

UNIVERSITY OF
EXETER

MEDICAL
SCHOOL

MEDICAL SCIENCES
SPORTS AND EXERCISE
MEDICAL SCIENCES

UNDERGRADUATE SUBJECT BROCHURE 2017



THE GLOBAL
TIMES HIGHER EDUCATION 100
UNIVERSITY



THE UNIVERSITY OF EXETER MEDICAL SCHOOL

The University of Exeter Medical School delivers four highly-regarded and innovative undergraduate degrees: the BSc in Medical Sciences, the BSc in Sports and Exercise Medical Sciences, the BSc in Medical Imaging (Diagnostic Radiography) and the Bachelor of Medicine, Bachelor of Surgery (BMBS). Our research extends from cutting-edge fundamental life science to studies of disease mechanisms; from innovative health services research to world-renowned patient-centred interventions. As a student here you'll benefit from the unparalleled insights that can be gained by spending time in such an exceptional research environment.

The combination of our scientific research and evidence-based approaches to learning and teaching will prepare you to become the scientists and doctors that will overcome current and future challenges in health and social care.

As a student of the Medical School, you'll also benefit from our partnership with the NHS, the cutting-edge research of the

Institute of Biomedical and Clinical Sciences in life and medical sciences and various translational health technologies (eg, Cardiovascular, Diabetes, Neuroscience and Ageing) and the research of other colleges across the University.



The Athena SWAN Charter recognises and celebrates good employment practice for women working in STEMM in higher education and research.

The University of Exeter Medical School have been awarded an Athena SWAN Silver department award. Find out more about Athena SWAN in the University of Exeter Medical School at www.exeter.ac.uk/medicine/about/athenaswan



Find us on Facebook and Twitter:
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www.twitter.com/UoE_Med



Your brain contains tens of billions of nerve cells communicating across an intricate web of connections. These complex circuits arise in the developing brain from neurons extending long, thin processes, called axons, which grow towards their targets guided by chemical signals in their environment. At the tip of the axon is a specialised structure called a growth cone which can read this chemical map using receptor proteins on its surface.

Growth cones contain an internal scaffold, called the cytoskeleton, which enables them to turn and sense their surroundings; it also provides the motor force to push them forward and power growth. A major barrier to understanding how the brain is wired up is deciphering how the growth cone steering is connected to the motor, that is, how the receptors turn external signals into changes in the cytoskeleton.

The brain's connections must be constantly remodelled throughout life to respond to and remember everyday experiences. This ability deteriorates with age and is lost in various neurological disorders such as dementia; unfortunately there is no way to repair this damage. Our aim is to provide a better understanding of how the brain forms, and apply this knowledge to developing new ways to treat congenital disorders or repair neurodegeneration. More details of our work can be found at www.axonology.com



Dr John Chilton, Senior Lecturer in Cell Biology

KEY INFORMATION AND ENTRY REQUIREMENTS

DEGREE PROGRAMME	UCAS CODE	TYPICAL OFFER	REQUIRED SUBJECTS
BSc Single Honours Medical Sciences	B100 3 yrs (B101 4 yrs)	AAB-ABB; IB: 34-32	At least one grade A and one grade B in GCE AL science subjects, one of which must be Biology; at least one HL6 and one HL5 in IB science subjects, one of which must be Biology.
Medical Sciences (Human Genomics)	B109 3 yrs (B119 4 yrs)	AAB-ABB; IB: 34-32	
Medical Sciences (Neuroscience)	B106 3 yrs (B116 4 yrs)	AAB-ABB; IB: 34-32	
Medical Sciences (Pharmacology and Therapeutics)	B105 3 yrs (B115 4 yrs)	AAB-ABB; IB: 34-32	
Medical Sciences (Health Research)	B107 3 yrs (B117 4 yrs)	AAB-ABB; IB: 34-32	
Sports and Exercise Medical Sciences	BC03 3 Yrs	AAA-AAB; IB: 36-34	GCE AL Biology grade B and another science at grade B; IB Biology HL5; and second science HL5
Sports and Exercise Medical Sciences with Professional Training Year	BC04 4 Yrs	AAA-AAB; IB: 36-34	

GCE AL/AS science includes: Biology/Human Biology⁺; Chemistry; Computing; Design and Technology; Electronics; Environmental Studies; Geography; Geology; Maths/Pure Maths/ Further Maths⁺; Physical Education; Physics; Psychology; Science (applied); Statistics.

Students joining the three-year programme will have the option to transfer to the four-year programme, and vice versa.

International students

You can find details of English language requirements and Foundation programmes at www.exeter.ac.uk/ug/international

For full and up-to-date information on applying to Exeter and entry requirements, including requirements for other types of qualification, please see www.exeter.ac.uk/ug/applications

Transfer to Medicine

In line with its career and employability drive, the Medical School allows up to eight students from the Medical Sciences programme to transfer to the first year of the BMBS programme after completion of their first year. This will be for students with minimum AAB at A level or equivalent qualifications, who have achieved average scores of First or 2:1 level in their first year of Medical Sciences. Further conditions may apply. For more up-to-date details of the admission process via this route you are advised to contact BMBS admissions team at team@medicine@exeter.ac.uk

Biosciences

The Medical Sciences programmes are delivered in conjunction with Biosciences. You may also be interested in programmes within the Biosciences portfolio including BSc Exercise and Sports Science, BSc Biochemistry and BSc Biological and Medicinal Chemistry; Study Abroad and professional placement variants of each of these programmes are offered. Full details of the programmes are available in the Biosciences subject brochure and online at www.exeter.ac.uk/ug/biosciences

Sport and Health Sciences

The Sports and Exercise Medical Sciences programmes (see page 10) are delivered in conjunction with Sport and Health Sciences. You may also be interested in programmes within the Sport and Health Sciences department including BSc Exercise and Sport Science, BSc Psychology with Sport and Exercise Science; Study Abroad and professional placement variants of each of these programmes are offered. Full details of the programmes are available in the Sport and Health Sciences subject brochure and online at www.exeter.ac.uk/ug/sport

BSC (HONS) MEDICAL SCIENCES

3rd in the UK for Biosciences in *The Guardian University Guide 2016*¹

3rd in the UK for student support and support for careers and employability

93% satisfied with teaching quality in the National Student Survey 2015²

83% of research classified as world-leading or internationally excellent³

A broad and flexible programme, looking at the science supporting medicine

Innovative approaches to individual and group learning

Programme information

Email: medicine@exeter.ac.uk

Phone: +44 (0)1392 725500

www.exeter.ac.uk/ug/medical-sciences

At present, many scientific discoveries often do not leave the laboratories in which they are made. At the same time, the needs of front-line clinicians – and their patients – often go unheard by those doing research. This career-focused degree trains you to fill these gaps, and thereby enhance the lives of patients.

Our Medical Sciences degree offers an innovative approach to learning that includes lectures from world-leading experts; supportive small-group learning; internationally renowned e-learning resources; hands-on sessions in research laboratories and clinical settings; inspirational clinician-scientist-patient sessions; and worldwide professional training placements. The curriculum combines contemporary medical science with the training required to undertake cutting-edge research.

Career opportunities and employability training run throughout the programme: after your second year, you could choose to

take a Professional Training Year (PTY) and spend a year undertaking research at one of the world's leading universities, find out what it's really like to work in knowledge industry or work in the NHS research environment. This optional year will increase your employability and reinforce your CV.

The programme has been developed in consultation with industry employers, the NHS and academia and provides a firm foundation in the core biomedical and biomolecular sciences, alongside an insight into medical practice and the biotechnologies used to prevent, test and diagnose disorders and treat patients. You'll develop an integrated, scientific knowledge that you can put into practice in a clinical setting and robust research skills, plus creative and inquisitive communication, leadership, critical appraisal and problem-solving skills. These key skills will prepare you for a career helping to progress scientific discovery into clinical and medical practice, ultimately to improve human health.

¹ Medical Sciences is included with other related subjects in this category

² Percentage of Medical Sciences students who agreed they were satisfied

³ Research Excellence Framework 2014 based on the percentage of research categorised as 4* and 3*. Medical Sciences is returned to the Clinical Medicine Unit of Assessment

PROGRAMME DETAILS

BSc (Hons) Medical Sciences

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Our Medical Sciences degree prioritises the science that underpins medicine and clinical practice, preparing you to translate scientific discoveries and technological advances into improved healthcare. To achieve this, the first part of the programme gives you a wide-ranging insight into how the human body normally works. We study this through small-group sessions (in the *Integrated Clinical Science* and *Expanding Horizons* modules), lectures and hands-on laboratory practicals.

We then build upon this foundation to see how things can go wrong in the body due to disease and how normal function might be restored. We are keen that you develop a holistic understanding of human health. For example, whilst pharmaceutical intervention may be appropriate in some conditions, other conditions might be helped more by using technology or engineering. You will be able to see this for yourself, thanks to the wide-range of placements that run throughout the programme.

The longest of these placements is the Professional Training Year in the third year, when many students take the option to spend a whole year working in industry or a university or NHS laboratory. Whether you chose to do the three or four-year programme, your final year will be spent specialising in the area that interests you most, tailoring your degree to match your specific career ambitions. You'll also undertake a two-term long independent research project under the supervision of an academic.

Pathways

All students complete the same first year regardless of whether you choose Medical Sciences or one of our four Medical Sciences pathways. Our programme is designed to be flexible so that you can change between pathways, or onto a pathway at the end of year one. In year two, modules are introduced which are designated to the pathways, and in the final year you will study advanced pathway-specific modules and complete a research project within your chosen area.

These pathways have been developed through discussions with the scientific community to make sure graduates have the skills and knowledge needed to work in the ever evolving workplace. These areas link with the research strengths of the Medical School; this means that you will learn about the most relevant and up-to-date thinking in these fields.

Please note that the modules listed relate to the core BSc (Hons) Medical Sciences programme. If you study one of our pathways core and optional modules will differ slightly in year 2 and the final year. Refer to our website for the most up-to-date module information.

Human Genomics

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Genomics is the study of the structure and function of our genome. Genes are regulated to produce the RNAs and proteins needed for life, and these factors may be influenced by internal factors (such as genetic variation or disease states) or external factors (such as our environment). Powerful technologies in genomics allow us to sequence a person's entire genetic code, giving insight into the mechanisms of normal and pathological states, as well as the identification, diagnosis and treatment of genetic disorders.

Topics/modules will include:

- Medical Genetics;
- Medical Genomics;
- Pharmacogenomics;
- Genomics and Introductory Bioinformatics;
- Molecular Biology of the Gene;
- Final Year Project in Human Genomics;
- Expanding Horizons of Science in Human Genomics.

Neuroscience

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

The study of the Central (brain, the spinal cord) and the Peripheral Nervous Systems, and how they interact with the internal and external environments in normal and disease states. Study neurological and behavioural disorders and gain an insight into the latest research methodologies in these areas.

Topics/modules will include:

- Foundations in Neuroscience;
- Frontiers in Neuroscience;
- Neuropharmacology;
- Expanding Horizons of Science in Neuroscience.

Pharmacology and Therapeutics

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Study how drugs are designed and how they work in the body. Become familiar with research and development in the new generation of 'smart' drugs and how they are being targeted for specific sub-set of disorders.

Topics/modules will include:

- Induction to Pharmacology;
- Rational Drug Design;
- Pharmacogenomics;
- Neuropharmacology;
- Pharmacology and Medicinal Chemistry;
- Expanding Horizons of Science in Pharmacology.

Health Research

LOCATION: EXETER (ST LUKE'S AND STREATHAM CAMPUSES)

Consider the key principles that underpin the successful design and implementation of clinical trials. Study the process of designing and undertaking a clinical trial including: applying for funding; building a team; and the different techniques that could be used for successful results. Learn the complex network of activities from patient recruitment to monitoring and outcome, and the management of relevant organisations.

Topics/modules will include:

- Introduction to Health Research;
- Health Research: Clinical Trials;
- Health Research: Innovation and Implementation;
- Health Research: Design, Measurement and Evaluation;
- Health Economy.

MODULES

KEY C = Core
● = Optional

Please note that the modules listed relate to the core BSc (Hons) Medical Sciences programme. If you study one of our pathways, core and optional modules will differ slightly in year 2 and the final year. Refer to our website for the most up-to-date module information.

Year 1 Modules

Module Name	
Biochemistry	C
Expanding Horizons 1	C
Fundamental Principles for Medical Scientists	C
Genetics	C
Integrated Clinical Science I	C
Cell and Developmental Biology	C
Microbiology	C

Year 2 Modules

Module Name	
Expanding Horizons 2	C
Genomics and Biotechnology	C
Integrated Clinical Science 2	C
Principles of Good Clinical Practice and Research	C
Analysis of Biological Macromolecules	●
Advanced Cell Biology	●
Molecular Biology of the Gene	●
Medical and General Microbiology	●
Anatomical Science	●
Immunopathology	●
Academic and Professional Support	●

Professional Training Year (PTY) optional competitive entry

Module Name	
PTY Placement and Report	C
Learning from the PTY	C

Final Year Modules

Module Name	
Expanding Horizons 4 Research project and PDP	C
Integrated Clinical Science 4	C
Cellular Basis of Immunity	●
Frontiers in Molecular Cell Biology	●
Managing Clinical Trials: Putting Science into Practice	●
Cytoskeleton in Human Disease	●
Medical Imaging: Principles and Applications	●
Microbial Effectors of Disease	●
Molecular Basis of Infection	●
Pharmacology and Medicinal Chemistry	●
Bioinformatics	●
Horizons of Biochemical Research	●
Energy Metabolism	●
Leadership and teams	●
Psychology Applied to Health	●
Academic and Professional Support	●

Advantage and opportunity are the two main factors that make this Medical Sciences degree a worthy consideration. The first two years provide you with the confidence and teamwork skills necessary to not only do well during the Professional Training Year, but to enjoy it. These skills mean you make the contacts required to take the next step in your career. On top of this, you have an edge over other graduates in the job market. Thanks to the Professional Training Year programme I returned to the US to continue the research I began during the year, with leaders in the field of vascular biology and ophthalmology.

Mark Graham, Medical Sciences graduate



MODULES CONTINUED

Year 1

In your first year you will explore the science that underpins the advancement of modern medical practice. The emphasis is on understanding the normal functioning of the human body, from enzymes through to whole biological systems. Without this core knowledge of how the body works, it would be impossible for us, as scientists, to devise the new diagnostic tests, drugs or treatments that will best benefit patients.

Alongside traditional lectures, tutorials and laboratory practicals, you will engage in small group work where you are given the

freedom to explore a scientific topic under the expert guidance of one of our tutors (in the *Integrated Clinical Science* and *Expanding Horizons* modules). Further tutor-guided learning occurs within our Life Science Resource Centre, supported by state-of-the-art technology-enhanced learning resources (the *Integrated Clinical Science* modules). Your core laboratory skills will be developed through laboratory-based practicals that run alongside and support your other sessions. Some sessions also involve a doctor, scientist and patient to explore key clinical cases from three different perspectives.

You will begin to compile your Personal Development and Professionalism Portfolio, in which you chart your progress from a new student to a professional individual ready for the world of employment. You'll do this by analysing your academic performance and the frequent feedback offered by the school to identify opportunities for personal and professional development to help you achieve your career goals. Support for your academic progress and career planning is provided by your personal tutor and through various workshops and training sessions.

Core modules:

Biochemistry

Biochemistry is an introductory module providing the essential biochemical knowledge for understanding all living processes. You will study protein structure, enzyme kinetics and basic metabolism; understanding how each of these processes function and shape the living cell. Practical sessions offer you vital hands-on experience, learning key biochemical techniques and how to apply them.

Expanding Horizons 1

This module will provide you with the opportunity to develop the important academic and professional skills of reflective practice and writing, the critical analysis of published data and scientific writing in the form of a literature review. This module will also show you how basic science can improve healthcare by introducing you to expert researchers and gaining an insight into what they do. The day-to-day life of a researcher will be demonstrated in scheduled visits to laboratories in both university and healthcare environments, and in seminars detailing the biomedical science and clinical concepts of specific diseases from the view-point of doctor, patient and researcher.

Fundamental Principles for Medical Scientists

Introduces the underlying concepts required for scientific investigation, including modern laboratory techniques, experimental design and presenting scientific data. Particular emphasis is given to learning the quantitative skills required to analysing experimental results. Team development training and small-group tutorial work are features of this module.

Genetics

Genetics is fundamental to understanding life sciences. In this module you will gain an understanding of how information is stored and inherited in living organisms. You will consider genetics from the perspectives of DNA structure, gene expression, genome replication, heredity, genes in populations, and evolution. Modern techniques in DNA sequencing and the exploration of gene diversity will be introduced, with examples from humans and other organisms. In laboratory practicals you will prepare and analyse your own DNA, testing the Out-of-Africa hypothesis of human evolution.

Integrated Clinical Science 1

This module links the key scientific concepts you explore in other modules to clinical practice. Working in small groups, you will use illustrative clinical science scenarios to study the core principles of biomedical disciplines relating to human function (including biochemistry, physiology, pharmacology, neuroscience and immunology) and observe how these subjects interact and interrelate within normal human function. You'll also have an opportunity to gain an understanding of some key medical technologies used to assess human health and function.

Cell and Developmental Biology

This module takes you on a trip around the fundamental unit of life – the cell. With particular emphasis on its dynamic nature, and using examples from bacteria to plants to animals, you will learn how cells use membranes and proteins to organise themselves, and how they communicate both within and without their confines. It also considers the guiding principles that govern formation of a multicellular organism such as cell division and tissue development.

Microbiology

This module focuses on the microbiological world, covering, bacteria, fungi and protists. Topics including evolution, structure and function and the impact of microorganisms are covered, with an emphasis of their practical applications. You will continue to build on your practical techniques, developing microscopy and microbiological skills.

Year 2

The second year focuses on the scientific basis of important diseases, beginning with some fundamental insights into the ways in which human biology goes awry in disease. This knowledge is then used to explore how cutting-edge scientific technologies can be exploited to advance disease diagnosis and treatment.

Within a variety of learning environments, including lectures, tutorials, workshops, laboratory practicals and small-group

learning, you will have opportunities to investigate and debate how disease develops and how healthcare can be improved. Key aspects of applied research are explored including clinical research methods and its design and setting within healthcare environments. Your understanding of these areas develops through a variety of hands-on learning opportunities which enhance your practical research skills and knowledge of contemporary medical research issues.

You'll continue to develop your academic professionalism and if you plan to undertake the Professional Training Year placement, you'll be supported in making your application.

Core modules:

Expanding Horizons 2

Working both individually and as part of a research team, this module develops your research enquiry skills. It consolidates your growing skills in collection, interpretation and presentation of research evidence critical in a variety of cutting-edge scientific areas. With the assistance of your personal tutor you will also develop your academic skills and professional aptitudes in leadership, teamwork and communication.

Genomics and Introductory Biotechnology

We focus on state-of-the-art technology for analysis of genomes and gene expression and critically discuss their use in biological research and biotechnology. Practical classes consolidate use of internet-based genomics tools and provide a platform to critically discuss case studies.

Integrated Clinical Science 2

Building on the first year module, you'll utilise small group learning to investigate the biology of some key human diseases. Through collaborative and individual study, under the guidance of an expert tutor, you will develop your understanding of core human diseases and cutting-edge medical technologies applied to their detection, diagnosis and treatment. You will also gain an understanding of how the successful translation of science may further advance medical practice in the future.

Principles of Good Clinical Practice and Research

The best research blends knowledge, skill and inspiration; this module combines all three and will unlock your research potential. Working wherever possible in small groups and hands-on, we begin with an historical and philosophical perspective. We then consider experimental design, explore how critical thinking supports discovery and see why ethics matter. You'll then have a chance to put all this into practice by designing, conducting and analysing your own research project. Throughout, we help you develop the skills of presentation and writing that will ensure you can share your ideas in whatever career you pursue.

Optional modules. You can select two from the following:

Analysis of Biological Macromolecules

This module introduces you to the state-of-the-art methods used to analyse and characterise biological macromolecules. Lectures are supplemented by two one-day practical sessions where you will work in groups and learn how to fractionate proteins from cells, purify proteins by different chromatographic methods, assay specific enzymes and analyse results by gel electrophoresis. These techniques will be very valuable to those of you who will carry out a research project in your final year and those wishing to continue into a research career.

Advanced Cell Biology

This module builds on the first year module, *Cell and Developmental Biology*, focusing on processes such as maintenance of cell shape, cell division, cell motility and autophagy, and the regulation of these processes, to provide you with an understanding of the complex spatio-temporal organisation required for cell function.

Molecular Biology of the Gene

This module covers a range of topics including cellular structure, genome organisation and replication, and genome expression, including protein modification and targeting.

Medical and General Microbiology

This module explores the relationship of the microbial world with our environment and ourselves. Microbial infective potential and the human response to infection form a large portion of this module. Specific examples of disease-causing organisms and disease processes are explored. This module is supported by guest lectures from active researchers and lecturers within medicine and from a veterinary school. The practical classes will train you in the aseptic techniques which are essential skills for safe working practice within microbiology.

Anatomical Sciences

This module provides you with a brief overview of human evolution and development to gain a conceptual understanding of the structure and function of the human body. Using selected examples of body systems, structures and regions, you will explore key concepts and principles that underpin understanding of the structural organisation and function of the human body. You will be applying these anatomical principles within a clinical context and explaining the basis for recognising clinical manifestations of disease processes and congenital malformations.

Immunopathology

In this module you will explore how your immune system is vital for protection from disease. Immunology is also fundamental for preventing the spread of disease, through vaccination, as well as treating infectious conditions, autoimmune diseases and even cancer. You will learn to identify the major components of the immune system and how they relate to diseases which have major global impact, such as malaria. You will also recognise how immunology has been exploited for the development of therapeutics (such as monoclonal antibodies) and for diagnostic assays.

MODULES CONTINUED

Professional Training Year

Our students have been awarded prestigious placements in major pharmaceutical companies, such as AstraZeneca, BTG International and Pfizer. Placements with these companies are open to all UK undergraduates, and our students are closely supported by us throughout their application. Some of the research organisations our students have previously undertaken placements in includes:

- Research laboratories within the NHS;
- Harvard Medical School (USA);
- Johns Hopkins University (USA);
- University of California (USA);
- Public Health England;
- Universities of London (King's College, Imperial), Exeter, Oxford and Southampton.

Students who are not successful in securing a PTY placement or who would like to only study for three years, will continue directly from the second year into the final year of the programme.

Core modules:

Expanding Horizons 3: Learning from the Professional Training Year	This module helps you to focus and reflect on your PTY to ensure that you gain the maximum benefit from the year. During your placement you are closely supported by both your workplace supervisor and by a visiting PTY tutor.
Integrated Clinical Science 3: PTY Placement and Report	Here you will gain valuable experience of working within a professional clinical and medical research environment. You'll also further develop evidence-based analysis of your academic and professional experience throughout your placement.

Professional Training Year Learn from the Professional Training Year

Focus and critically reflect on your PTY to ensure that you gain the maximum benefit from the year. During your placement you are closely supported by both your workplace supervisor and by a visiting PTY tutor normally acting as your personal tutor.

Gain valuable experience of working within a professional clinical and medical research environment. You'll also further develop evidence-based analysis of your academic and professional experience throughout your placement culminating in a scientific report and its presentation.

Final Year

In your final year you have opportunities to study and undertake research to help improve current medical knowledge and practice. In addition to the core modules, you can select from a range of optional specialist advanced modules, enabling you to tailor your degree to match your own specific interests and career ambitions.

You'll look at authentic and complex clinical case scenarios and, working as a team, you'll apply evidence-based scientific theory and explore emerging new health technologies to help improve patient health and advance fundamental understanding of pathologies. During this year, you will undertake a biomedical science/clinical research project,

closely supervised by an expert research professional.

You'll also complete your Personal Development and Professionalism Portfolio. Support will be provided to help you consider your career options and help consolidate your CV and interview technique.

Core modules:

Expanding Horizons 4	In this module you'll have an opportunity to undertake your own independent and original piece of clinical research under expert staff supervision. Research projects deal with questions and issues at the cutting-edge of medical developments. You'll design the research project, collect and analyse data and then write up the results. In addition, the module will also enhance your future employability by consolidating your personal and professional skills.
Integrated Clinical Science 4	Continuing on from the first and second year modules, you'll apply critical appraisal of technological advances, scientific discoveries and published research to contemporary healthcare problems, thereby illustrating how science translation advances current clinical practice. Major areas of translational science such as genetics, diabetes, immunology and neuroscience will be explored within extensive medical and clinical contexts.

Optional modules. You can select three from the following:

Cellular Basis of Immunity	This module introduces you to the science of immunology. Key components of the immune system are explored and current research topics are used to illustrate how antibodies are engineered and used in the diagnosis and prevention of diseases in contemporary medicine and agriculture.
Frontiers in Molecular Cell Biology	Selected topics at the forefront of cell biology are explored in this module and you will be introduced to the range of experimental techniques that are used to investigate how cells function. In addition, you'll gain understanding of the medical relevance of some cellular processes such as mitosis, motors in membrane trafficking, function and morphogenesis of cilia and bacterial environmental sensing and chemotaxis.
Managing Clinical Trials: Putting Science into Practice	This module explores the key scientific principles underpinning the successful design, implementation and monitoring strategies associated with a new clinical technology trial. You will gain a thorough understanding of the key principles that influence new clinical trial design; including but not limited to the role of diagnostic biomarkers, the development of complex interventions and the role of health prevention.

Cytoskeleton in Human Disease	This module will provide insight into the molecular basis of human diseases. The emphasis is on the role of the cytoskeleton and intracellular motility in various neurodegenerative genetic disorders such as Lissencephaly, Alzheimer's or Huntington's disease, bacterial listeriosis and tuberculosis, organelle biogenesis disorders, vertebrate left-right asymmetry defects and in deregulation of mitosis in cancer.	Psychology Applied to Health	Health and illness are not only influenced by biological factors (viruses, bacteria etc.) but also by psychological and social factors, including emotions, personality, and our relationships with other people. Understanding the interplay between these different influences is critical to medical research and clinical practice. Students on this module are introduced to contemporary research in key areas of psychology applied to health (including stress, social support, medication adherence), and will study how research findings are translated into practice in healthcare settings.
Medical Imaging: Principles and Applications	This module provides an understanding of the key scientific principles and clinical research applications of current and emerging innovations in medical imaging. Medical imaging uses ionising and non-ionising radiation in order to visualise anatomical structures and physiological processes, diagnose and treat pathologies, monitor disease progression and the effects of therapeutic interventions.	Frontiers in Global Health	A global perspective on health and medical provision is becoming increasingly important when considered in the context of population dynamics such as traveling, immigration and increasing urbanisation (and possible links to new or known diseases (re-) emerging). In the future there will be health and wellbeing challenges that will be trans-national and different from current challenges. Many of these issues concern infectious diseases that can spread rapidly at the international level, and/or are related to zoonoses, while many chronic diseases are increasing in the developing world with increased life expectancy and urbanisation. We will examine emerging issues in this field to improve world health as measured by life expectancy, quality of life and childhood mortality. The international healthcare workforce, its effectiveness and sustainability will be studied along with the changing lifestyle, outbreaks and disease control, innovation and health technology assessment and manmade toxins.
Microbial Effectors of Disease	Microbial effectors are at the very heart of the ability of some microorganisms to cause disease. They are the molecules used by pathogens to subvert host functions and to cause many of the symptoms of disease. They are often a key component of vaccines and targets for compounds that neutralise their activity and therefore prevent disease; and are frequently the targets for diagnostics. Through this module you will learn about the range of types of effector produced by pathogenic microbes and the different ways in which they work.	Living with Environmental Change	The environment is changing locally and globally, from climate change to biodiversity loss and ecosystem degradation, with increasing pressures on life-sustaining resources (including water, food, clean air, energy and materials). This environmental change is in the context of rapidly ageing populations and growing inequalities around the world. This in turn has important implications for human health and wellbeing. We will examine the wellbeing, resiliency, and sustainability of vulnerable human populations and ecosystems in the face of rapid global environmental change.
Molecular Basis of Infection	Both bacterial and fungal pathogens pose a significant threat to our health and that of the agricultural crops upon which we depend. In this module we will explore the strategies adopted by pathogens that allow them to gain entry into a host and survive within the host environment. You will gain insight into how disease might be controlled in the future through evaluating the molecular basis of pathogenicity.		
Pharmacology and Medicinal Chemistry	This module offers you an insight into the design of drug molecules, the biological macromolecules they are designed to target and their mode of action. It covers a broad area of the subject from the chemical design to allow molecules to get to their target in the human or bacterial cell, the biological targets and mode of action and their medical application. Lectures will include external speakers who are working at the forefront of this area in industry and in the medical profession. It will be of invaluable experience for those wanting to pursue a career in medicine or medically-related research, the pharmaceutical or biotechnology industries.		
Horizons of Biochemical Research	Biochemistry, the study of chemical processes in biological systems, is a broad discipline, encompassing biological aspects of chemistry, study of biological macromolecules, and the many ways in which chemicals are synthesised and degraded in organisms. This module seeks to engage you with recent research in diverse areas of biochemistry, giving an insight into the progress that has been made, the range of areas being explored, and the challenges for the next generation of scientists. You will actively engage with the literature across a series of six distinct areas of biochemistry, gaining a broad understanding of the current state of the art.		

BSc Sport and Exercise Medical Sciences

(also available with Professional Training Year)

LOCATION: EXETER (ST LUKE'S CAMPUS)

Taught jointly by the University of Exeter Medical School and Sport and Health Sciences, this programme blends an understanding of the pathology, prevention and treatment of acute or chronic disease/injury, alongside an insight into the science underpinning the optimal preparation, performance and rehabilitation of the athlete or healing patient. The combination of medical sciences and sport and health sciences enables you to develop a holistic understanding of the human body and exercise and physical activity. The four-year version, with Professional Training Year, offers you the opportunity to undertake a relevant work placement with an employer within the health sector or another appropriate sector.

Programme details

The programme responds to a growing public health agenda which seeks to prevent disease and treat targeted disorders through appropriate physical activity, lifestyle-related health behaviours and nutrition. It provides a broad range of career opportunities particularly within medical sciences, rehabilitation, sport science, health and wellbeing sectors. On graduation, you will be well positioned to support the preparation and rehabilitation of athletes, with patients recovering from injury or illness, and to undertake roles aimed at improving lifestyle through increasing levels of sport and exercise in the population at large. You will also be well placed to pursue further postgraduate study in, for example, Sport and Exercise Medicine, Medicine, Physiotherapy, Occupational Therapy, Sports Nutrition or Nursing.

The first part of the programme gives you a wide-ranging insight into how the human body normally works. We study this through small-group sessions (in the *Integrated Clinical Science* and *Expanding Horizons* modules), lectures and hands-on laboratory practicals.

We then build upon this foundation to see how things can go wrong in the body due to disease and how normal function might be restored. We are keen that you develop a holistic understanding of human health. For example, whilst pharmaceutical intervention

may be appropriate in some conditions, other conditions might be helped more by using technology or engineering. You will be able to see this for yourself, thanks to the wide-range of placements that run throughout the programme.

The longest of these placements is the Professional Training Year in the third year, when many students take the option to spend a whole year working in industry the sports and exercise environment or a university or NHS laboratory. Whether you chose to do the three or four-year programme, your final year will be spent specialising in the area that interests you most. You'll also undertake a two-term long independent research project under the supervision of an academic.

The modules provide examples of what you can expect to learn on this degree course based on recent academic teaching. The precise modules can vary in future years depending on staff availability and research interests, new topics of study, timetabling and student demand.

Year 1

- Foundations of Biomechanics;
- Sports Training Physiology;
- Foundations of Sports Nutrition;
- Foundations of Exercise and Sport Psychology;
- Integrated Clinical Science 1;
- Expanding Horizons 1;
- Fundamental Skills for Medical Scientists.

Year 2

- Exercise Physiology;
- Biomechanics and Kinesiology;
- Sport Psychology;
- Integrated Clinical Science 2;
- Principles of Good Clinical Practice and Research.

Options from:

- Strength, Conditioning and Athletic Training;
- Sports Nutrition;
- Skill Acquisition;
- Learning and Teaching in Physical Education;
- Expanding Horizons 2;
- Foundation in Neuroscience;
- Introduction to Pharmacology;
- Medical Genetics;
- Introduction to Health Research.

Final Year

- Dissertation or Research Project and Personal Development Planning;
- Medical Imaging – Principles and Applications;
- Rehabilitation Medicine.

Options from:

- Biomechanical Analysis of Human Movement;
- Clinical Exercise Prescription;
- Employability and Career Development;
- Factors Affecting Performance;
- Paediatric Exercise
- Physiology;
- Sport, Physical Activity and Health;
- Sport Psychology.

LEARNING AND TEACHING

Throughout the programme, you benefit from a careful blend of innovative and traditional teaching methods employed by both the Medical School and the Biosciences department. A variety of stimulating, cutting-edge resources are also available to support your learning.

Structured small group learning sessions

In tutor-led groups of about 12-14 students, you'll investigate key scientific concepts and systems presented in the form of triggers. The style of trigger varies week by week but will include patient-based clinical case studies, current media-worthy medical science breakthroughs and extracts from research papers. Within your group, you will discuss the trigger and report back your individual research findings, coming to a shared understanding of the medically relevant scientific knowledge important to fully understand the trigger. Throughout your degree you'll have the opportunity to apply your increasing knowledge to new triggers and build on the depth of your understanding. These small group sessions will also develop your critical thinking, problem design and solving, teamwork, presentation and lifelong learning skills which are essential for your career development.

Life Sciences Resource Centre activities

You'll be supported in your exploration of the human biomedical science that is presented in your small group sessions by the rich variety of state-of-the-art resources available in the Life Sciences Resource Centre.

These resources include anatomical models, multimedia and IT resources, and a well-stocked library. Tutor-led activities will drive your engagement with selected resources in order to increase your understanding of the small group triggers.

Clinical Skills Resource Centre sessions

You'll work with the specialist equipment available in this facility to consolidate your understanding of human physiology and train you in key practical clinical research techniques and patient communication skills. You'll have access to state-of-the-art simulated patient mannequins and other equipment which you would find in a clinical environment.

Lectures and seminars

Large group lectures and cutting-edge research seminars delivered by academics as well as external speakers will complement your studies. Lectures may contain students from a variety of different programmes for which the lecture content is relevant.

Practical laboratory sessions

You'll develop your laboratory skills in the Biosciences teaching laboratory on the Streatham Campus, which is equipped with the best available instruments for observational, experimental and numerical aspects of biosciences including a range of biochemical, molecular, physiological and electronic apparatus. Computer-based practical sessions are held in the IT suite on the St Luke's Campus. Helpful and friendly technicians and demonstrators are always available during practical sessions to ensure

that you get the most out of your training sessions.

Online learning

Your learning will be supported by the University's virtual learning environment. You will have individual access to electronic journals, content-rich study guides, and interactive online learning materials covering various science disciplines, formative online assessments and group discussion forums.

Assessment

Regular assessment is used to help provide you with frequent feedback, enabling you to identify your strengths, as well as areas for improvement. Feedback is provided in a number of different ways including online written feedback and self, peer, tutor or small-group feedback.

Assessment in the early stages of the degree tends to be more knowledge-based to ensure a strong and broad grounding in the subject area, with some opportunities for essay writing and critical analysis. Assessment in the later degree stages tends to assess your critical appraisal skills, depth of understanding and your ability to think independently. Some assessments take place in groups, focusing on the team product or how well you lead your team to complete a task. A variety of assessment methods are employed across the programme, each aligned to the intended learning outcomes of the modules. Assessment formats include multiple-choice tests, essays, structured practical exams, reflective essays, oral and poster presentations, scientific report writing, short-answer question tests and independent project work.



I'm Director of the European Centre for Environment and Human Health and, as both a medical doctor and public health researcher, I have over 25 years of experience in environment and health issues. We look at how environmental factors, such as climate change, are likely to affect health and wellbeing. As part of this work, I'm considering how we can impact the 'health' of the oceans and how

these changes might lead to increased risks, such as those from harmful algal blooms. Working closely with organisations such as the Met Office and Public Health England, I'm exploring new ways to analyse large sets of data. I hope that, by combining different sources of information, we can shed new light on the relationships between our surroundings and our health, ultimately helping to improve public health and the environment in the UK and beyond.

Professor Lora Fleming, Director of the European Centre for Environment and Human Health

SUPPORT FOR YOUR LEARNING

Academic support

All students are assigned a personal tutor by the Medical School for the three or four years of the programme. Your personal tutor is responsible for monitoring and supporting your academic progress and offers support and guidance in remediation, module choice advice and career development via the Personal Development Planning programme. Your personal tutor will also support you through career and employability workshops and training events.

In addition, you'll be assigned a programme adviser from Biosciences who will provide you with extra academic support for Biosciences modules.

You will benefit from student representation in the Student-Staff Liaison Committee. This organisation enables student opinions

and interests to be recognised, and provide an effective channel for formal communications between students and academic, clinical and administrative staff.

Wellbeing

We offer a friendly and supportive environment from your first day with us. Our Pastoral Tutor team can provide assistance with non-academic issues.

The University also provides extensive wellbeing support through a range of services including counselling services, advice units, chaplaincy, childcare facilities and student health centres. Further information can be found at www.exeter.ac.uk/undergraduate/life/wellbeing

CAREERS AND EMPLOYABILITY

This programme is designed to prepare you for employment in a wide variety of professional careers and helps to develop the key transferable skills valued by employers. These skills range from identifying and solving problems, to efficient communication, leadership and management. Key vocational skills, such as advanced laboratory training within molecular biology, also enhance your employability. Additionally, those students undertaking a Professional Training Year have an additional and invaluable insight into the professional workplace, having also potentially gained an employer reference for their CV.

Careers and employability activities are integrated within our core modules entitled Academic & Professional Support delivered throughout the programme.

Science graduates compete well in the wider graduate employment market, as they offer

strong analytical, formulating and problem-solving skills valued highly across all sectors.

Future career pathways include:

- postgraduate study, either at a university or with the NHS;
- employment in knowledge industries, such as pharmaceuticals or medical technology. Roles might include research and development, clinical trials, or sales and marketing;
- training and employment to become a Scientific Officer in the Civil Service;
- NHS management;
- postgraduate training for the NHS Scientist Training Programme (STP);
- graduate entry to professional degrees such as radiotherapy;
- graduate entry to medicine*, dentistry or other accredited healthcare programmes.

* Up to eight final year students will have the opportunity to be interviewed for entry to BMBS without the need to sit the GAMSAT examination. Selection for this will be by a competitive process. For further details contact medicine@exeter.ac.uk.



I came to an Offer-Holder Visit Day for the Medical Sciences programme, where I had a look around the campus, took part in a teaching taster session and thought 'wow, this is the course for me'. I've really enjoyed it. The campus is beautiful and Exeter as a university is really good; it is in the top 10 and the Russell Group. I have enjoyed the Professional Training Year the most; it was a chance to go out and work in a research environment. This was a really great experience. I also liked the style of learning which is based around group work where we would examine a particular topic each week.

At the start of the week we'd get a trigger. We would then, as a group, set our own questions and through self-directed learning aim to solve these. At the end of the week we would come back together and present to the group. The sessions at the start and the end of the week are facilitated by an expert in the area who would make sure we stayed on topic or help if we had any questions. I've found this style really helped me to remember the content much better than other styles I've experienced.

Sam Wallis, Medical Sciences graduate



ABOUT THE UNIVERSITY OF EXETER

Ranked in the top 100 universities in the world

Top 10 in all major UK league tables

7th in *The Times and The Sunday Times Good University Guide 2016*

Our teaching is inspired by our research, 82% of which was ranked as world-leading or internationally excellent in the 2014 Research Excellence Framework

Six months after graduation, 95% of our first degree graduates were in employment or further study (HESA 2013/14)



VISIT US TO FIND OUT MORE

Open Days

You can register your interest now for our Open Days and receive priority access to book your place*; visit www.exeter.ac.uk/ug/opendays

* Pre-registration only guarantees priority access to the booking system and is not an absolute guarantee of a place at any of our Open Days. Booking is essential and is on a first-come, first-served basis.

Exeter campuses:

Friday 3 June 2016

Saturday 4 June 2016

Saturday 1 October 2016

Campus Tours

We run campus tours at the Streatham Campus each weekday, and at St Luke's Campus on Tuesdays and Fridays during term time. You'll be shown round by a current student, who'll give you a first-hand account of what it's like to live and study at the University.

Phone: +44 (0)1392 724043

Email: visitus@exeter.ac.uk

www.exeter.ac.uk/ug/medical-sciences



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