Department Of Molecular Biology & Biotechnology.

Study life at the molecular level:
- Biochemistry
- Genetics
- Microbiology
- Molecular Biology

www.sheffield.ac.uk/mbb
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A World Class Research University

Historic Firth Court, home to our department.
The Peak District National Park on our doorstep
An award-winning student experience
Winner of best students’ union in the UK for the last ten years
2009–2018 Times Higher Education Student Experience Survey
Welcome to Molecular Biology and Biotechnology

At the University of Sheffield’s Department of Molecular Biology and Biotechnology we study life at the molecular level.

Our expert bioscientists are working to tackle global challenges like food security and antibiotic resistant infections, but when they’re not carrying out world-leading research, they’re training our students to address these challenges in the future.

Flexible courses
Whichever biochemistry, genetics, molecular biology or microbiology course you choose, your first year of study will introduce you to all four disciplines. We offer a range of modules covering the breadth and depth of molecular bioscience and as you move through the course and discover what you’re passionate about, this training will allow you to keep your interests broad, specialise in one area, or even switch to another degree programme within our department.

Get involved
Sheffield has a vibrant science community with plenty of opportunities to get involved in activities alongside your studies. You can join student societies like Science Brainwaves where students across the university take everything ‘science’ and make it accessible to the general public or you can become a Student Ambassador and contribute to local pupils’ lives by running exciting events in schools.

Your future
From the very start of your degree we’ll support you to develop key transferable skills that employers value including team work skills, critical thinking, and how to present effectively. You can gain work experience whilst studying by spending a year on placement in the UK or abroad as a recognised part of your degree or you can extend your degree by one year, graduating with additional in-depth lab experience with our accredited MBiolSci integrated masters qualification.

When our students step into the world of work, they begin successful careers in both industry and applying science in a range of roles with giants such as AstraZeneca, the NHS and Coca-Cola. Many progress onto further study to PhD level with a view to pursuing a career in research.

Whatever path you choose, you can be sure that our dedicated staff will be here to support you throughout your time at Sheffield.

Professor Mike Williamson,
Head of Department
Throughout your course, you’ll learn in lots of different ways. In lectures, world leading scientists will introduce you to key concepts and help you develop the skills to direct your own learning, and small group tutorials will allow you to hone your analytical abilities as you work through scientific problems. You’ll also spend a large chunk of your course learning by doing as we teach you hands-on skills during your practical sessions.
Lectures
During lectures, you’ll learn about the facts, theories and controversies in the molecular biosciences. As you progress through the course, you’ll have more and more choice about what areas you study, as the topics get more specialised and advanced.

At Sheffield, lectures are recorded and made available online, giving you the chance to listen again, check your understanding of topics and support your revision.

Tutorials
Tutorials provide a personalised way of learning. They’re designed to explore subjects in more detail to develop your writing, analysis and presentation skills through one-to-one teaching and group working.

Your personal tutor will be a great resource throughout your course to review your progress, offer careers advice, and help you with any issues with your studies.

Practical teaching
Laboratory classes
Six hours every week are dedicated to teaching you the practical skills used by scientists. In these sessions, you’ll learn how to handle equipment, design experiments, and interpret data.

Throughout your course, you’ll undertake projects such as cloning genes and expressing the proteins, or sequencing a genome; and you’ll start designing your own practicals, too.

Find out more p32.

Analysis classes
These classes will teach you how to interpret findings and make calculations based on your data - practical, transferable skills that bioscientists and professionals use outside the lab.

Research projects
All of our students complete a research project in their third year, giving you a chance to put the skills you’ve gained during your course into practice.

Students on our MBiolSci courses also carry out an advanced research project which forms the majority of fourth year. This can be based in one of our research laboratories, the University of Sheffield Medical School, a local hospital, or in industry.

Find out more p34.

Assessments
As you progress through your programme, assessments will provide you with regular feedback so you can monitor your progress. We use a range of methods to assess you throughout your degree from written examinations, essays and reports to practical assessment in the lab.

Students studying an MBiolSci will be assessed through their fourth-year project as well as through presentations and written reports.

World-class learning facilities
Molecular bioscience is a practical subject and our Perak teaching labs provide all the space and equipment you need to develop the skills of a professional scientist.

The Information Commons is our 24-hour library. Refurbished in 2017, the building holds individual study spaces and group study rooms across 6 floors, accessible to students at any time of day or night.
An example year one student’s timetable

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>9am</td>
<td>Lecture</td>
<td>Lecture</td>
</tr>
<tr>
<td>10am</td>
<td>Independent study at library</td>
<td>Lecture</td>
</tr>
<tr>
<td>11am</td>
<td>Lecture</td>
<td></td>
</tr>
<tr>
<td>Noon</td>
<td>Lecture</td>
<td>Lecture</td>
</tr>
<tr>
<td>1pm</td>
<td></td>
<td></td>
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<tr>
<td>2pm</td>
<td>Tutorial</td>
<td></td>
</tr>
<tr>
<td>3pm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4pm</td>
<td>Independent study</td>
<td>Analysis class</td>
</tr>
<tr>
<td>5pm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
All students have the same timetable in year one. How you structure your independent learning is up to you, but here's an example week of a first year student.

<table>
<thead>
<tr>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>Practical in lab</td>
<td>Practical in lab</td>
</tr>
<tr>
<td>Lecture</td>
<td>Complete tutorial activity</td>
<td>Independent study at library</td>
</tr>
<tr>
<td>Sports / Student Society / Volunteering</td>
<td>Review lecture notes and recommended study</td>
<td>Review lecture notes</td>
</tr>
</tbody>
</table>
Our courses

No matter which course you choose, your first year will introduce you to the key areas in the molecular biosciences – biochemistry, genetics, microbiology and molecular biology.

After passing your first year, you’re free to transfer between any of the courses in the department. Each of our degree courses is made up of a number of modules that reflect the area of specialism. In your second year, you’ll study your chosen subjects in more depth and develop your practical skills through learning how biochemistry, microbiology and genetics are integrated.

In third year, you’ll complete an extended research project and have a wide range of modules to choose from, giving you the freedom to study areas that interest you the most before graduating with the degree title that reflects what you studied.

BSc or MBiolSci?
With any of our courses, you can graduate after three years with a BSc degree, or you can choose to study for an optional fourth year, leading to an MBiolSci qualification. The majority of your fourth year will be spent carrying out an extensive research project, based either at the university or in an industrial lab. Our four-year MBiolSci course has Advanced Accreditation from the Royal Society of Biology and is designed to let you experience what it’s like to do a PhD – a route that many of our graduates pursue.

You may transfer in either direction between the three-year BSc and four-year MBiolSci during years one to three of your degree.

Find out more p27.

Degrees with a Year in Industry
All of our BSc courses are available with a Year in Industry, giving you the opportunity to spend a year in employment as a recognised part of your degree programme.

Find out more p29.
Our subject areas

Biochemistry (p18)
Biochemistry is the study of living systems at a molecular level and lies at the core of all modern biosciences, from biochemical studies on cell membranes and photosynthesis to how our immune systems function.

Genetics (p20)
Genetics is the study of how DNA encodes the information required to make all life on the planet. New sequencing technologies have dramatically increased the amount of information available to geneticists, making it an exciting time to study this area.

Microbiology (p22)
Microbes are the most abundant and diverse life forms on the planet. In many ways, microbes rule the world, providing us with food, natural resources and antibiotics. They’re also the subjects of our most fundamental experiments to understand how life functions, with their genomes being the first to be completely sequenced.

Molecular Biology (p24)
A lot of the success of modern biology is because of the fusion of large areas of biochemistry, genetics and microbiology to form newer disciplines, like molecular biology, which aims to build up a detailed, molecular-level understanding of the structure, function and interactions of cells.
How our degrees work

We know that choosing what to study at university is a big decision: that’s why our courses are designed to give you maximum flexibility. This page shows how our programmes are structured and the flexibility available to you as you progress through your course.

**Year 1**
Your first year will give you a broad understanding of biochemistry, genetics, microbiology and molecular biology, allowing you to explore what you’re most interested in.

All of our courses have the same first year: our students all attend the same practical sessions in our teaching laboratories and take part in tutorials together.

“What first attracted me to the course and to the department was the breadth of the modules and the fact that the courses were interchangeable. Given that when I first came to university I wasn’t really sure what I wanted to specialise in, this was really useful.”

Charlotte Wynn, BSc Medical Biochemistry with Employment Experience

**Year 2**
From second year you’ll have the freedom to branch out into other areas of molecular bioscience that interest you, and the flexibility to change specialism if you wish.

The second year of all our programmes is based on the same range of modules but what’s compulsory depends on your chosen course.

“I came to Sheffield to study BSc Biochemistry but once I started studying other areas in the department I realised I had a passion for Microbiology. Second year allowed me to study more Microbiology modules and this led me to switch onto the Biochemistry and Microbiology programme.”

Rob Smith, MBiolSci Biochemistry and Microbiology

As you progress through your degree, what you study will become increasingly specialised.
Placement opportunities
You can spend a year in industry and gain valuable work experience as a recognised part of your BSc degree to make you stand out in the workplace.
Find out more p29.

Year 3
In your third year you’ll complete an extended research project which can be lab or non-lab based, alongside your chosen specialist modules.

You’ll also choose from a wide range of modules according to your interests, and graduate with the degree title that reflects your chosen specialisms.

A particular highlight of my undergraduate degree was my third year research project, following which I was awarded the Alan Roper prize for outstanding performance. The project was particularly fulfilling as it allowed me to apply genetic aspects I had learnt in theory to solve real life problems.”

Annie Ellis,
BSc Biochemistry and Genetics

Year 4 - MBiolSci
Our four-year MBiolSci degrees are the same as our BSc degrees for the first three years, but have an extra year of research training.

These are especially suited to students interested in industrial or academic research, with the majority of the year devoted to a major research project.

“In my fourth year, I undertook a nine-month research project in the research laboratory of Professor Julie Gray. My research focused on how rice plant leaves correctly pattern the stomatal openings on the underside of their leaves. My research here is currently in review for publication.”

Tim Fulton,
MBiolSci Genetics

Many of our students choose to complete an extra year of research training

Your fourth year will have an increased focus on developing your specialist lab skills.
Biochemistry is the study of living systems at a molecular level and lies at the core of all modern biosciences, from biochemical studies on cell membranes and photosynthesis to how our immune systems function.

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<thead>
<tr>
<th>Degree</th>
<th>BSc UCAS Code</th>
<th>MBiolSci UCAS Code</th>
<th>BSc with a Year in Industry UCAS Code</th>
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<tr>
<td>Medical Biochemistry (p26)</td>
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Our BSc and MBiolSci programmes in biochemistry are designed to give you a theoretical and practical understanding of this fundamental science and its use in biotechnology and medicine. These flexible degree programmes allow you to choose modules that focus mainly on biochemistry, or on biochemistry in combination with another molecular bioscience subject.

Our Biochemistry and Genetics degrees give you the opportunity to study these highly complementary subject areas that are at the core of all modern biosciences.

Our Biochemistry and Microbiology degrees emphasise the power of modern molecular approaches to study microorganisms and some of the diseases they cause. Microbes are the most abundant life forms on the planet and impact human health in many ways. At Sheffield, we're leaders in using biochemical approaches to study microorganisms at a molecular level.

These dual courses are an excellent way to study the most fundamental disciplines underpinning all life.

**Example modules**
- Biochemical Signalling
- Biochemical Basis of Human Disease
- Membrane Protein Structure and Function

A full list of modules can be found on p30.

Find out more: www.sheffield.ac.uk/mbb/prospectiveug/courses

**Entry requirements**

**BSc courses**
Typical offer: AAB
Duration: Three years

**MBiolSci courses**
Typical offer: AAA
Duration: Four years

Full entry requirements can be found on p43.

**Spend a Year in Industry**

Our BSc with a Year in Industry degrees allow you to do a year long, paid work placement between your second and third year as a recognised part of your degree programme.
Find out more p29
Applying biochemistry: Using ground-breaking imaging techniques to advance medicine

Imaging is a revolutionary way that we can visualise the inner workings of living things and at Sheffield we’re developing microscopy technologies to answer some of the biggest questions in biology and medicine.

Our multi-million pound Imagine: Imaging Life research institute brings together advanced imaging techniques under one roof and within our department, we’re extremely privileged to house a state-of-the-art Cryo-Electron Microscope facility to further our expertise in imaging. Professor Per Bullough who leads this facility previously trained with Professor Richard Henderson, the winner of the 2017 Nobel Prize for Chemistry for developing the cryo-electron microscopy imaging technique.

Matthew Stedman
MBiolSci Medical Biochemistry
For his final year project, Matthew worked under the supervision of Professor Per Bullough and got a chance to use Sheffield’s brand new cryo-electron microscope as he studied amyloid beta, a protein involved in Alzheimer’s disease.

The project covered structural determination of the amyloid fibrils and manual analysis of the images collected. This work was very different to the techniques studied in the teaching labs and showed me a different side of biochemistry.

We were some of the first people to use the new Arctica cryo-electron microscope, and considering the cost of the microscope (~£2.5M) I was surprised that we were allowed to use it at all. This was a nice reflection of the faith the department has in our research abilities and made us feel rather valued if a bit daunted.”

Biochemistry, Genetics, Microbiology and Molecular Biology

The Krebs Cycle
Sir Hans Krebs was the first Professor of Biochemistry in Sheffield, and in 1953 won the Nobel Prize in Physiology or Medicine for discovering the citric acid cycle (also known as the Krebs cycle), while working at the University of Sheffield. The cycle explains one of the most fundamental processes of life: the conversion of biological molecules into energy within a cell.
Genetics is the study of how DNA encodes the information required to make all life on the planet. New sequencing technologies have dramatically increased the amount of information available to geneticists, making it an exciting time to study this area.

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Our BSc and MBiolSci programmes in genetics are designed to give you a theoretical and practical understanding of the core principles and techniques required to study genetics whilst emphasising its significance to biology and genetic medicine. These flexible degree programmes allow you to choose modules that focus mainly on genetics, or on genetics in combination with another molecular bioscience subject.

Our Biochemistry and Genetics degrees give you the opportunity to study these highly complementary areas that are at the core of all modern biosciences.

Genetics and Microbiology are important for the study of modern biosciences, particularly human diseases. Students on these programmes are among the first to hear about the ground-breaking discoveries being made in this area as you’ll be taught by the same academic staff that are conducting genetics and microbiology research within our department. This degree will emphasise the power of modern genetic approaches to study microorganisms and the diseases they cause.

Example modules
- Genetics of Cell Growth and Division
- The Genetics of Human Disease
- Human Reproduction and Fertility

A full list of modules can be found on p30.

**Entry requirements**

**BSc courses**

Typical offer: AAB  
Duration: Three years

**MBiolSci courses**

Typical offer: AAA  
Duration: Four years

Full entry requirements can be found on p43.

**Find out more:**
www.sheffield.ac.uk/mbb/prospectiveug/courses

**Spend a Year in Industry**

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Find out more p29
Applying genetics: Making discoveries in the treatment of Motor Neurone Disease

Motor Neurone Disease is a common degenerative disorder affecting the nervous system with symptoms including difficulty walking, eating, drinking and talking. There’s currently no cure or effective treatment for this life-threatening condition.

Professor Sherif El-Khamisy from our department has made significant breakthroughs in the search for Motor Neurone Disease treatments through careful study of the genetic and cellular malfunctions that lead to disease. Most recently his lab was able to correct an out-of-control biological process in human cells, even though the genetic material within them was still damaged.

When Professor El-Khamisy isn’t carrying out groundbreaking research, he’s teaching our students on a number of our modules covering genetic stability and genetic change within cells.

Zoe Parton
MBiolSci Molecular Biology
Zoe completed her third year project within Professor El-Khamisy’s lab which gave her a real idea of what it would be like to work in research.

“My third year project was experimentally based and I worked in Professor El-Khamisy’s laboratory which is interested in understanding the genetics of DNA damage and repair. My project was specifically focused around R-loops, which are structures that can form in the DNA and lead to DNA damage. During the project, we showed that R-loops accumulated in DNA when a protein called USP11 lost its catalytic activity. This enabled us to think more about the pathway of R-loop resolution, and which enzymes could be involved.”

This is just one area where we’re undertaking groundbreaking research in our department. To find out more, visit our website: www.sheffield.ac.uk/mbb/research
Microbiology

Microbes are the most abundant and diverse life forms on the planet. In many ways, microbes rule the world, providing us with food, natural resources and antibiotics. They're also the subjects of our most fundamental experiments to understand how life functions, with their genomes being the first to be completely sequenced.

Through studying Microbiology, you'll learn the fundamental role these tiny organisms play in the world and their role in countless scientific advances.

Our BSc and MBiolSci programmes in microbiology are designed to give you a theoretical and practical understanding in the biochemical and genetic principles underpinning the study of these remarkable organisms. Our courses also teach you the skills needed to study microbes and manipulate their genetic makeup. These flexible degree programmes allow you to choose modules that focus mainly on microbiology, or on microbiology in combination with another molecular bioscience subject.

Our Biochemistry and Microbiology degrees emphasise the power of modern molecular approaches to study microorganisms and some of the diseases they cause. Microbes are the most abundant life forms on the planet and impact human health in many ways. At Sheffield, we're leaders in using biochemical approaches to study microorganisms on a molecular level.

Genetics and Microbiology are important for the study of modern biosciences, particularly human diseases. This degree will emphasise the power of modern genetic approaches to study microorganisms and the diseases they cause.

Example modules
- Molecular Systems Biology and Synthetic Biology
- Bacterial Pathogenicity
- Microbial Structure and Dynamics

A full list of modules can be found on p30.

Find out more:
www.sheffield.ac.uk/mbb/prospectiveug/courses

Entry requirements

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**MBiolSci courses**
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Duration: Four years

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Spend a Year in Industry
Our BSc with a Year in Industry degrees allow you to do a year long, paid work placement between your second and third year as a recognised part of your degree programme. Find out more p29
Applying microbiology: Tackling the threat of antibiotic resistant infections

Microbes, like MRSA and *Salmonella* species which cause infections, are becoming increasingly resistant to antibiotics. This has diminished the effect that some drugs have on treating infections, which in turn threatens the foundations of modern medicine. Addressing this issue is one of the biggest public health challenges facing the world today.

Professor Simon Foster from our department is the head of the Florey Institute where we're carrying on the legacy of Sir Howard Florey, focusing on understanding the interaction between infective bacteria and our own immune systems to tackle the global threat of antibiotic resistance in infections.

Sir Howard Florey
At Sheffield we have a proud history in developing clinical interventions that have a global impact. Sir Howard Florey, Professor of Pathology at the university in the 1930s, took Alexander Fleming's observation that penicillin killed bacteria and developed it into a usable treatment for patients.

This discovery led to him being awarded the Nobel Prize for Physiology or Medicine in 1945 and penicillins remain the most prescribed antibiotic in use today having saved millions of lives world-wide.

When he's not tackling this challenge, Professor Foster is teaching undergraduates how microbes cause disease, how antibiotics function and how we can meet the challenge of resistant microbes.

This is just one area where we're undertaking ground-breaking research in our department. To find out more, visit our website: [www.sheffield.ac.uk/mbb/research](http://www.sheffield.ac.uk/mbb/research)
Molecular Biology

A lot of the success of modern biology is because of the fusion of large areas of biochemistry, genetics and microbiology to form newer disciplines, like molecular biology, which aims to build up a detailed, molecular-level understanding of the structure, function and interactions of cells.

Recent developments include the emergence of the new subjects of genomics, transcriptomics and proteomics. The techniques and approaches of molecular biology now affect every other biological discipline.

Our BSc and MBiolSci programmes in molecular biology are designed to give you a theoretical and practical understanding of the broad range of molecular biosciences including biochemistry, genetics and microbiology. These are the most flexible of our degree programmes, giving our students access to the full range of modules available within the department.

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<tr>
<th>Degree</th>
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<th>MBiolSci UCAS Code</th>
<th>BSc with a Year in Industry UCAS Code</th>
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<tbody>
<tr>
<td>Molecular Biology</td>
<td>C440</td>
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<td>C446</td>
</tr>
</tbody>
</table>

Example modules
- Molecular Immunology
- Cells as Factories
- Genomic Science

A full list of modules can be found on p30.

Find out more: www.sheffield.ac.uk/mbb/prospectiveug/courses

Entry requirements

**BSc courses**
Typical offer: AAB
Duration: Three years

**MBiolSci courses**
Typical offer: AAA
Duration: Four years

Full entry requirements can be found on p43.

Spend a Year in Industry

Our BSc with a Year in Industry degrees allow you to do a year long, paid work placement between your second and third year as a recognised part of your degree programme.

Find out more p29
Applying molecular biology:
Feeding the world’s growing population

We’re taking on the global challenge of achieving food security, a state when all people are able to access enough food to meet their requirements for a healthy life, in ways the planet can sustain.

As part of one of our international collaborations, Professor Julie Gray from our department is identifying and creating rice cultivars with altered requirements for water or with enhanced heat tolerance that are suitable as crops in Northeast Thailand.

By improving seedling establishment in the region and working to engineer plants, it could allow two crops of jasmine rice per year, rather than one, which could reduce poverty in the region and improve global food security.

Dr Matt Johnson studied his undergraduate degree in our department before completing his PhD and beginning his research career with us. He’s now making discoveries to improve the efficiency of photosynthesis to increase crop yields to feed our growing population.

Dr Johnson teaches our undergraduate molecular bioscience modules and was last year voted one of the best lecturers in the department, scooping himself our Teaching Prize.

This is just one area where we’re undertaking ground-breaking research in our department. To find out more, visit our website: www.sheffield.ac.uk/mbb/research
Biochemistry, genetics and microbiology are fundamentally important for our understanding of the human body, health and disease. Our medically focused BSc and MBiolSci degree programmes are designed to provide you with a broad understanding of your chosen discipline, but with an emphasis on topics of medical relevance.

**Medical Biochemistry:** Biochemistry is fundamentally important to our understanding of the human body, in both healthy and disease states. The development of treatments, drugs and diagnostic testing always has an underpinning biochemical principle, making biochemistry a great choice for those looking to understand medicine.

**Medical Genetics:** Many aspects of genetics are increasingly relevant to medicine, and advances in sequencing technologies have allowed clinicians to sequence human genomes in a matter of hours. How this genetic information will be used and how it is interpreted is crucial for future medicine.

**Medical Microbiology:** Infectious diseases, caused by microbes, have a major effect on global human health. Our ability to treat infections depends in a large part on our understanding of how microbes live and on finding new ways to disrupt disease processes.

A full list of modules can be found on p30.

**Find out more:**
www.sheffield.ac.uk/mbb/prospectiveug/courses

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**Entry requirements**

**BSc courses**
Typical offer: AAB
Duration: Three years

**MBiolSci courses**
Typical offer: AAA
Duration: Four years

Full entry requirements can be found on p43.
MBiolSci courses

Our four-year MBiolSci courses are designed for students who want to pursue a career in industrial or academic research, with the majority of the fourth year devoted to a major research project. The first three years of your course will have the same structure as the BSc, with the fourth year designed to equip you with the advanced laboratory skills you’ll need for a successful and rewarding career in science.

MBiolSci modules
Fourth year students study:
- Introduction to Research Methods
- Advanced Research Topics
- Advanced Research Project
- Advanced Literature Review

MBiolSci students will also have greater exposure to research seminars in their fourth year.

Research project
The majority of your fourth year is devoted to an extensive research project. Students have the choice between spending a year in industry and completing their project at a company such as AstraZeneca, GSK, or Unilever; or undertaking projects in one of our world-leading research labs within the department, the University of Sheffield Medical School or local hospitals.

Our four-year MBiolSci degrees are accredited by the Royal Society of Biology which shows employers that you’ve developed the extra skills and knowledge that they’re looking for.

Rhiannon Leyden-Preece
MBiolSci Molecular Biology

Rhiannon chose to take the ‘Project in industry’ option in the fourth year of her degree, so she could do her research project at the pharmaceutical company GSK.

“
I’m currently completing my fourth year as an industrial placement student at GSK, gaining a masters qualification whilst learning more about research and development in industry – a rare opportunity compared to other universities and one of my main reasons for choosing to apply to Sheffield. This year has been invaluable in helping me to plan and prepare for my future career.”

Entry requirements
Typical offer: AAA
Duration: Four years

All of our courses are available as a three-year BSc degree, or a four-year MBiolSci degree. If you’re considering the additional experience offered by the MBiolSci we recommend you enrol on this course when you first apply to secure your place.

Choosing a BSc or MBiolSci
You may transfer in either direction between the three-year BSc and four-year MBiolSci during years one to three of your degree depending on performance. For further information, please visit www.sheffield.ac.uk/mbb/prospectiveug/apply/MBiolSci.
100% of science graduates who completed a year’s work experience were in graduate-level work or further study six months after graduation.

Destination of Leavers from Higher Education survey 2016/17
Spending a Year in Industry

All of our degrees offer you the opportunity to spend a year working in industry, usually at the end of your second year.

Spending a year in industry allows you to gain valuable work experience as a recognised part of your degree programme and apply the theoretical knowledge and skills you’ve developed so far. You can test out a career path that you’re considering - whether that’s in the lab or applying your scientific knowledge and transferable skills in industry, and earn a salary while you’re doing it. You’ll pay reduced fees for the year you’re on placement and you’ll still have access to your tutor and the support you need from the university. Your experience will be reflected in your degree title and you’ll graduate “with a Year in Industry”.

We have a dedicated tutor in the department to provide advice and the university’s Careers Service runs workshops on CV and application writing, job hunting and preparing for interviews. Placements aren’t guaranteed – it’s your responsibility to secure one but we’ll do everything we can to help.

Krizand Christine Vaz
MBiolSci Genetics and Microbiology with Employment Experience

Krizand chose to spend a year completing a paid work placement at pharmaceutical giant, Pfizer as part of her degree.

“During my placement year, I have been supporting the renal oncology cross-functional team in numerous exciting projects. Through my involvement in these projects, I have developed softer professional skills, and have learned several specific marketing skills.”

Pei Lyn Tey
BSc Molecular Biology with Employment Experience

Pei Lyn won the award for Best Placement Student at the 2017 National Undergraduate Employability (NUE) Awards for her year-long placement at GSK.

“I was very surprised to have won the prize and it meant a lot to me because I don’t excel in exams. I think I’m more of a problem-based learning type of person. Being on placement and learning to do new things very quickly reassured me that I can do things - just a little bit differently to other people.”
What you’ll be studying

All of our courses have the same first year and the content of the other years is based on the same range of molecular bioscience modules. Here's a flavour of the types of modules you'll study at Sheffield.

First year
During your first year, all students study the same five core modules:
• Practical Molecular Bioscience 1
• Biochemistry
• Genetics
• Microbiology
• Molecular Biology

We'll introduce you to the laboratory skills that underpin modern bioscience, and equip you with the practical skills that bioscientists use outside the lab.

Second year
As you move to your second year, you’ll learn about how biochemistry, microbiology and genetics are integrated. All students will study:
• Practical Molecular Bioscience 2
• Biostructures, Energetics and Synthesis
• Genes, Genomics and Chromosomes

You’ll also study two specialist modules which will depend on your chosen course. These include:
• Biochemistry 2
• Genetics 2
• Microbiology 2
Third year
What you study in first and second year is designed to prepare you for your third year where you'll be able to choose from over 20 modules across our four disciplines.

All students will study a data handling module, undertake a project and complete a literature review.

You'll also study seven specialist modules. This is our current module list to give you an insight into what you could be studying:

- Bacterial Pathogenicity
- Biochemical Basis of Human Disease
- Biochemical Signalling
- Cells as Factories
- Dynamic Proteins
- Evolutionary Genetics
- Genetics of Cell Growth and Division
- Genetic Pathways from Zygote to Organism
- Genome Stability and Genetic Change
- Genomic Science
- Human Reproduction and Fertility
- Membrane Protein Structure and Function
- Microbial Structure and Dynamics
- Molecular Immunology
- Molecular Systems Biology and Synthetic Biology
- Physical Methods for Studying Biological Structures
- Plant Biotechnology
- Protein Folding and Misfolding in Disease
- The Genetics of Human Disease
- The Microbiology of Extreme Environments
- The Organisation of Bacterial Cells
- The World of RNA

Our latest module content details are available in the University of Sheffield's online prospectus. Visit www.sheffield.ac.uk/study

Fourth year (MBiolSci)
If you take one of our four-year MBiolSci courses, you'll undertake an extra year of research training with emphasis on completing an extensive research project.

You'll study the following modules:

- Introduction to Research Methods
- Advanced Research Topics
- Advanced Research Project
- Advanced Literature Review

You can find more information about the course structure here: www.sheffield.ac.uk/mbb/prospectiveug/courses/structure
Getting hands-on with practicals

Throughout your course, you’ll develop the practical science skills that every molecular bioscientist needs, under the supervision of our dedicated teaching staff. You’ll spend six hours in our purpose-built teaching lab every week in first and second year, learning how to handle equipment, design experiments, and interpret data. Once you’ve mastered the essentials, you’ll be ready to complete your third year research project.
Here’s how you’ll get hands-on with molecular cloning techniques throughout your degree.

First year
Throughout the year, you’ll be introduced to essential molecular biology techniques such as manual pipetting, agarose gel electrophoresis, DNA purification, polymerase chain reaction, transformation of bacteria, and antibiotic selection.

At the end of the year, you’ll design your own experiments, incorporating appropriate controls and using the various methods you’ve learnt to identify a plasmid.

Second year
By second year, you’ll have mastered the essential lab techniques, ready to begin an extended molecular genetics project. Over 6 weeks you’ll clone a gene which is of potential interest in the study of cystic fibrosis.

You’ll then assay the success of cloning and the function of the cloned gene in a variety of ways, including DNA sequencing, restriction digest and enzyme assays.

Whilst in the laboratory, you’ll use tablets to access your digital project schedule and other online resources, allowing you to make use of research papers or biotech company data to better inform your work.

Third year
During your third year, you’ll get the chance to put the technical skills and knowledge that you’ve gained so far into practice with an independent research project in the area of Experimental Science. Here you’ll investigate a research question alongside professional scientists.

Previous students have continued their study of molecular cloning with projects including studying the effect of combined treatment antibiotics and nitric oxide on the growth of \textit{E. coli}, and the effect of glutamate/aspartate binding protein, GltI, on fibrilisation of amyloid beta 1-42 involved in Alzheimer’s disease.

Alternatively, you can choose to complete a project in another area - find out more on p.34.

One of the areas that you’ll study throughout your degree is molecular cloning. As biologists, we can isolate DNA sequences of interest and integrate them into specially adapted DNA vectors (plasmids) that can be replicated in bacteria. The sequence can then be used for purposes such as expressing large amounts of a protein in bacteria for crystallisation or mutagenesis of particular sites of interest.
You’ll undertake research projects throughout your degree, getting practical hands-on experience in the laboratory. In your third year, you’ll complete an extended research project in an area of molecular bioscience that interests you ranging from experimental science and clinical diagnostics, where you’ll get involved in real projects, working alongside our PhD students, to science communication, computing, or teaching in local schools.

Here’s a flavour of what some of our recent students investigated during their research projects.

**Experimental Science – Clinical Diagnostics**

Sarah French  
BSc Biochemistry and Genetics

Sarah chose the area of clinical diagnostics for her third year research project. Here she learnt how to use the analytical software used by clinical diagnostic staff in NHS laboratories to diagnose leukaemia.

“As a part of my degree, I was able to pursue my interest in genetics and take on a clinical diagnostics research project focused on leukaemia. This gave me the opportunity to be trained and to become competent in both conventional and molecular cytogenetics diagnostic techniques used in the NHS.”

**Experimental Science - The Genetics of Brewing**

Jenny Harris  
MBiolSci Molecular Biology

Jenny explored how mutations in yeast genes affect the flavour of beer for her Genetics of Brewing research project which even involved visits to the local pub to collect yeast samples!
Molecular Systems and Computing

Alex Taylor
MBiolSci Molecular Biology

Alex chose the area of Molecular Systems and Computing for his third year research project to allow him to learn about the increasingly crucial role that computing and bioinformatics play in modern molecular biology.

“The project involved characterisation of ale yeasts, both genetically and in response to various aspects of the brewing process. I chose this project as I was undecided between a career in industry or academic research and was also considering studying for a masters in brewing science. The brewing project provided the satisfaction of carrying out proper molecular biology research in a rapidly expanding field, along with seeing how our results could directly benefit the brewing industry.”

Steve Cox
BSc Biochemistry

Steve chose the area of public outreach - taking science into schools for his third year research project and this experience confirmed that going into teaching was the right career choice for him.

“I’m now a science teacher in a secondary school. The experience of taking science into schools in Sheffield affirmed that going into teaching was the correct career choice for me, as having the opportunity to interact with young people to discuss scientific concepts was something I particularly enjoyed, and will continue to enjoy during my career.”

Public Outreach

Steve Cox
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Molecular Systems and Computing

Alex Taylor
MBiolSci Molecular Biology

Alex chose the area of Molecular Systems and Computing for his third year research project to allow him to learn about the increasingly crucial role that computing and bioinformatics play in modern molecular biology.

“For my project, I developed programs to identify potential drug-binding cavities in biological molecules, and collect information about their structure and chemistry. These data could inform the development of more effective therapeutics for a wide range of diseases. During the course of the module I discovered a love of computational biology, and the experience gained allowed me to secure a PhD studentship with a strong computational aspect.”
Where your degree can take you

Our students are successful in pursuing a wide range of careers as scientists, teachers, researchers and technology consultants.

Whether you want to enter academia or industry, progress on to further study, or you’re just not sure, as a Molecular Biology and Biotechnology student we’ll give you lots of support to help you work out what you want to do after graduation, and the steps you need to take to get there.

Further study
Almost half of our graduates decide to continue their studies by doing a PhD or other postgraduate training. This can lead to jobs in universities, research institutes, industry and the NHS.

Lizzie Dellar,
MBiolSci Molecular Biology
Studying for DPhil in Interdisciplinary Bioscience, University of Oxford

“Studying in Molecular Biology and Biotechnology was a fantastic experience because of the flexibility and wide range of options that it offers throughout the degree programme. I was able to experience research in both academia, through a summer project at Sheffield Institute of Translational Neuroscience as part of the university research experience (SURE) scheme, and in the pharmaceutical industry, working on neurodegeneration at Eli Lilly in Surrey as my integrated masters year.

“I also made the most of opportunities I was offered to explore other career directions, such as science policy and science communication. As a result of my time in the department, I realised how much I enjoyed research, so I am now studying for a DPhil in Interdisciplinary Bioscience at the University of Oxford.”
Applying science
Many of our graduates choose to apply their scientific knowledge outside of academia. This could be in the pharmaceutical industry, the NHS, communicating science, or teaching the next generation of scientists.

Lucy Spencer, BSc Medical Genetics
Trainee Healthcare Scientist in Genetics, NHS

I have always wanted to work in diagnostic genetics and so applied for the highly competitive NHS Scientist Training Programme in Genetics whilst in the final year of my degree.

“The opportunities that arose during my time at Sheffield, including my third year project and involvement in the Molecular Biology and Biotechnology Society, helped to make my application stand out. My degree gave me a strong grounding for the knowledge that I will gain from the training programme.

“When I qualify as a Healthcare Scientist, I will be working to analyse real patient cases and make a genetic diagnosis. It is very rewarding being able to apply my knowledge to real life situations and have an impact on people’s lives.”

Business
Employers love the analytical skills that students develop on our degrees and some graduates apply their skills to roles outside of bioscience, from IT and business management, to accounting and insurance, to events management.

Arron Dougan, BSc Biochemistry
Technology Consultant, KPMG UK

Studying Biochemistry at Sheffield was a fascinating experience. It allowed me to gain an insight into the cutting-edge developments in research as well as a robust set of analytical and report writing skills.

“During my three years I immersed myself in the inclusive Molecular Biology and Biotechnology community and actively contributed through time as the MBB Undergraduate Society President. The experience combined with other volunteering roles in the Students’ Union allowed me to transition into working life with confidence.

“I now work as a Technology Consultant for KPMG, a global leader in professional services. My role allows me to practice my passion for science and technology in a business oriented environment.”
Student life in Sheffield

Sheffield is the greenest city in Britain, with a third of it sitting within the stunning Peak District National Park. Sheffield is safe, friendly and cost effective; it’s no wonder so many of our students choose to live here after they’ve graduated.

Ranked in the top 10 most popular student cities in the world (Student.com 2018), as a place to live and study, Sheffield is hard to beat, with ground-breaking international festivals like Tramlines and Doc/Fest, galleries with links to the Tate and the V&A, a world-famous theatre and music scene, and the biggest indie cinema outside London.

Students’ Union

For ten years in a row, Sheffield Students’ Union has been recognised as the best in the country. It boasts nightlife ranging from weekly club nights to live comedy, musical theatre, and film as well as cultural events and hundreds of clubs and societies to get involved with. Take up a new sport, volunteer, debate, the possibilities are endless. Many of our students also join the departmental society, MBB Soc.

When it comes to student support, our award-winning Student Services Information Desk is the first place to go for help, advice and information throughout your time at Sheffield.
Accommodation

University accommodation is a great place to meet new friends when you arrive. Whether you opt to live in the city centre or at our purpose-built student villages, all our accommodation is within walking distance of campus and popular student areas. Whichever location you choose, you’ll be part of a supportive community where there’s always something happening.

Your accommodation includes your utility bills, internet and contents insurance. You’ll also benefit from Residence Life events, sports activities and support from our Residence Mentors.

International students

At Sheffield, you’ll mix with staff and students from all over the world – sharing ideas and making them happen.

We offer lots of support for international students. You can be picked up at Manchester Airport when you arrive and once you’re here, we run a range of activities to help you get to know the city, the university, and other students, including a dedicated Orientation Week.

The University’s Student Services Information Desk can help you with any academic, financial, personal, or social issues, with specially trained immigration advisers.

www.sheffield.ac.uk/international

Ranked in the top 50 “most international” universities in the world

2019 Times Higher Education
What’s next?

Apply
Don’t forget to submit your UCAS application by the 15th January deadline.

If you’re taking a gap year, you can still apply before you get your exam results and we’ll treat your application the same. You’ll need to meet the conditions of our offer by 31st August in the year that you plan to start your degree.

www.ucas.com

Visit us
Visit us at one of our open days throughout the summer and discover for yourself why our students love Sheffield.

Get a feel for the university by exploring the campus, experience our students’ union on guided tours and see where you could be living by visiting our accommodation.

On the day, you’ll be able to experience our department and facilities first hand. You’ll also have chance to ask staff and students about the courses you’re interested in.

Book your place: www.sheffield.ac.uk/opendays

Applicant open days
If we offer you a place on one of our courses, you’ll be invited to an applicant open day. On the day, you’ll get an in-depth overview of our courses, meet our staff, see research in action, and get a chance to talk to current students about what studying in Sheffield is really like. These days are also another great opportunity to explore everything that Sheffield and our university has to offer.

International students - visits to your region
Our International Officers regularly travel overseas to meet with students interested in studying with us. Information on the latest events can be found here:

www.sheffield.ac.uk/international/countries/visits

Biosciences at Sheffield
Discoveries in bioscience can save and improve lives all over the world. Here at Sheffield our courses cover the full breadth of biology: from molecules and cells, right up to human anatomy and global ecosystems.

To explore our full range of courses in bioscience at Sheffield, visit the website:

www.sheffield.ac.uk/biosciences
Entry requirements

For all our BSc degree programmes we ask for AAB, including two sciences at A level, or equivalent. For all our MBiolSci degree programmes we ask for AAA, including two sciences at A level, or equivalent.

For Biochemistry courses, one of your A levels should be in Chemistry.

We can accept other qualifications including Scottish Highers, Welsh Baccalaureate, Irish Leaving Certificate, International and European Baccalaureates, Access and BTEC courses. A full list is given on the University of Sheffield’s webpages for undergraduate students: www.sheffield.ac.uk/undergraduate/apply

You can find out which other qualifications we accept at: www.sheffield.ac.uk/undergraduate/apply/international-qualifications

International students

If you have not already studied in a country where English is the majority language, it is likely that you will need to have an English language qualification. We usually ask for: International English Language Testing Service (IELTS): Overall grade of 6.5 with 6 in each component.

We welcome applications from international students. If you don’t meet our entry requirements, our International College offers an International Foundation Year in Science and Engineering. The programme is designed to develop your academic level in your chosen subject, introduce you to the study skills that will be vital to success and help with language if you need it. www.usic.sheffield.ac.uk

Biosciences Foundation Year

We offer a foundation year for students who want to study biosciences, but don’t meet the entry requirements to go straight into first year. So if you’ve studied the right subjects but haven’t achieved high enough grades, or you’ve achieved good grades in unrelated subjects, this could be the route for you. After successfully completing the one-year programme, you’ll progress onto the first year of your chosen degree.

Visit www.sheffield.ac.uk/sefy for more information and entry requirements.

Tuition fees

Tuition fees for UK, European Union and international students are given on the University of Sheffield’s webpages for undergraduates here: www.sheffield.ac.uk/registration/tuitionfees

Information for disabled students

Specific information for disabled students can be found on our website: www.sheffield.ac.uk/study/policies/disabled-applicants
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The content of our courses is reviewed annually to make sure it’s up-to-date and relevant. Individual modules are occasionally updated or withdrawn. This is in response to discoveries through our world-leading research; funding changes; professional accreditation requirements; student or employer feedback; outcomes of reviews; and variations in staff or student numbers. In the event of any change we’ll consult and inform students in good time and take reasonable steps to minimise disruption.

We timetable teaching across the whole of our campus, the details of which can be found on our campus map. Teaching may take place in a student’s home department, but may also be timetabled to take place within other departments or central teaching space.

This publication is correct as at the time of print, but please see www.sheffield.ac.uk/mbb for the most up-to-date information about these programmes.

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