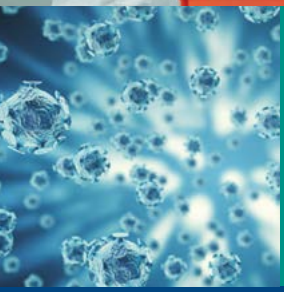
University of Nottingham
UK | CHINA | MALAYSIA

Biochemistry

Explore it



Improve it

nottingham.ac.uk/life-sciences
Undergraduate guide 2020

Contents

Contents

> The degree enabled me to understand biochemistry in great depth and apply this knowledge to develop an understanding of clinical agents and a more diverse understanding of disease.
>
> Megan Cox,
> BSc Biochemistry and Molecular Medicine

95%
of our research is of
'international quality'*

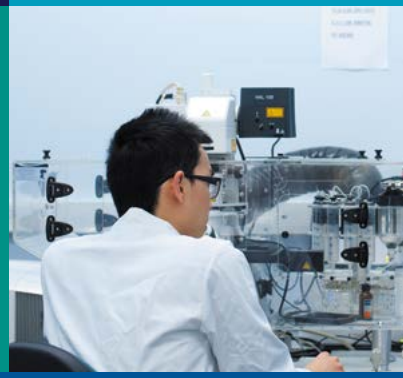
*According to the Research Excellence Framework (REF) 2014.

A member of the prestigious
Russell Group
and founding member of the global
Universitas 21 network

Gain substantial
laboratory experience
from year one

Flexibility
to transfer between different
biochemistry degrees

Gain a **breadth** of knowledge from a **variety** of different fields



Join a global community
of over **46,000 students**, from more than **150 countries**

Improve employability
by developing skills in data interpretation, research methods and problem-solving

A large percentage of your learning is based in the
Medical School
and taught by
biochemistry specialists

Where could biochemistry take you?

The advancements in biochemistry over the last century have been astonishing. It is the branch of science that combines biology and chemistry to explore life at the molecular level.

Biochemists ask questions and solve problems to develop a greater understanding of how life works, both in health and disease. Could you be one of the next generation of biochemists working to answer some of these molecular biological problems?

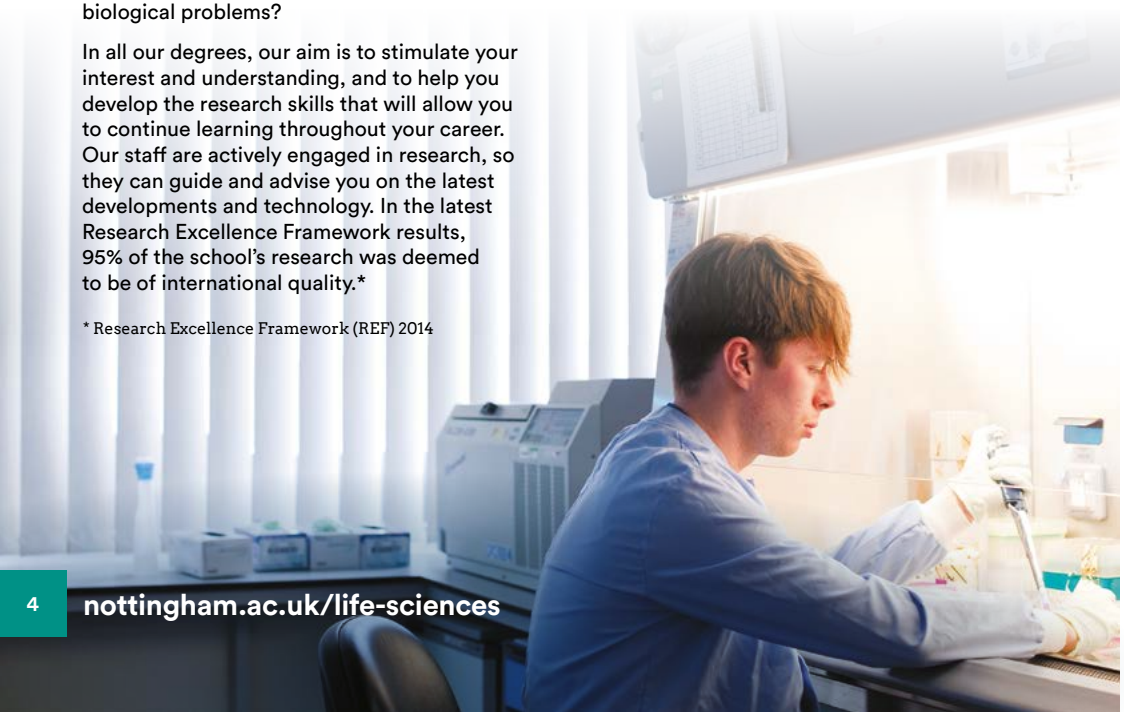
In all our degrees, our aim is to stimulate your interest and understanding, and to help you develop the research skills that will allow you to continue learning throughout your career. Our staff are actively engaged in research, so they can guide and advise you on the latest developments and technology. In the latest Research Excellence Framework results, 95% of the school's research was deemed to be of international quality.*

* Research Excellence Framework (REF) 2014

In addition to knowledge and understanding of molecular and cellular biology, these degree courses will also ensure that you develop the necessary skills in data interpretation, research methods and problem-solving.

We hope that you will consider Nottingham for your degree, and that you will visit us to see University Park Campus and the Medical School for yourself.

Dr Ian Kerr
Course Director



Our courses

Degree title	UCAS code	Duration	A levels	IB
Single honours				
BSc Biochemistry	C700	3 years	AAB	34
MSci Biochemistry	C703	4 years	AAB	34
BSc Biochemistry and Biological Chemistry	C720	3 years	AAB	34
MSci Biochemistry and Biological Chemistry	C721	4 years	AAB	34
BSc Biochemistry and Genetics	CC47	3 years	AAB	34
MSci Biochemistry and Genetics	CC4R	4 years	AAB	34
BSc Biochemistry and Molecular Medicine	C741	3 years	AAB	34
MSci Biochemistry and Molecular Medicine	C742	4 years	AAB	34

For all of the above we require GCSE English language and maths at grade 4 (C).

Foundation courses

Applicants who are not eligible for direct entry to undergraduate study may be able to apply for a foundation course. Find out more at **nottingham.ac.uk/foundationcourses**

English language requirements

IELTS 6.5 (no less than 6.0 in any element). For details of other English language tests and qualifications we accept, please see **nottingham.ac.uk/go/alternativerequirements**

Academic English preparation

If you require additional support to take your language skills to the required level, you may be able to attend a presessional course at the Centre for English Language Education, which is accredited by the British Council for the teaching of English in the UK.

Students who successfully complete the presessional course to the required level can progress onto their chosen degree course without retaking IELTS or equivalent. Find out more at **nottingham.ac.uk/cele**

What's an MSci?

MSci degrees are undergraduate-level courses which last for four years and have an integrated masters qualification. They are the equivalent to a bachelors degree plus a masters level qualification.

These courses usually provide additional industry and/or research experience to enhance your future prospects. An MSci is excellent preparation for further study such as a PhD.

BSc | MSci Biochemistry

These degrees will provide you with a thorough understanding of modern biochemistry, including molecular cell biology, molecular genetics, biotechnology and metabolism.

Year one

The course begins with an introduction to the fundamental aspects of cell biology, biochemistry, genetics and cellular control, as well as core skills in biochemistry and genetics. You will also cover essential chemistry, exploring molecular structure, bonding and reactivity of organic molecules. Theoretical learning is supported by practical studies in cell biology, biochemistry, genetics and physiology.

Alongside core modules, you will have 40 credits of optional modules. Twenty of these credits are to be from the School of Life Sciences, while the other 20 can be from other schools in the University, such as languages or business.

Year two

In the second year, you will cover topics in greater depth. You will study proteins and enzymes, from their structure to their mechanisms. Basic properties of DNA are explored, with practical sessions for you to practise manipulating DNA and express recombinant proteins. You will also cover cell signalling and metabolic regulation.

A dissertation is undertaken along with studies developing transferable skills of presentation, interpretation and criticism of scientific data.

Year three

A major feature of the final year is an individual project which may be laboratory, bioinformatics or literature-based. The aim is to provide you with the ability to analyse a relevant biological problem in depth, in a modern research environment.

Other modules will help you understand biochemical diseases, genetic engineering and protein folding. Optional modules are available to enhance your learning. You could discover more about cancer, proteins, cells or infection.

Year four (MSci only)

The focus of this year is a masters-level research project. You will choose an area of biochemistry you find interesting, then plan, research and present your findings. The learning style will be strongly student-centred with one-to-one supervision from a research academic.

Optional modules will also be available. This gives you the opportunity to concentrate on a topic that complements your previous study, or to try something new.

Typical modules

Year one

Core

- Core Skills in Biochemistry
- Genes, Molecules and Cells
- Fundamental Inorganic and Organic Chemistry

Optional

- Evolution, Ecology and Behaviour
- Fundamentals of Neuroscience
- Human Physiology
- Life on Earth
- Molecules of Life

Year two

Core

- Higher Skills in Biochemistry
- Signals and Metabolic Regulation
- Structure, Function and Analysis of Genes
- Structure, Function and Analysis of Proteins

Optional

- Concise Inorganic and Organic Chemistry
- From Genotype to Phenotype
- Infection and Immunity
- Macromolecular structure assembly and analysis
- Microbial Biotechnology
- The Pharmacological Basis of Therapeutics

Year three

Core

- Advanced Biochemistry
- Biochemistry of Disease
- Biochemistry Research Project

Optional

- Biochemistry of Cancer
- Chemical Biology and Enzymes
- Molecular Basis of Medicine
- Molecular Diagnostics and Therapeutics
- Molecular Microbiology and Infection
- Protein Folding and Biospectroscopy
- Signal Transduction

Year four (MSci only)

Core

- Research Presentation Skills
- Research Project

Optional

- Advanced Experimental Design and Analysis
- Cutting-Edge Research Ideas in Molecular Biology
- Process and Practice in Science

Modules may change, for example due to curriculum developments. The above list is a sample of typical modules that we offer, not a definitive list. The above year three modules will be changing for 2019 entry. The most up-to-date information can be found on our website at **nottingham.ac.uk/ugstudy/biochemistry**

BSc | MSci Biochemistry and Biological Chemistry

Accredited by the Royal Society of Chemistry, these courses equip you with the fundamental aspects of biochemistry and chemistry.

Teaching is split between the School of Life Sciences and the School of Chemistry, providing you with expertise from both subjects.

Year one

During this introductory year, you will study cell biology, biochemistry, genetics and cellular control together with essential chemistry. These modules are supported by practical studies in cell biology, biochemistry, genetics and chemistry. Students without A level maths will be required to take modules providing the necessary maths skills for chemists.

Year two

In the second year, you will expand your chemical knowledge, both theoretically and practically. Proteins and enzymes are explored, from their structure to their mechanisms. Other core topics include cell signalling and an understanding of how biochemical processes are integrated and regulated.

Year three

Advanced laboratory work in biochemistry and chemistry is a major feature of the third year. In biochemistry, you will perform a number of fundamental and advanced molecular biology techniques. Individual results and data from the class will be analysed as part of an overall project to investigate relevant scientific questions.

In chemistry, you will further your experience in the principles upon which modern experimental methodology is based, chemical synthesis, obtaining and interpreting physical data, and report writing.

Other advanced modules are available, from looking at disease to a detailed understanding of proteins.

Year four (MSci only)

A substantial feature of the fourth year is an extended individual project in biochemistry or chemistry, which may be either lab or bioinformatics based. All subjects will require a review of published work and the planning of a research project under the guidance of two supervisors. You will be assessed by a dissertation and oral presentation.

Additional modules are available which may cover disease, business, immunology or nucleic acids.

Typical modules

Year one

Core

- Core Skills in Biochemistry and Biological Chemistry
- Genes, Molecules and Cells
- Fundamental Chemistry Theory and Practical

If you do not have A level maths, you will take:

- Mathematical Toolkits and Calculations in Chemistry

If you do have A level maths, you can choose from:

- Calculations in Chemistry
- Molecules for Life
- Human Physiology

Year two

Core

- Intermediate Inorganic and Organic Chemistry
- Core Chemistry Laboratory Work
- Signals and Metabolic Regulation
- Structure, Function and Analysis of Genes
- Structure, Function and Analysis of Proteins

Optional modules

- Principles in Analytical Chemistry
- Medicinal Chemistry and Molecular Biology

Year three

Core

- Advanced (Chemistry) Lab Techniques
- Advanced Biochemistry
- Advanced Biochemistry Laboratory Work
- Biochemistry of Disease
- Bioinorganic and Metal Coordination Chemistry
- Organometallic and Asymmetric Synthesis
- Pericyclics and Reactive Intermediates
- Protein Folding and Biospectroscopy

Year four (MSci only)

Core

- Biochemistry of Cancer
- Biochemistry or Chemistry Research Project
- Cellular and Molecular Immunology
- Contemporary Organic Synthesis
- Enterprise for Chemists
- Nanostructure Fabrication
- Nucleic Acids and Bioorganic Mechanisms
- Signal Transduction

Modules may change, for example due to curriculum developments. The above list is a sample of typical modules that we offer, not a definitive list. The above year three modules will be changing for 2019 entry. The most up-to-date information can be found on our website at **nottingham.ac.uk/ugstudy/biochemistry**

BSc | MSci Biochemistry and Genetics

These courses will provide you with a thorough training in both biochemistry and genetics, emphasising common areas such as molecular biology, genetic engineering and biotechnology.

Year one

The course will begin with an introduction to the fundamental aspects of cell biology, biochemistry, genetics, cellular control and core skills in biochemistry and genetics. You will also cover essential chemistry, exploring molecular structure, bonding and reactivity of organic molecules. Theoretical learning is supported by practical studies in cell biology, biochemistry, genetics and physiology.

Alongside compulsory modules, you will have the choice of optional modules.

Year two

The second year covers subjects in greater detail. You will look at the structure and function of the genes, genomes and chromosomes of eukaryotic cells. The Human Genome Project is explained, and you will explore genes responsible for some of the most common disorders and the development of strategies for treatment. You will also learn about the brain – how it works, develops and makes connections.

Year three

The main component of the third year is a research project. You will work with a supervisor to find a topic you find interesting. You will then plan, research and present your findings effectively. The project could be an individual or group laboratory experiment, or an in depth literature review.

Advanced modules will also be available, covering topics from cancer to data analysis.

Year four (MSci only)

In the fourth year, you will have more independence in your learning. You will undertake a year-long masters-level research project. Supported by a research academic, you will write a research grant proposal, which is particularly good experience for those wishing to pursue a research career. You will then carry out your project and present your findings effectively.

A choice of optional modules will be available to add variety to your learning.

Typical modules

Year one

Core

- Core Skills in Biochemistry and Genetics
- Genes, Molecules and Cells
- Fundamental Inorganic and Organic Chemistry
- Life on Earth

Optional

- Evolution, Ecology and Behaviour
- Fundamentals of Neuroscience
- Human Physiology

Year two

Core

- Higher Skills in Biochemistry and Genetics
- Signals and Metabolic Regulation
- Structure, Function and Analysis of Genes
- Structure, Function and Analysis of Proteins
- The Human Genome and Disease

Optional

- Bacterial Genes and Development
- Developmental Biology
- Evolutionary Biology of Animals
- Microbial Biotechnology

Year three

Core

- Advanced Biochemistry
- Biochemistry of Disease
- Data Analysis
- Gene Regulation
- Research Project

Optional

- Advanced Developmental Biology
- Cancer Biology
- Conservation Genetics
- Human Variation
- Population Genetics

Year four (MSci only)

Core

- Research Presentation Skills
- Research Project

Optional

- Advanced Experimental Design and Analysis
- Cutting-Edge Research Ideas in Molecular Biology
- Process and Practice in Science

Modules may change, for example due to curriculum developments. The above list is a sample of typical modules that we offer, not a definitive list. The above year three modules will be changing for 2019 entry. The most up-to-date information can be found on our website at **nottingham.ac.uk/ugstudy/biochemistry**

BSc | MSci Biochemistry and Molecular Medicine

These courses allow you to specialise in the medically related aspects of biochemistry while still gaining a good foundation in biochemistry.

Biochemistry is important in nearly all aspects of medicine, from basic life processes to understanding changes occurring in disease and the development of new therapies.

Year one

The course will begin with an introduction to the fundamental aspects of cell biology, biochemistry, genetics, cellular control and core skills in biochemistry and genetics. You will also cover essential chemistry, exploring molecular structure, bonding and reactivity of organic molecules. Theoretical learning is supported by practical studies in cell biology, biochemistry, genetics and physiology.

Alongside core modules, you will have 20 credits of optional modules. You could choose these from the School of Life Sciences or from other schools in the University.

Year two

In the second year, you will study topics in greater depth. You will cover proteins and enzymes, from their structure to their mechanisms. Basic properties of DNA are explored, with practical sessions for you to practise manipulating DNA and express recombinant proteins.

The regulation and integration of various metabolic pathways will be covered in health and disease, along with techniques to study signal transduction and metabolism.

A dissertation is undertaken along with studies developing transferable skills of presentation, interpretation and criticism of scientific data.

Year three

A major feature of the third year is a research project that may be laboratory, bioinformatics or literature-based. You will choose a topic related to your interests and plan, carry out and present your findings. Throughout the project, you will be supported by a research academic.

Year four (MSci only)

In the final year, you will undertake a masters-level research project which will involve a literature review, a grant proposal, collection of data and appropriate analysis. The findings will be presented as a research paper. You will be supervised by a research academic and will benefit from professional research facilities.

In addition, you will have optional modules. You could choose to learn about how science and society influence each other, or explore new technologies and the implications on the scientific community.

Typical modules

Year one	Year two	Year three	Year four (MSci only)
Core	**Core**	**Core**	**Core**
■ Core Skills in Biochemistry and Molecular Medicine	■ Higher Skills in Biochemistry and Molecular Medicine	■ Advanced Biochemistry	■ Research Presentation Skills
■ Genes, Molecules and Cells	■ Signals and Metabolic Regulation	■ Biochemistry of Disease	■ Research Project
■ Fundamental Inorganic and Organic Chemistry	■ Structure, Function and Analysis of Genes	■ Biochemistry Research Project	**Optional**
■ Human Physiology	■ Structure, Function and Analysis of Proteins	■ Molecular Basis of Medicine	■ Cutting-Edge Research Ideas in Molecular Biology
Optional	■ The Pharmacological Basis of Therapeutics	**Optional**	■ Process and Practice in Science
■ Evolution, Ecology and Behaviour	**Optional**	■ Biochemistry of Cancer	
■ Fundamentals of Neuroscience	■ Intermediate Inorganic and Organic Chemistry	■ Cellular and Molecular Immunology	
■ Life on Earth	■ From Genotype to Phenotype	■ Molecular Diagnostics and Therapeutics	
	■ Macromolecular structure assembly and analysis	■ Molecular Microbiology and Infection	
	■ Microbial Biotechnology	■ Signal Transduction	
	■ Infection and Immunity		

Modules may change, for example due to curriculum developments. The above list is a sample of typical modules that we offer, not a definitive list. The above year three modules will be changing for 2019 entry. The most up-to-date information can be found on our website at **nottingham.ac.uk/ugstudy/biochemistry**

Engaging study, incredible results

Teaching and learning

You will learn through a variety of methods depending on the module. These may include:

- lectures
- seminars
- laboratory classes
- workshops
- tutorials

Much of the teaching is supported by a virtual learning environment. This allows teaching materials, self-tests and electronic feedback to be delivered directly to you and is accessible whenever and wherever you wish to study.

Assessment

Assessment varies on the module being studied, but is typically a combination of:

- exams
- essays
- dissertations
- laboratory reports
- presentations

Exams happen twice a year at the end of each semester.

Student support

When you start the course, you will be assigned a personal tutor. Personal tutors are members of academic staff in the school and they will:

- monitor your academic progress and check on your wellbeing
- provide exam marks and help you reflect on feedback
- act as a first point of contact for any guidance on academic or personal matters

At Nottingham, we offer small group tutorials. This ensures you have enough time to build a relationship with your tutor and benefit from their support. Your fellow tutees also provide peer support.

Additionally, the school has a dedicated Welfare Officer and a Student Liaison Officer who are available to help you adapt to university life and provide advice on more complex issues.

Key Information Sets

Key Information Sets (KIS) are comparable sets of information about full or part-time undergraduate courses and are designed to meet the information needs of prospective students. All KIS data is published on the Unistats website: **unistats.co.uk**

For Nottingham's KIS data, please see individual course entries at **nottingham.ac.uk/ugstudy**

Outstanding careers support

As a graduate, you will have obtained a broad range of skills valued by employers in areas such as scientific research, biotechnology, diagnostics, pharmaceuticals, epidemiology and more. Many graduates choose to pursue further study including masters, PhDs or graduate entry medicine.

96.5%
of undergraduates
from the School of Life Sciences secured work or further study within six months of graduation.*

£20,000
was the average starting salary of our graduates in 2017*

Recent graduate destinations:

- **Cambridge Bioscience:** technical sales (medical research)
- **EY:** audit trainee
- **Essex and Suffolk Water:** water quality scientist
- **Inpharmation:** business development consultant (pharmaceuticals)
- **NHS:** biomedical scientist
- **Retroscreen Virology Ltd:** project administrator (medical research)
- **Succinct:** assistant editor (media and communications)
- **Vectura:** scientist (pharmaceutical industry)
- **Roche Diagnostics:** scientist (pharmaceutical industry)

@UoNCareers
CareersUoN

Amplify your potential

Whether you already have a plan or need some inspiration, your Careers and Employability Service is here to help.

Academic excellence and employability go hand in hand at Nottingham. Your course, and the diverse student experiences we offer, will enable you to develop the skills and professional competencies required to thrive in the job market of the future.

We will help you explore your options, so you feel confident making choices about what you want to achieve. Our team will support you as you build your CV, search for jobs, prepare applications, practise your interview technique, and much more.

Get the Advantage

The career-enhancing Nottingham Advantage Award recognises and rewards your extracurricular activities. With a choice of over 200 modules, you can hone the key skills employers are looking for. From developing your leadership skills and learning a language to public speaking and volunteering, you will leave university with demonstrable experience that sets you apart from other graduates. For further information, visit **nottingham.ac.uk/careers/advantage**

* Known destinations of full-time home undergraduates who were available for work 2016/17. Salaries are calculated based on the median of those in full-time paid employment within the UK.

How to apply

In 2020/21, the University will provide generous bursaries to support lower-income students. For details, including eligibility, see **nottingham.ac.uk/financialsupport**

All applications for full-time undergraduate study at the University of Nottingham, including applications by international students, must be made through UCAS.

You can apply online at **ucas.com** and will be notified of decisions through UCAS Track.

Your personal statement

This is the section of your UCAS form that tells us most about you, and you should make the best use of it. Be as specific and detailed as you can – we would like to see that you are a student who can work hard, be self-motivated and make the best possible use of the opportunities that our courses offer you. We would also like to hear about any skills you have gained through extracurricular activities.

Minimum entry requirements

Unless otherwise stated in individual course profiles, all UK applicants should have GCSE English grade 4 (C) as a minimum.

Alternative qualifications

In this brochure you will find our A level and International Baccalaureate entry requirements but we accept a much broader range of qualifications. For more details, visit **nottingham.ac.uk/ugstudy/applying**

Flexible admissions policy

In recognition of our applicants' varied experience and educational pathways, we employ a flexible admissions policy. If we judge that your situation has adversely affected your achievement, then we will consider this when assessing your academic potential. Some courses may make a slightly lower offer. For more information about this policy, see **nottingham.ac.uk/ugstudy/applying**

Mature applicants

We encourage applications from mature students, who are defined as 21 years old and over. You should apply through UCAS. Find out more at **nottingham.ac.uk/mature**

International applicants

The University provides a range of information and advice for international applicants. If you are unable to attend an open day, we can meet you in your country at one of our overseas events or arrange an individual visit to the University. For further information please visit **nottingham.ac.uk/international**

Deferred entry

Applicants who wish to defer their entry by a year will not be at a disadvantage. Please tell us something about your plans for your gap year in your UCAS personal statement.

Equal opportunities policy

The University aims to create the conditions whereby students and staff are treated solely on the basis of their merits, abilities and potential, regardless of gender, race, colour, nationality, ethnic or national origin, age, socio-economic background, disability, religious or political beliefs, trade union membership, family circumstances, sexual orientation or other irrelevant distinction.

If you wish to declare a disability, please ensure that you have ticked the appropriate box on your UCAS application form. Disclosure of this information will not affect your application.

Live and study abroad as part of your degree

nottingham.ac.uk/studywithus/studyabroad

Accommodation to suit every budget and personal choice

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Around **15 minutes** by tram or bus from the city for music, food and shopping

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su.nottingham.ac.uk

Student Service Centres on all **UK campuses** for support and advice

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** The Times and The Sunday Times Good University Guide, 2019.*

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Choose from **9 modern languages** to study alongside your course

nottingham.ac.uk/language-centre

University of Nottingham
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TEF Gold

THE TIMES THE SUNDAY TIMES GOOD UNIVERSITY GUIDE 2019 INTERNATIONAL UNIVERSITY OF THE YEAR

THE TIMES THE SUNDAY TIMES GOOD UNIVERSITY GUIDE 2019 SPORTS UNIVERSITY OF THE YEAR

For undergraduate enquiries contact:
Student Recruitment Support Hub

+44 (0)115 951 5559

nottingham.ac.uk/contact

UoNLifeSciences

@UoNLifeSci

nottingham.ac.uk/life-sciences

This publication is available in alternative formats: +44 (0)115 951 5559

Add FSC here

This brochure has been drafted in advance of the academic year to which it applies. Every effort has been made to ensure that the information contained in this brochure is accurate at the time of publishing, but changes (for example to course content) are likely to occur given the interval between publication and commencement of the course. It is therefore very important to check our website for any updates before you apply for the course by following **nottingham.ac.uk/ugstudy**. Where there is a difference between the contents of this brochure and our website, the contents of the website take precedence.