inherited disease	Biochemistry - LSC-10064 Relevant examples will be expanded in CBL session associated with LSC-10068
the principles that determine the three-dimensional structure of biological macromolecules (including nucleic acids, proteins and carbohydrates) and be able to explain detailed examples of how structure enables function, including the application of this knowledge in context to drug design	Biochemistry - LSC-10064 Molecular Cell Biology - LSC-10066 Chemistry for Bioscience - LSC-10056 Relevant examples will be expanded in CBL session associated with LSC-10068
the molecular basis of genetics and gene expression, including the structure, arrangement, expression, and regulation of genes, and relevant experimental methods for their study and/or manipulation	Molecular Cell Biology - LSC-10066 Relevant examples will be expanded in CBL session associated with LSC-10068
the structure, function and organisation of a wide range of cell types (both prokaryotic and eukaryotic), including subcellular organelles and transport processes	Molecular Cell Biology - LSC-10066 Relevant examples will be expanded in CBL session associated with LSC-10068
the signal transduction mechanisms of extra- and intra-cellular receptors in cell signalling pathways controlling cellular activities and how these can be investigated experimentally	Molecular Cell Biology - LSC-10066 Relevant examples will be expanded in CBL session associated with LSC-10068
experimental methods for the investigation of relevant areas of biochemistry and molecular biology, including the scientific method, hypothesis-driven investigation and the critical nature of evidence and scientific debate	All modules, but especially LSC-10087 (Core Practical Skills) and LSC-10068 (Professional Skills for Biochemists)
current developments in biochemistry and molecular biology, including areas of ethical or public concern	All modules

<b>Subject Specific Skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
evaluate scientific literature with a full and critical understanding, while addressing such questions as content, context, aims, objectives, quality of information, and its interpretation and application	All modules
attain competence in a range of laboratory techniques and employ a variety of methods (including computational studies related to bioinformatics and the use of small molecule and macromolecular databases) in investigating, acquiring, recording and analysing information relevant to biochemistry and molecular biology	Most modules but particularly the practical component in LSC-10087
design, conduct, analyse, report and evaluate biochemical experiments, acknowledging an awareness of the validity, accuracy, calibration, precision and reproducibility of results	Core Practical Skills - LSC-10087 Molecular Cell Biology - LSC-10066 Professional Skills for Biochemists - LSC-10068 Biochemistry - LSC-10064 Most modules but particularly the practical component in LSC-10087
work safely and responsibly in the laboratory with awareness of standard procedures such as risk assessment, COSHH, relevant health and safety regulations	Professional Skills for Biochemists - LSC-10068 Core Practical Skills - LSC-10087
recognise philosophical and ethical issues relevant to the subject, including those relating to animal welfare and procedures for obtaining informed consent	Core Practical Skills - LSC-10087 Professional Skills for Biochemists - LSC-10068
apply scientific method, planning and analytical skills to carry out a research project	Core Practical Skills - LSC-10087 Professional Skills for Biochemists - LSC-10068
apply biochemical understanding to familiar and unfamiliar problems	All modules but particularly CBL session in LSC10068

<b>Intellectual skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
assess the merits of contrasting theories, paradigms, concepts or principles and develop reasoned arguments	All modules
identify, analyse and solve problems by a variety of methods, either individually and/or cooperatively	All modules, particularly LSC-10087 and LSC-10068
make critical interpretations, evaluations and judgements of data	All modules, particularly the practical component of LSC-10087
construct grammatically correct documents in an appropriate academic style using and referencing relevant ideas and evidence	All modules
obtain, analyse and summarise several lines of subject-specific evidence to formulate and test hypotheses, with critical interpretation of quantitative and qualitative research findings	Biochemistry - LSC-10064 Professional Skills for Biochemists - LSC-10068 Core Practical Skills - LSC-10087
take responsibility for their own learning and reflect upon that learning	All modules
understand the importance of academic and research integrity	All modules, Personal Development Planning with personal tutor, engaging with feedback

<b>Key or Transferable Skills (graduate attributes)</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
develop an adaptable, flexible, sustainable and effective approach to learning and study, including time management, creativity and intellectual integrity	All modules
acquire, analyse, synthesise, summarise and present information and ideas from a wide range of sources: textual, numerical, verbal, graphical	All modules
prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques, statistical programmes, spreadsheets and programs for presenting data visually	All modules with a practical component/data analysis based on content developed in LSC-10087
use the internet and other electronic sources effectively and critically as a means of communication and a source of information	All modules
cite and reference work in an appropriate manner, ensuring academic integrity and the avoidance of plagiarism whether intentional or not	All modules
communicate effectively to a variety of audiences by written, spoken and graphical means using appropriate techniques and scientific language	All modules
develop skills necessary for self-managed and lifelong learning, including working independently, organisational, enterprise and knowledge transfer skills	All modules
work with others to identify and achieve collaborative goals and responsibilities and perform in a respectful manner that is accepting of the viewpoints and opinions of others	All modules, particularly LSC-10068 and LSC-10087
motivate themselves and sustain that motivation over an extended period of time	All modules
identify and work towards targets for personal, academic and career development	All modules

## **Level 5**

<b>Subject Knowledge and Understanding</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
the chemistry that underlies biological process and their study, including chemical and thermodynamic principles applied to biochemical catalysis and the role of enzymes and other proteins in determining the function and fate of cells and organisms.	Cell Signalling - LSC-20085 Metabolism in Health and Disease - LSC-20016 Drug design - LSC-20087
the essential features of cell metabolism and its control, developing from a broad understanding of core processes related to cellular respiration and photosynthesis to the application of this in context to acquired and inherited disease	Metabolism in Health and Disease - LSC-20016
the principles that determine the three-dimensional structure of biological macromolecules (including nucleic acids, proteins and carbohydrates) and be able to explain detailed examples of how structure enables function, including the application of this knowledge in context to drug design	Gene and Protein Engineering - LSC-20003 Drug design - LSC-20087 Molecular, Cellular and Structural Immunology - LSC-20015
the molecular basis of genetics and gene expression, including the structure, arrangement, expression, and regulation of genes, and relevant experimental methods for their study and/or manipulation	Human Genetics - LSC-20050 Gene and Protein Engineering - LSC-20003
the structure, function and organisation of a wide range of cell types (both prokaryotic and eukaryotic), including subcellular organelles and transport processes	Metabolism in Health and Disease - LSC-20016 Molecular, Cellular and Structural Immunology - LSC-20015 Microbes, Viruses and Parasites - LSC-20073
the signal transduction mechanisms of extra- and intra-cellular receptors in cell signalling pathways controlling cellular activities and how these can be investigated experimentally	Microbes, Viruses and Parasites - LSC-20073 Molecular, Cellular and Structural Immunology - LSC-20015 Metabolism in Health and Disease - LSC-20016 Drug design - LSC-20087 Cell Signalling - LSC-20085
the innate and adaptive immune system, including the main cell types involved, the structural basis for pathogen recognition and key effector functions related to host defence and experimental methods for their study or manipulation	Microbes, Viruses and Parasites - LSC-20073 Molecular, Cellular and Structural Immunology - LSC-20015
experimental methods for the investigation of relevant areas of biochemistry and molecular biology, including the scientific method, hypothesisdriven investigation and the critical nature of evidence and scientific debate	All modules, especially the practical components of LSC-20107
current developments in biochemistry and molecular biology, including areas of ethical or public concern	All modules

<b>Subject Specific Skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
evaluate scientific literature with a full and critical understanding, while addressing such questions as content, context, aims, objectives, quality of information, and its interpretation and application	All modules
attain competence in a range of laboratory techniques and employ a variety of methods (including computational studies related to bioinformatics and the use of small molecule and macromolecular databases) in investigating, acquiring, recording and analysing information relevant to biochemistry and molecular biology	Practical Skills in Bioscience - LSC-20107 All modules with a practical component, particularly LSC-20107 but also LSC-20015, LSC-20087 and LSC20056
design, conduct, analyse, report and evaluate biochemical experiments, acknowledging an awareness of the validity, accuracy, calibration, precision and reproducibility of results	All modules with a practical/analysis component, in particular LSC-20107, LSC-20056 and LSC-20016
work safely and responsibly in the laboratory with awareness of standard procedures such as risk assessment, COSHH, relevant health and safety regulations	Practical Skills in Bioscience - LSC-20107
recognise philosophical and ethical issues relevant to the subject, including those relating to animal welfare and procedures for obtaining informed consent	All modules
apply scientific method, planning an analytical skills to carry out a research project	All modules with a practical component, particularly LSC-20016 and LSC-20056, developing content in LSC-20107
apply biochemical understanding to familiar and unfamiliar problems	All modules



<b>Intellectual skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
assess the merits of contrasting theories, paradigms, concepts or principles and develop reasoned arguments	All modules
identify, analyse and solve problems by a variety of methods, either individually and/or cooperatively	All modules
make critical interpretations, evaluations and judgements of data	All modules
obtain, analyse and summarise several lines of subject-specific evidence to formulate and test hypotheses, with critical interpretation of quantitative and qualitative research findings	All modules and in particular, LSC-20107, LSC-20056 and LSC-20016
take responsibility for their own learning and reflect upon that learning	All modules
construct grammatically correct documents in an appropriate academic style using and referencing relevant ideas and evidence	All modules
understand the importance of academic and research integrity	All modules

<b>Key or Transferable Skills (graduate attributes)</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
develop an adaptable, flexible, sustainable and effective approach to learning and study, including time management, creativity and intellectual integrity	All modules
acquire, analyse, synthesise, summarise and present information and ideas from a wide range of sources: textual, numerical, verbal, graphical	All modules
prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques, statistical programmes, spreadsheets and programs for presenting data visually	All modules, especially LSC-20015, LSC-20016, LSC20056 and LSC-20087
use the internet and other electronic sources effectively and critically as a means of communication and a source of information	All modules
cite and reference work in an appropriate manner, ensuring academic integrity and the avoidance of plagiarism whether intentional or not	All modules
communicate effectively to a variety of audiences by written, spoken and graphical means using appropriate techniques and scientific language	Most modules, with varied assessment types (reports, essay, group activities etc.)
develop skills necessary for self-managed and lifelong learning, including working independently, organisational, enterprise and knowledge transfer skills	All modules
work with others to identify and achieve collaborative goals and responsibilities and perform in a respectful manner that is accepting of the viewpoints and opinions of others	All modules, particularly LSC-20107
motivate themselves and sustain that motivation over an extended period of time	All modules
identify and work towards targets for personal, academic and career development	All modules

## **Level 6**

<b>Subject Knowledge and Understanding</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
the chemistry that underlies biological process and their study, including chemical and thermodynamic principles applied to biochemical catalysis and the role of enzymes and other proteins in determining the function and fate of cells and organisms.	Advances in Medicine - LSC-30028 Medical Glycobiology (Level 6) - LSC-30065 Case Studies in Biotechnology - LSC-30051 Structural Biology & Macromolecular Function - LSC-30016 Biology of Disease (some topics)
the essential features of cell metabolism and its control, developing from a broad understanding of core processes related to cellular respiration and photosynthesis to the application of this in context to acquired and inherited disease	Cancer Biology - LSC-30061 Advances in Medicine - LSC-30028 Biology of Disease (some topics)
the principles that determine the three-dimensional structure of biological macromolecules (including nucleic acids, proteins and carbohydrates) and be able to explain detailed examples of how structure enables function, including the application of this knowledge in context to drug design	Bioinformatics and Science Communication - LSC-30057 Medical Glycobiology (Level 6) - LSC-30065 Structural Biology & Macromolecular Function - LSC-30016
the molecular basis of genetics and gene expression, including the structure, arrangement, expression, and regulation of genes, and relevant experimental methods for their study and/or manipulation	Case Studies in Biotechnology - LSC-30051 Bioinformatics and Science Communication - LSC-30057 Cancer Biology - LSC-30061 Advances in Medicine - LSC-30028 Biology of Disease (some topics)
the structure, function and organisation of a wide range of cell types (both prokaryotic and eukaryotic), including subcellular organelles and transport processes	Cancer Biology - LSC-30061 Medical Glycobiology (Level 6) - LSC-30065 Human Parasitology - LSC-30036 Advances in Medicine - LSC-30028 Biology of Disease (some topics)
the signal transduction mechanisms of extra- and intra-cellular receptors in cell signalling pathways controlling cellular activities and how these can be investigated experimentally	Advances in Medicine - LSC-30028 Human Parasitology - LSC-30036 Cancer Biology - LSC-30061 Structural Biology & Macromolecular Function - LSC-30016 Biology of Disease (some topics)
the innate and adaptive immune system, including the main cell types involved, the structural basis for pathogen recognition and key effector functions related to host defence and experimental methods for their study or manipulation	Structural Biology & Macromolecular Function - LSC-30016 Human Parasitology - LSC-30036 Cancer Biology - LSC-30061 Biology of Disease (some topics)
experimental methods for the investigation of relevant areas of biochemistry and molecular biology, including the scientific method, hypothesisdriven investigation and the critical nature of evidence and scientific debate	Tropical Biology Field Course - LSC-30066 Bioinformatics and Science Communication - LSC-30057 Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045 Double Applied Life Sciences Placement - ISP - LSC-30038
current developments in biochemistry and molecular biology, including areas of ethical or public concern	All modules, particularly LSC-30051

<b>Subject Specific Skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
evaluate scientific literature with a full and critical understanding, while addressing such questions as content, context, aims, objectives, quality of information, and its interpretation and application	All modules, especially LSC-30057, LSC-30045, LSC30038, LSC-30015
attain competence in a range of laboratory techniques and employ a variety of methods (including computational studies related to bioinformatics and the use of small molecule and macromolecular databases) in investigating, acquiring, recording and analysing information relevant to biochemistry and molecular biology	Bioinformatics and Science Communication - LSC-30057 Double Applied Life Sciences Placement - ISP - LSC-30038 Tropical Biology Field Course - LSC-30066 Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045
design, conduct, analyse, report and evaluate biochemical experiments, acknowledging an awareness of the validity, accuracy, calibration, precision and reproducibility of results	Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045 Double Applied Life Sciences Placement - ISP - LSC-30038
work safely and responsibly in the laboratory with awareness of standard procedures such as risk assessment, COSHH, relevant health and safety regulations	Double Applied Life Sciences Placement - ISP - LSC-30038 Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045
recognise philosophical and ethical issues relevant to the subject, including those relating to animal welfare and procedures for obtaining informed consent	Double Applied Life Sciences Placement - ISP - LSC-30038 Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045 Case Studies in Biotechnology - LSC-30051
apply scientific method, planning an analytical skills to carry out a research project	Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045 Double Applied Life Sciences Placement - ISP - LSC-30038
apply biochemical understanding to familiar and unfamiliar problems	All modules

<b>Intellectual skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
assess the merits of contrasting theories, paradigms, concepts or principles and develop reasoned arguments	All modules
identify, analyse and solve problems by a variety of methods, either individually and/or cooperatively	All modules especially LSC-30045/LSC-30038
make critical interpretations, evaluations and judgements of data	All modules but particularly LSC-30015, LSC30045/30038, LSC-30057
obtain, analyse and summarise several lines of subject-specific evidence to formulate and test hypotheses, with critical interpretation of quantitative and qualitative research findings	Life Sciences Double Experimental Project (with research skills assessment) - LSC-30045 Double Applied Life Sciences Placement - ISP - LSC-30038
take responsibility for their own learning and reflect upon that learning	All modules
construct grammatically correct documents in an appropriate academic style using and referencing relevant ideas and evidence	All modules
understand the importance of academic and research integrity	Case Studies in Biotechnology - LSC-30051 Most modules, in particular LSC-30045/38

<b>Key or Transferable Skills (graduate attributes)</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
develop an adaptable, flexible, sustainable and effective approach to learning and study, including time management, creativity and intellectual integrity	All modules
acquire, analyse, synthesise, summarise and present information and ideas from a wide range of sources: textual, numerical, verbal, graphical	All modules
prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques, statistical programmes, spreadsheets and programs for presenting data visually	All modules
use the internet and other electronic sources effectively and critically as a means of communication and a source of information	All modules
cite and reference work in an appropriate manner, ensuring academic integrity and the avoidance of plagiarism whether intentional or not	All modules
communicate effectively to a variety of audiences by written, spoken and graphical means using appropriate techniques and scientific language	All modules
develop skills necessary for self-managed and lifelong learning, including working independently, organisational, enterprise and knowledge transfer skills	All modules
work with others to identify and achieve collaborative goals and responsibilities and perform in a respectful manner that is accepting of the viewpoints and opinions of others	Most modules will have some element of group work/discussion/debate in particular LSC-30051
motivate themselves and sustain that motivation over an extended period of time	All modules
identify and work towards targets for personal, academic and career development	All modules and via personal tutor system

## **Level 7**

These are in addition to the programme learning outcomes listed in the previous tables for levels 4-6, all of which are also developed, where appropriate, in modules across level 7 of the MSci programme.

<b>Subject Knowledge and Understanding</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
the principles and applications of cutting-edge research methodologies and techniques in the study of Biochemistry and wider Biosciences to an advanced level	Advanced Research Topics in Biochemistry - LSC-40061 Literature Review and Grant Proposal - LSC-40065 MSci Extended Research Project - LSC-40063
explain and justify the context of the extended research project in relation to on-going research activity in the field of study and the wider biosciences	Literature Review and Grant Proposal - LSC-40065 MSci Extended Research Project - LSC-40063

<b>Subject Specific Skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
develop an understanding of the processes involved in research dissemination and the acquisition of research funding	Literature Review and Grant Proposal - LSC-40065 Advanced Research Topics in Biochemistry - LSC-40061 MSci Extended Research Project - LSC-40063
critically evaluate current literature and complex methodologies to an advanced level in relevant areas of contemporary biochemistry	Literature Review and Grant Proposal - LSC-40065 Advanced Research Topics in Biochemistry - LSC-40061 MSci Extended Research Project - LSC-40063

<b>Intellectual skills</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
develop a greater awareness of research impact and the processes involved in research dissemination and the acquisition of research funding	Literature Review and Grant Proposal - LSC-40065 MSci Extended Research Project - LSC-40063

<b>Key or Transferable Skills (graduate attributes)</b>	
<b>Learning Outcome</b>	<b>Module in which this is delivered</b>
develop greater autonomy in the planning and implementation of tasks associated with their research project and taking responsibility for their workload	Literature Review and Grant Proposal - LSC-40065 MSci Extended Research Project - LSC-40063

## 9. Final and intermediate awards

Credits required for each level of academic award are as follows:

<b>Master's Degree</b>	480 credits	You will require at least 120 credits at levels 4, 5, 6 and 7 You must accumulate at least 360 credits in your main subject (out of 480 credits overall) to graduate with a named single honours degree in this subject.
<b>Honours Degree</b>	360 credits	You will require at least 120 credits at levels 4, 5 and 6 You must accumulate a minimum of 270 credits in your main subject (out of 360 credits overall), with at least 90 credits in each of the three years of study, to graduate with a named single honours degree in this subject.
<b>Diploma in Higher Education</b>	240 credits	You will require at least 120 credits at level 4 or higher and at least 120 credits at level 5 or higher
<b>Certificate in Higher Education</b>	120 credits	You will require at least 120 credits at level 4 or higher

**International Year option:** in addition to the above students must pass a module covering the international year in order to graduate with a named degree including the 'international year' wording. Students who do not complete, or fail the international year, will be transferred to the four-year version of the MSci programme.

**Work Placement Year option:** in addition to the above students must pass a non-credit bearing module covering the work placement year in order to graduate with a named degree including the 'with Work Placement Year' wording. Students who do not complete, or fail the work placement year, will be transferred to the four-year version of the MSci programme.

## 10. How is the Programme Assessed?

Our assessment strategy is designed to be authentic and diverse so that you can develop key skills that meet academic, professional body and employer expectations. Module managers will provide appropriate guidance for each assessment and the marking criteria that will be used to assess your work

Our assessment strategy will help you to develop and evidence your ability to:

**Provide evidence-based solutions to current scientific problems.** Most often this is assessed through a range of essays, portfolios and literature reviews.

**Present scientific findings.** Often these are lab reports or experimental projects that test your ability to pose scientific hypotheses, design experiments, understand methodologies, present findings, analyse data and situate your work in the current literature. Other assessments will also develop your skills in accessing, manipulating and presenting the outcomes of computational investigations, including in bioinformatics and the use of small molecule and macromolecular databases.

**Communicate effectively with a range of audiences.** These can include scientific posters, patient information leaflets, wikis, blogs or oral presentations, as well as more standard laboratory reports, proformas and literature reviews.

**Work professionally.** Your third year, independent research project will give you an opportunity to demonstrate a range of professional skills such as leadership, innovation, time keeping, communication and the ability to work safely and ethically. This will be enhanced in the design and conduct of an extended MSci research project in the final year, developing this skills to advanced level.

**Work effectively in a team.** Most often this is assessed through group presentations but can also include competencies such as working together in the lab or other group assignments, such as the optimisation and product of commercial laboratory assay kit for metabolite quantification.

**Solve problems in a time-limited fashion.** Often in the work environment we are asked to solve problems in a relatively short amount of time. Our online tests and end-of-semester, online, open-book examinations will help you to evidence these skills.



Marks are awarded for summative assessments designed to assess your achievement of learning outcomes. You will also be assessed formatively to enable you to monitor your own progress and to assist staff in identifying and addressing any specific learning needs. Feedback, including guidance on how you can improve the quality of your work, is also provided on all summative assessments, which we aim to provide within three working weeks of submission. This is often phrased in terms of strengths, weaknesses and ways to improve to help you focus on key areas that can improve the quality of your work in the future.

## 11. Contact Time and Expected Workload

This contact time measure is intended to provide you with an indication of the type of activity you are likely to undertake during this programme. The data is compiled based on module choices and learning patterns of students on similar programmes in previous years. Every effort is made to ensure this data is a realistic representation of what you are likely to experience, but changes to programmes, teaching methods and assessment methods mean this data is representative and not specific.

Undergraduate courses at Keele contain an element of module choice; therefore, individual students will experience a different mix of contact time and assessment types dependent upon their own individual choice of modules. The figures below are an example of activities that a student may expect on your chosen course by year stage of study. Contact time includes scheduled activities such as: lecture, seminar, tutorial, project supervision, demonstration, practical classes and labs, supervised time in labs/workshop, fieldwork and external visits. The figures are based on 1,200 hours of student effort each year for full-time students.

### Activity

	<b>Scheduled learning and teaching activities</b>	<b>Guided independent Study</b>	<b>Placements</b>
<b>Year 1 (Level 4)</b>	9%	91%	0%
<b>Year 2 (Level 5)</b>	10%	90%	0%
<b>Year 3 (Level 6)</b>	10%	90%	0%
<b>Year 4 (Level 7)</b>	5%	95%	0%

## 12. Accreditation

This programme does not have accreditation from an external body.

## 13. University Regulations

The University Regulations form the framework for learning, teaching and assessment and other aspects of the student experience. Further information about the University Regulations can be found at: <http://www.keele.ac.uk/student-agreement/>

If this programme has any exemptions, variations or additions to the University Regulations these will be detailed in an Annex at the end of this document titled 'Programme-specific regulations'.

## 14. What are the typical admission requirements for the Programme?

See the relevant course page on the website for the admission requirements relevant to this programme: <https://www.keele.ac.uk/study/>

Applicants who are not currently undertaking any formal study or who have been out of formal education for more than 3 years and are not qualified to A-level or BTEC standard may be offered entry to the University's Foundation Year Programme.

Applicants for whom English is not a first language must provide evidence of a recognised qualification in English language. The minimum score for entry to the Programme is Academic IELTS 6.0 or equivalent.

### English for Academic Purposes

Please note: All new international students entering the university will sit a diagnostic language assessment.

Using this assessment, the Language Centre may allocate you to an English language module which will become compulsory. This will replace any GCP modules. *NB:* students can take an EAP module only with the approval of the English Language Programme Director and are not able to take any other Language modules in the same academic year.

English Language Modules at Level 4:

- Business - ENL-90003 Academic English for Business Students (Part 1); ENL-90004 Academic English for Business Students (2)
- Science - ENL-90013 Academic English for Science Students
- General - ENL-90006 English for Academic Purposes 2; ENL-90001 English for Academic Purposes 3; ENL-90002 English for Academic Purposes 4

Recognition of Prior Learning (RPL) is considered on a case-by-case basis and those interested should contact the Programme Director. The University's guidelines on this can be found here:

<http://www.keele.ac.uk/qa/accreditationofpriorlearning/>

## 15. How are students supported on the programme?

The School of Life Sciences operates an open door policy. This means that you can contact any of our staff via email to request a meeting or discuss any problem that you may be experiencing.

In addition to the open door policy, you can also contact the following people across Life Sciences for help and support:

- Programme Director or Director of Education for programme-, discipline- or School-related issues
- Module Manager for module-related issues
- Demonstrators for help during labs
- Academic mentors for academic help and guidance
- Student Experience and Support Officers for more personal or pastoral help
- Early Resolution Officer to help advocate for you, for example, if you would like to raise a complaint
- Student Voice are a group of students from your programme that can advocate for you to the School

Student Services also offer a comprehensive range of specialist services that help you at any time from enrolment to graduation. The following link will provide more information:

<https://www.keele.ac.uk/students/student-services/>

## 16. Learning Resources

Workshops and tutorials are delivered in modern teaching rooms across the University, including up-to-date PC suites for data analysis and bioinformatics workshops.

Practical sessions are held in dedicated teaching laboratories within the School of Life Sciences over recent years these have been completely refitted, providing modern and well-equipped facilities supporting delivery of a diverse practical programmes (including the David Attenborough laboratories, opened in person by Sir David in 2019). Final year MSci extended research projects will be held in one of our state-of-the-art research laboratories working with a lead academic supervisor.

The learning resources available to you on the Programme include:

- An extensive collection of books and journals held in the University Library on campus, or the health library situated at the University Hospital of North Staffordshire.
- Access to a comprehensive range of ebooks, journals and published papers all available online
- The Keele Learning Environment (KLE) which provides easy access to a wide range of learning resources including lecture materials and other guidance/supporting resources, and Microsoft Teams for further content development and to facilitate live and interactive discussions.

## 17. Other Learning Opportunities

We are committed to offering a rich and diverse student experience that goes far beyond your degree.

Most years, we are able to offer range of different opportunities to enrich your student experience. These can include:

**Study abroad.** You could apply to spend one semester at Level 5 studying in one of our international partner universities. This not only gives you valuable international experience, but can also allow you to study a complimentary subject - such as epidemiology or molecular biology - in greater detail, whilst 22 remaining complementary to the your programme of study at Keele. The marks that you achieve whilst studying abroad will count to your overall attainment across Level 5. *NB: Please note that students cannot take both a Global Challenge Pathway (GCP) and the Study abroad option.*

**International year.** Is similar to study abroad, but here you choose to take an additional year in between Levels 5 and 6 studying in one of our international partner universities. More information can be found at: <http://www.keele.ac.uk/studyabroad/partneruniversities/>

**Industrial placements.** You could apply to a range of national and international employers for an industrial placement. These take place in between Level 5 and 6 and usually last 6-9 months. They provide excellent work experience and an opportunity to collect data for your Level 6 independent research student project.

**Secondments.** These are shorter industrial placements that usually take place over the summer in between Level 5 and 6 and usually last between 2-8 weeks. They can be based locally in one of our research labs here at Keele, nationally or internationally. For example, often some of our students will travel to Malaysia to work with our partner Universiti Sains Malaysia.

**Tropical field trip.** You could apply for our School tropical field that takes place in Malaysia. These are often more conservational in nature, but again provide fantastic international experience and of course, will complement and broaden your programme of study in Biochemistry.

**Operation Wallacea.** This is a private company that supports a wide range of student projects with a particular focus on biodiversity and climate research. More information can be found at: <https://www.opwall.com> Note: the opportunities described above are limited and dependent on external providers. We may not be able to offer them every year and there will be additional costs if you do successfully secure a place. We discuss all of these options in more detail across Level 4 and Level 5 so you can make an informed decision

### Other opportunities

There are a number of schemes available from e.g. the Wellcome Trust that provide bursaries for students to gain laboratory experience in the summer vacation between level 5 and 6. Staff in Life Sciences have hosted these bursaries in the past and students who are interested can approach staff, who will have to submit an application on the students' behalf to the funding bodies (usually in January or February). Staff may also be willing to host students in their laboratories during the summer vacation on a voluntary basis.

Other learning opportunities for Biochemistry students vary from year to year but include the opportunity to hear from, and talk to, a range of guest speakers and presenters including researchers from around the world. Some of these activities are timetabled as part of taught modules, others are organised separately as part of a school-wide seminar programme, but are widely advertised and undergraduate students are always welcome to attend.

## 18. Additional Costs

Activity	Estimated cost
Field courses - compulsory	£N/A
Field courses - optional, e.g USM Malaysia	£1,200
Equipment	
Text books (mainly require in levels 4 and 5)	£250
Calculator and writing materials	
Travel (optional, e.g. for placement in UK or abroad)	£ Unable to estimate
Other additional costs	
Replacement lab coat if allocated one is lost	£12
<b>Total estimated additional costs</b>	<b>£262</b>

These costs have been forecast by the University as accurately as possible but may be subject to change as a result of factors outside of our control (for example, increase in costs for external services). Forecast costs are reviewed on an annual basis to ensure they remain representative. Where additional costs are in direct control of the University we will ensure increases do not exceed 5%.

As to be expected there will be additional costs for inter-library loans and potential overdue library fines,

print and graduation. We do not anticipate any further costs for this programme.

## 19. Quality management and enhancement

The quality and standards of learning in this programme are subject to a continuous process of monitoring, review and enhancement.

- The School Education Committee is responsible for reviewing and monitoring quality management and enhancement procedures and activities across the School.
- Individual modules and the programme as a whole are reviewed and enhanced every year in the annual programme review which takes place at the end of the academic year.
- The programmes are run in accordance with the University's Quality Assurance procedures and are subject to periodic reviews under the Revalidation process.

Student evaluation of, and feedback on, the quality of learning on every module takes place every year using a variety of different methods:

- The results of student evaluations of all modules are reported to module leaders and reviewed by the Programme Committee as part of annual programme review.
- Findings related to the programme from the annual Postgraduate Taught Experience Survey (PTES), and from regular surveys of the student experience conducted by the University, are subjected to careful analysis and a planned response at programme and School level.
- Feedback received from representatives of students on the programme is considered and acted on at regular meetings of the Student Staff Voice Committee.

The University appoints senior members of academic staff from other universities to act as external examiners on all programmes. They are responsible for:

- Approving examination questions
- Confirming all marks which contribute to a student's degree
- Reviewing and giving advice on the structure and content of the programme and assessment procedures

Information about current external examiner(s) can be found here:

<http://www.keele.ac.uk/qa/externalexaminers/currentexternalexaminers/>

## 20. The principles of programme design

The programme described in this document has been drawn up with reference to, and in accordance with the guidance set out in, the following documents:

a. UK Quality Code for Higher Education, Quality Assurance Agency for Higher Education:

<http://www.qaa.ac.uk/quality-code>

b. QAA Subject Benchmark Statement: Biosciences (2019) [https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-biosciences.pdf?sfvrsn=21f2c881\\_4](https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-biosciences.pdf?sfvrsn=21f2c881_4)

c. Keele University Regulations and Guidance for Students and Staff: <http://www.keele.ac.uk/regulations>

## 21. Annex - International Year

### MSci Biochemistry with International Year

<b>International Year Programme</b>
<p>At Level 5 you can apply to transfer onto our International Year pathway. If successful, you will have an additional year of study at one of our international partner Universities once you have completed Level 5 here at Keele.</p> <p>Students who successfully complete both the second year (Level 5) and the International Year will be permitted to progress to Level 6. Students who fail to satisfy the examiners in respect of the International Year will normally revert to the standard programme and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.</p> <p>Study at Level 4, Level 5, Level 6 and Level 7 will be as per the main body of this document. The additional detail contained in this annex will pertain solely to students registered for the International Year option (MSci Biochemistry with International Year).</p>
<b>International Year Programme Aims</b>

In addition to the programme aims for Biochemistry, we also aim to:

1. Enhance your personal development to give you an insight into the international dimension of Biochemistry
2. Give you an experience of a different culture, academically, professionally and socially

### **Entry Requirements for the International Year**

Students may apply to the 4-year programme during Level 5. Admission to the International Year is subject to successful application, interview and references from appropriate staff.

The criteria to be applied are:

- Academic Performance (an average of 55% across all modules in Semester 1 at Level 5 is normally required. Places on the International Year are then conditional on achieving an average mark of 55% across all Level 5 modules. Students with up to 15 credits of re-assessment who meet the 55% requirement may progress to the International Year. Where no Semester 1 marks have been awarded performance in 1st year marks and ongoing 2nd year assessments are taken into account)
- General Aptitude (to be demonstrated by application for study abroad, interview during the 2nd semester of year 2 (Level 5), and by recommendation of the student's Academic Mentor, 1st and 2nd year tutors and programme director)

Students may not register for both an International Year and a Placement Year.

### **Student Support**

We have a dedicated Study Abroad tutor within Life Sciences that will stay in touch with you throughout your International Year, effectively acting as an additional Academic Mentor. There is also support available for Keele's Global Opportunities Team (<https://www.keele.ac.uk/study/studyabroad/>)

### **Learning Outcomes**

In addition to the learning outcomes specified in the main text of the Biochemistry Programme Specification, students who complete a Keele undergraduate programme with International Year will be able to:

1. Describe, discuss and reflect upon the cultural and international differences and similarities of different learning environments
2. Discuss the benefits and challenges of global citizenship and internationalisation
3. Explain how their perspective on their academic discipline has been influenced by locating it within an international setting.
4. Use independent research skills to identify relevant information resources on a range of subjects related, or complementary, to Biochemistry.
5. Demonstrate the use of critical thinking skills, augmented by creativity and curiosity, in discussing the application of their International Year studies to Biochemistry.

These learning outcomes will all be assessed by the submission of a satisfactory individual learning agreement, the successful completion of assessments at the partner institution and the submission of the reflective portfolio element of the international year module.

### **Regulations**

Students registered for the International Year are subject to the programme-specific regulations (if any) and the University regulations. In addition, during the International Year, the following regulations will apply:

Students undertaking the International Year must complete 120 credits, which must comprise at least 40% in the student's discipline area.

This may impact on your choice of modules to study, for example you will have to choose certain modules to ensure you have the discipline specific credits required.

Students are barred from studying any module with significant overlap to the Level 6 modules they will study on their return. Significant overlap with Level 5 modules previously studied should also be avoided.

### **Additional costs for the International Year**

Tuition fees for students on the International Year will be charged at 15% of the annual tuition fees for that year of study, as set out in Section 1. The International Year can be included in your Student Finance allocation, to find out more about your personal eligibility see: [www.gov.uk](http://www.gov.uk)

Students will have to bear the costs of travelling to and from their destination university, accommodation, food and personal costs. Depending on the destination they are studying at additional costs may include visas, study permits, residence permits, and compulsory health checks. Students should expect the total costs of studying abroad be greater than if they study in the UK, information is made available from the Global Education Team throughout the process, as costs will vary depending on destination.

Students who meet external eligibility criteria may be eligible for grants as part of this programme. Students studying outside of this programme may be eligible income dependent bursaries at Keele.

Students travel on a comprehensive Keele University insurance plan, for which there are currently no additional charges. Some Governments and/or universities require additional compulsory health coverage plans; costs for this will be advised during the application process.

## **22. Annex - Work Placement Year**

### **MSci Biochemistry with Work Placement Year**

#### **Work Placement Year summary**

Students registered for this programme may apply to transfer during level 4 or 5 to the 'with Work Placement Year' option. Students accepted onto this programme will have an extra year of study (the Work Placement Year) with a relevant placement provider after they have completed Level 5 at Keele.

Students who successfully complete both the second year (Level 5) and the Work Placement Year will be permitted to progress to Level 6. Students who fail to satisfactorily complete the Work Placement Year will normally revert to the 4-year programme and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.

Study at Level 4, Level 5, Level 6 and Level 7 will be as per the main body of this document. The additional detail contained in this annex will pertain solely to students taking MSci Biochemistry the Work Placement Year.

#### **Work Placement Year Programme Aims**

In addition to the programme aims for Biochemistry, we also aim to:

- Provide experience of working in a subject-related laboratory or work place within an industrial, academic or public institution either in the UK or abroad.

#### **Entry Requirements for the Work Placement Year**

Admission to the Work Placement Year is subject to successful application, interview and references from appropriate staff. Students have the opportunity to apply directly for the 4-year 'with work placement year' degree programme, or to transfer onto the 4-year programme at the end of Year-1 and in Year-2 at the end of Semester 1. Students who are initially registered for the 4-year degree programme may transfer onto the 3-year degree programme at any point in time, prior to undertaking the year-long work placement. Students who fail to pass the work placement year, and those who fail to meet the minimum requirements of the work placement year module (minimum 30 weeks full time (1,050 hours), or equivalent, work placement), will be automatically transferred onto the 3- year degree programme.

The criteria to be applied are:

- A good University attendance record and be in 'good academic standing'.
- Passed all Year-1 and Year-2 Semester 1 modules with an overall module average of > 60%
- General Aptitude (to be demonstrated by application(s) to relevant placement providers with prior agreement from the Programme Lead, interview during the 2nd semester of year 2 (Level 5), and by recommendation of the student's Academic Mentor, 1st and 2nd year tutors and Programme Lead)
- Students undertaking work placements will be expected to complete a Health and Safety checklist prior to commencing their work experience and will be required to satisfy the Health and Safety regulations of the company or organisation at which they are based.
- (*International students only*) Due to visa requirements, it is not possible for international students who require a Tier 4 Visa to apply for direct entry onto the 4-year with Work Placement Year degree programme. Students wishing to transfer onto this programme should discuss this with student support, the academic tutor for the work placement year, and the Programme Lead. Students should be aware that there are visa implications for this transfer, and it is the student's responsibility to complete any and all necessary processes to be eligible for this programme. There may be additional costs, including applying for a new Visa from outside of the UK for international students associated with a transfer to the work placement programme.

Students may not register for both an International Year and a Work Placement Year.

### **Student Support**

We have a dedicated Industrial Placement tutor within Life Sciences that can act as a point of contact for you before, during or after your placement year. You will also be assigned a Placement Supervisor. This will be an academic member of the School who will maintain regular contact with you throughout your placement and will become your project supervisor at Level 6. The School Director of Education will also act as an important contact throughout the process, that you can contact them in strict confidence at any point during your placement if you have any concerns about your placement provider or overall experience

### **Learning Outcomes**

In addition to the learning outcomes specified in the main text of the Programme Specification, students who complete the 'with Work Placement Year' option will be able to:

- Demonstrate an ability to successfully work within their placement institution and to learn practical skills and develop their science base within the scope of their work project.

These learning outcomes will be assessed through the non-credit bearing Work Placement Year module LSC-30038.

### **Regulations**

Students registered for the 'with Work Placement Year' option are subject to programme-specific regulations (if any) and the University regulations. In addition, during the Work Placement Year, the following regulations will apply:

- Students undertaking the Work Placement Year must successfully complete the 30-credit 'Work Placement Year' module LSC-30038.
- In order to ensure a high quality placement experience, each placement agency will sign up to a placement contract (analogous to a service level agreement).
- Once a student has been accepted by a placement organisation, the student will make a pre-placement visit and a member of staff identified within the placement contract will be assigned as the placement supervisor. The placement supervisor will be responsible for ensuring that the placement experience meets the agreed contract agreed with the University.
- The placement student will also sign up an agreement outlining his/her responsibilities in relation to the requirements of each organisation.

Students will be expected to behave professionally in terms of:

(i) conforming to the work practices of the organisation; and

(ii) remembering that they are representatives of the University and their actions will reflect on the School and have an impact on that organisation's willingness (or otherwise) to remain engaged with the placement.

### **Additional costs for the Work Placement Year**

Tuition fees for students on the Work Placement Year will be charged at 20% of the annual tuition fees for that year of study, as set out in Section 1. The Work Placement Year can be included in your Student Finance allocation; to find out more about your personal eligibility see: [www.gov.uk](http://www.gov.uk)

Students will have to bear the costs of travelling to and from their placement provider, accommodation, food and personal costs. Depending on the placement provider additional costs may include parking permits, travel and transport, suitable clothing, DBS checks, and compulsory health checks.

A small stipend may be available to students from the placement provider during the placement but this will need to be explored on a placement-by-placement basis as some organisations, such as charities, may not have any extra money available. Students should budget with the assumption that their placement will be unpaid.

Eligibility for student finance will depend on the type of placement and whether it is paid or not. If it is paid, this is likely to affect student finance eligibility, however if it is voluntary and therefore unpaid, should not affect student finance eligibility. Students are required to confirm eligibility with their student finance provider.

International students who require a Tier 4 visa should check with the Immigration Compliance team prior to commencing any type of paid placement to ensure that they are not contravening their visa requirements.

## **23. Annex - Programme-specific regulations**

### **Programme Regulations: MSci Biochemistry**



<b>Final Award and Award Titles</b>	MSci Biochemistry MSci Biochemistry with International Year MSci Biochemistry with Work Placement Year
<b>Intermediate Award(s)</b>	BSc (Hons) Biochemistry Diploma in Higher Education in Biochemistry Certificate in Higher Education in Biochemistry
<b>Last modified</b>	November 2022
<b>Programme Specification</b>	<a href="https://www.keele.ac.uk/qa/programmespecifications">https://www.keele.ac.uk/qa/programmespecifications</a>

The University's Academic Regulations which can be found on the Keele University website (<https://www.keele.ac.uk/regulations/>)[1] apply to and regulate the programme, other than in instances where the specific programme regulations listed below over-ride them. These programme regulations list:

- *Exemptions* which are characterised by the omission of the relevant regulation.
- *Variations* which are characterised by the replacement of part of the regulation with alternative wording.
- *Additional Requirements* which set out what additional rules that apply to students in relation to this programme.

The following **exemptions, variations** and **additional requirements** to the University regulations have been checked by Academic Services and have been approved by the Faculty Education Committee.

## A) EXEMPTIONS

The clause(s) listed below describe where an exemption from the University's Academic Regulations exists:

For the whole duration of their studies, students on this Programme are exempt from the following regulations:

- **No exemptions apply.**

## B) VARIATIONS

The clause(s) listed below describe where a variation from the University's Academic Regulations exists:

**No variations apply**

## Additional Requirements

The programme requirements listed below are in addition to the University's Academic Regulations:

### Additional requirement 1: Laboratory, lecture and tutorial classes

1.1 Wearing a laboratory coat is compulsory in all classes held in laboratories. Students will not be allowed to attend the laboratory class without a laboratory coat.

1.2 Students must wear appropriate clothing in the laboratories, including sensible footwear. Closed shoes and low heels should be worn. This is to avoid tripping and to protect the feet in the case of spillages. Long hair must be tied back. Students who are inappropriately dressed may, at the discretion of the member of staff in charge, be excluded from the class and recorded as being absent without good cause.

1.3 Students who arrive late to laboratory classes may, at the discretion of the member of staff in charge, be excluded from the class and recorded as being absent without good cause.

1.4 Students who display serious misconduct in any class may, at the discretion of the member of staff in charge, be excluded from the class and recorded as being absent without good cause. Serious misconduct involves wilful damage to property, injury or threat to persons, or persistent disruption of teaching.

1.5 The unauthorised use of mobile phones or headphones is not permitted in any class.

1.6 Students are not permitted to record, video or photograph taught sessions or meetings with staff, except with the permission in advance of the staff concerned. Permission will be given where this is part of an approved disability adjustment. Any permission to record, video or photograph is for personal use only and all recordings, videos or photographs remain the property of the presenter and Keele University.

1.7 Students are required to read and follow the procedures in the School of Life Sciences Safety Handbook, which is available from the Life Science Noticeboard on the KLE.

## **Additional requirement 2: Study Abroad and Field Course**

3.1 A student who has completed a semester abroad will not normally be eligible to transfer onto the International Year option.

3.2 Students taking the final year module LSC-30066: Tropical Biology Field Course will undertake field work in Malaysia between level 5 and 6. Students must achieve the following criteria to be eligible to attend:

- **Academic Performance:** an average of 55% across all modules in Semester 1 at Level 5 is normally required. Places on the course are then conditional on achieving an average mark of 55% across all Level 5 modules. You will still be eligible to apply if you have up to 15 credits of re-assessment, but still meet the 55% requirement. Where no Semester 1 marks have been awarded, performance at Level 4 and ongoing Level 5 assessments are considered.
- **General Aptitude:** demonstrated through interview during Level 5, semester 2 and by recommendation of your academic mentor, year tutors and/or programme director.

At least one male and one female academic member of staff from the School of Life Sciences will accompany you on the field course to offer support.

There are additional costs associated with the tropical field course that change each year. These will be discussed at Level 5 before you need to decide to apply.

[1] References to University Regulations in this document apply to the content of the University's Regulatory Framework as set out on the University website here <https://www.keele.ac.uk/regulations/>.

## **Version History**

### **This document**

**Date Approved:** 08 February 2023

### **Previous documents**

<b>Version No</b>	<b>Year</b>	<b>Owner</b>	<b>Date Approved</b>	<b>Summary of and rationale for changes</b>
1	2022/23	DAVID WATSON	01 April 2022	
1	2021/22	DAVID WATSON	08 February 2021	
1	2020/21	CLAIRE EVANS	20 May 2020	