STUDYING BIOMEDICAL SCIENCES

One of the great societal and scientific challenges for the 21st century is improving human health. Combating disease requires a fundamental understanding of the processes that underlie the healthy state and subsequently what goes wrong during the onset of disease. Biomedical science is critical for developing novel drugs, intervention strategies and shaping public health policy.

With the advent of more sophisticated strategies for treating disease, such as the development of personalised medicine, never before has basic science had a greater impact in the clinic. Students who study Biomedical Sciences will be equipped to bridge the gap from bench to bedside and pursue careers in all aspects of the fight against disease.
BIOMEDICAL SCIENCES AT YORK

The University of York has an outstanding reputation for teaching and research. Being a student here is a special experience. The academic quality, supportive staff, campus community and beautiful city make it a popular choice with students.

An understanding of health and disease is best approached from different angles, and a distinctive feature of our programmes is that they are delivered by four University departments with outstanding biomedical research activity: the Department of Biology, the Hull York Medical School (HYMS), the Department of Health Sciences and the Department of Psychology. We therefore offer an interdisciplinary course with breadth and depth in diverse topics such as human biology, pathogens, epidemiology and psychology. The teaching is delivered by academic scientists with contributions from clinical researchers, thus providing strong links throughout the course between your studies, scientific research and clinical applications.

I decided to study at York because it is one of the top universities for Biosciences in the UK. The course is well-structured with a range of module choices, which for me was very important. The majestic campus made the decision to come to York an even easier one to make!

Bruna, Second Year Student
We offer both BSc Honours and MBiomedSci degrees in Biomedical Sciences. Both of these can be taken with either an extra year in industry or Europe.

The MBiomedSci adds an extra year to the BSc programmes and specifically focuses on the skills needed for a career as a research scientist. During this time you carry out further work with research scientists within some of the UK’s top science departments and the Hull York Medical School (HYMS) to learn specialised research techniques and gain experience in a cutting edge research lab.
The number of new practical skills I’ve been taught on my year in industry placement, has been excellent, and I’m really enjoying the project I’m working on. It’s great to be putting everything I’ve learned in my first two years at university into practice, and to see it all in context.

Jojo, Third Year Student
EXPANDING YOUR PROGRAMME

Degree Programmes with a Year in Industry

If you are successful in the competitive selection process, an extra year, following Stage 2, is spent gaining research experience in an industrial or research institute laboratory. An Industry Liaison Officer guides you through the process of applying for a placement, and you receive support from the Department during your year away.

We have excellent relationships with a wide variety of organisations and we place students with employers to match their interests, ranging from pharmaceutical companies (such as AstraZeneca, GlaxoSmithKline, Novartis) to medical research institutes (The Genome Analysis Centre, MRC Harwell).

Taking a year out in industry has many benefits, including hands-on experience of working in a research environment, and more transferable skills, such as teamwork and time management – invaluable for your final year and highly prized by prospective employers and PhD supervisors.
Degree Programmes with a Year in Europe

We also offer the opportunity to spend an extra year of your degree in a European partner country. The "Year in Europe" programme is overseen by academic co-ordinators with relevant expertise and experience, and may be eligible for financial support. As well as continuing to develop your scientific knowledge and skills, you would have the opportunity to experience a different culture, improve your language and communication skills and increase your self-confidence - all advantageous when you apply for jobs, as employers greatly value international experience.

There are two departmental schemes to choose from:

Study or laboratory placements. Our study placements offer you the opportunity to spend your year away studying at one of our partner universities, currently in France, Germany, Spain and Denmark. During your year abroad, you take a range of courses and carry out a project to complement your studies at York. Language prerequisites may apply for this study route and the requirements for each of our partners can be found online at york.ac.uk/erasmuspartners. Language tuition is available through Languages for All (LFA) in your first two years at York. In addition to LFA, the Centre for Global Programmes offers language and intercultural courses called Languages for International Mobility (LFIM) which can help you prepare for your year abroad. Further language courses may also be provided by the host University during your studies abroad.

Laboratory placements. As an alternative to a study placement, you can elect for a full-time laboratory placement during your third year, working on a research project that will complement your studies at York in an internationally renowned European laboratory, either in a university or a research organisation. Since English is the accepted working language in these laboratories, familiarity with the language of the host country is not a prerequisite, although some working knowledge will be useful for everyday life. Studying outside of Europe.

Worldwide exchange programme

The Centre for Global Programmes offers a structured credit-replacing worldwide exchange programme where you can apply to study for an academic year at a partner university overseas. The University of York has links with top institutions in North and Latin America, Asia and Australia. Studying abroad through the worldwide exchange programme gives you the opportunity to experience different academic and social cultures without extending the length of your degree. Worldwide exchanges are open to undergraduates across other University departments and are determined during through an internal application process. You would make an application during your first year at York, and if successful you would spend Stage 2 at your host university.

At York we aim to provide every student with an opportunity to gain an international experience, either on campus or by travelling abroad. This can range from a study placement for a full academic year to a two-week academic and cultural programme at one of our partners universities abroad.

For further information go to york.ac.uk/globalyork

My Year in Industry placement at a pharmaceutical company shifted my outlook to a more practical and biomedical orientation and in the final year I particularly enjoyed the modules that highlighted biomedical applications. These experiences encouraged me to accept an offer for a PhD in metabolic disease at the MRC Clinical Sciences Centre.

Robin, Final Year Student
WHAT YOU STUDY

Genetics
Considers how DNA is organised into chromosomes and genomes in a variety of organisms, from bacteriophage to humans, and examines gene expression through the processes of transcription and translation. Gene mutations and chromosome aberrations are considered in the context of human genetics and disease, and in terms of their significance in evolution.

Molecular Biology and Biochemistry
Explores the relationship between structure and function at the molecular and cellular levels. It examines how chemical reactions provide energy and building blocks, and how enzymes provide catalysis and control.

Cell and Developmental Biology
Introduces the cell biology of eukaryotic organisms, their evolution and diversity. The module looks at the behaviour of cells within the context of multi-cellular organisms. The roles of the extracellular environment, cell signalling and differential gene expression in the regulation cell fate, differentiation and the patterning of structures within animals and plants.

Stage 1 Modules
At Stage 1, the modules described below are compulsory for all students. They run concurrently and provide a foundation in all the main strands of the subject. Students take an additional module each term, which includes regular tutorials, and develop more general scientific and transferable skills.
Introduction to Biomedical Sciences

Introduction to Biomedical Sciences focuses on how molecules, cells, organs and systems function in the human body.

Microbiology

Examines the cell biology of microorganisms. It introduces the diverse world of microorganisms, including bacteria, viruses, algae, fungi and protozoa, with particular reference to the relationships between structure and functions.

Genetics and Evolution

Considers the dynamic nature of genes and includes topics on natural selection, phylogeny, the origin of human diversity and history of life on Earth.

Scientific and Transferable Skills

Scientific and transferable skills enhances the abilities of students in writing, presenting, experimental design and critical thinking.

SMALL TUTORIAL GROUPS
Stage 2 Modules

In Stage 2 you can select modules from the list below. A number of core modules in each term will be compulsory.

<table>
<thead>
<tr>
<th>Modules</th>
<th>20c</th>
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<tbody>
<tr>
<td>Cell Biology</td>
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<tr>
<td>Genes, Genomes, Evolution &amp; Populations</td>
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<tr>
<td>Immunology &amp; Infection</td>
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<tr>
<td>Laboratory &amp; Professional Skills for Bioscientists</td>
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<tr>
<td>Molecular Biology, Biotech &amp; Bioinformatics</td>
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<tr>
<td>Molecular Genetics &amp; Development</td>
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<tr>
<td>Neuroscience</td>
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<tr>
<td>Understanding Health and Disease</td>
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<tr>
<td>Pharmacology</td>
<td>10c</td>
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<tr>
<td>Tutorials</td>
<td>10c</td>
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</tbody>
</table>

In addition, a scientific and transferable skills module runs throughout Stage 2. This includes laboratory based group projects and other sessions aimed at developing experimental design, research skills as well as graduate level skills in project management and communication. There is a focus on modern techniques appropriate to your interest, applying experimental approaches to biological problems, and learning quantitative and computational approaches to analyse data. You also continue to take small group tutorials.

Stage 3 Modules

Biomedical Sciences students have a substantial choice of modules from the list below. The topics cover areas of current scientific importance, and may change from year to year. BSc students take four modules and an individual research project; Masters students take five modules and a group research project.

<table>
<thead>
<tr>
<th>Modules</th>
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<tbody>
<tr>
<td>Research Project (BSc Core Module)</td>
<td>40c</td>
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<tr>
<td>Group Research Project (MBiomedSci Core Module)</td>
<td>20c</td>
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<tr>
<td>Advanced Topics in Biotechnology</td>
<td>20c</td>
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<tr>
<td>Advanced Topics in Cell Biology</td>
<td>20c</td>
</tr>
<tr>
<td>Advanced Topics in Translational Medicine (BMS)</td>
<td>20c</td>
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<tr>
<td>Advanced Topics in Neuroscience</td>
<td>20c</td>
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<tr>
<td>Advanced Topics in Molecular Biology</td>
<td>20c</td>
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<tr>
<td>Advanced Topics in Microbiology</td>
<td>20c</td>
</tr>
<tr>
<td>Cancer Cell and Molecular Biology</td>
<td>20c</td>
</tr>
<tr>
<td>Genes and Development</td>
<td>20c</td>
</tr>
<tr>
<td>Human / Medical Genetics</td>
<td>20c</td>
</tr>
<tr>
<td>Immunology and Infectious Disease</td>
<td>20c</td>
</tr>
<tr>
<td>Molecular Recognition</td>
<td>20c</td>
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</tbody>
</table>

Key:
- Taken by all students on the programme
- BSc students select 2 modules. MBiomedSci students select 3
- Students choose from these modules to develop their own unique programme
- Each student must take 120c per year
Stage 4 Modules - Integrated Masters

Students taking the MBiomedSci conduct a substantial (four days per week) research project and two extended research skills modules.

<table>
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<tr>
<th>Modules:</th>
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<tbody>
<tr>
<td>Stage 4 Research Project</td>
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<tr>
<td>Critical Analysis</td>
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<tr>
<td>Data Analysis</td>
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</tbody>
</table>

Key | Taken by all students on the programme

All modules listed in this brochure are indicative and subject to change, as we regularly update and refine them to keep our teaching as up-to-date as possible.
75% of students have a professional job within 6 months of graduating.

Biomedical Sciences at York provides great opportunities to benefit from personalised, small group discussions. Weekly tutorials offer a chance to discuss topics more in-depth in a casual environment with lecturers and other students. They build your confidence for reading scientific material, and help you improve your writing and presentation skills.

Connie, Second Year Student
Tutorials
These are one of the most popular and distinctive aspects of our programmes. They are an opportunity for a group of usually five students to hold informal scientific discussions on a weekly basis with a member of staff. Tutorials help you to develop skills in conceptual thinking and analysis, as well as oral and written communication. You regularly give presentations and there is plenty of opportunity to debate topical issues. You select a different tutor each term in the first and second years.

Lectures
Much of the taught material is delivered through lectures. We aim to deliver lectures that are not just lists of facts, but which offer a stimulating and challenging perspective on a subject and encourage you to study further.

Practicals
Practicals are designed to complement your lectures and other studies. They help you to develop laboratory skills and to become familiar with a wide range of practical techniques, training you to use methods precisely and encouraging you to assess objectively the reliability of your results. These laboratory skills, together with skills in planning experiments and solving problems, will culminate in your research project in the final year of the programme.
Seminars and Workshops
The incorporation of student-led seminars and workshops provides an additional dimension to some modules. Students give presentations, often in small groups, based on recent research papers or on the wider implications of new technologies, from the use of human embryos in stem cell therapies and ‘designer’ babies, through DNA fingerprinting, to contemporary issues such as the use of GM crops and transgenic animals.

Skills and Group Work
Each term during the first two years, students take modules designed to develop more generic scientific and transferable skills. Some modules focus on specific scientific techniques, while others develop skills in problem solving, experimental design and data analysis. We encourage you to develop important communication skills, including working in groups to plan and carry out experiments that investigate a scientific problem, and presenting your work as an oral presentation or poster. The confidence and wide-ranging skills of our students are often commented on by employers.

Research Projects
Research projects are an essential part of your degree and you will spend a considerable amount of time working on this. For many students this is the aspect of the course that they find particularly rewarding. It is your chance to experience research at first hand. You have the support and advice of an academic member of staff, but you work independently and plan and carry out your own experiments. Projects span the whole range of contemporary biology, from cancer to tissue engineering, and most students carry out their project work alongside research students and postdoctoral staff within the research laboratory of the project director. BSc students take a two days per week research project in their final year and MBiomedSci students undertake an extensive four days per week project in a specific research lab.

I chose the integrated masters course to put myself a step above my competitors when applying for graduate jobs. A MBiomedSci shows that you can take responsibility for a large research project.

Emma, Final Year Student
Assessment
Modules are examined using a mixture of continuous assessment and closed examination, which helps you to judge how well you are progressing. Although you must perform to a satisfactory level, Stage 1 assessments do not count towards the final degree, which for BSc students is determined by work in Stage 2 (40%) and Stage 3 (60%). For MBiomedSci students the split is 25% in Stage 2 and 37.5% in Stages 3 and 4.

Year 1 Timetable
In a typical week in the first year you will have around 25 contact hours, typically six or seven lectures, two or three practicals, a skills workshop and a tutorial. You will spend time on independent study, consolidating information from lectures and practicals, and preparing work for tutorials.

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Monday</td>
<td>09.00 - 10.00</td>
<td>Lecture</td>
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<tr>
<td></td>
<td>10.00 - 13.00</td>
<td>Practical</td>
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<tr>
<td></td>
<td>14.00 - 15.00</td>
<td>Lecture</td>
</tr>
<tr>
<td>Tuesday</td>
<td>09.00 - 10.00</td>
<td>Lecture</td>
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<tr>
<td></td>
<td>11.00 - 13.00</td>
<td>Tutorial</td>
</tr>
<tr>
<td></td>
<td>14.00 - 17.00</td>
<td>Practical</td>
</tr>
<tr>
<td>Wednesday</td>
<td>09.00 - 10.00</td>
<td>Lecture</td>
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<td></td>
<td>11.00 - 12.00</td>
<td>Lecture</td>
</tr>
<tr>
<td>Thursday</td>
<td>09.00 - 10.00</td>
<td>Skills lecture</td>
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<td></td>
<td>10.00 - 12.00</td>
<td>Skills workshop</td>
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<tr>
<td>Friday</td>
<td>09.00 - 10.00</td>
<td>Lecture</td>
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<tr>
<td></td>
<td>10.00 - 13.00</td>
<td>Practical</td>
</tr>
</tbody>
</table>
I have found that the Biomedical Sciences course strings together a range of medical aspects, whilst pinpointing certain areas to explore more deeply, with intriguing results, be it via lectures or first-hand in the lab! The course is stimulating and creates a brilliant foundation of skills for students to rocket from.

Imogen, Second Year Student

INTERNATIONAL STUDENTS

International students form an important part of the community at York, and the Department welcomes students from all over the world.

We offer you an International Student Co-ordinator within the Department, and a personal supervisor to oversee your academic progress and welfare.

We offer one scholarship to a Biomedical Sciences overseas student. If you are paying overseas fees then you are eligible to apply. Application forms are available to download from You@York (applicant’s portal).
The Biology Department has an in-house employability team who provide one-to-one sessions with students covering careers advice, preparation of job applications and mock (scientific) interviews. The team also run regular careers events, including a two day employability fair each summer, inviting departmental alumni and employers into the Department. The Department has a proactive approach to employability, embedding it into teaching throughout the degree programmes.

Our graduates go on to a wide variety of careers both within and outside of Biomedical Sciences. Examples of roles that our recent graduates are currently undertaking include:

- Clinical Outsourcing Manager, Evidence Generation and Clinical Research
- Research Assistant, MRC Harwell
- Trainee Clinical Scientist, NHS Scientist Training Programme
- Senior Therapy Radiographer, NHS
- Clinical Trial Coordinator, University of Nottingham
- Account Executive, Bedgebury Communications
- PhD Student, The Babraham Institute

Any questions? Please email biol-admissions@york.ac.uk.
Contact Us

Biology Admissions Office
Department of Biology
University of York
York, YO10 5DD
United Kingdom

+44 (0) 1904 328548
biol-admissions@york.ac.uk

york.ac.uk/biology/undergraduate

@BiologyatYork

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