

Programme Specification: Undergraduate

For students starting in Academic Year 2020/21

1. Course Summary

Names of programme and award title(s)	BSc (Hons) Natural Sciences BSc (Hons) Natural Sciences with International Year (see Annex for details) BSc (Hons) Natural Sciences with Work Placement Year (see Annex for details)
Award type	Single Honours
Mode of study	Full-time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 6
Normal length of the programme	3 years; 4 years with either the International Year or Placement Year between years 2 and 3
Maximum period of registration	The normal length as specified above plus 3 years
Location of study	Keele Campus
Accreditation (if applicable)	n/a
Regulator	Office for Students (OfS)
Tuition Fees	<p>UK/EU students:</p> <p>Fee for 2020/21 is £9,250*</p> <p>International students:</p> <p>Fee for 2020/21 is £16,500**</p> <p>The fee for the international year abroad is calculated at 15% of the standard year fee</p> <p>The fee for the work placement year is calculated at 20% of the standard year fee</p>

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

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

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

2. What is a Single Honours programme?

The Natural Sciences degree allows you to study a broad range of disciplines within a single honours programme. In keeping with

Keele's commitment to breadth in the curriculum, the programme also gives you the opportunity to take some modules outside Natural Sciences, in other disciplines and in modern foreign languages as part of a 360-credit Honours degree.

The Natural Sciences programme described in this document is highly interdisciplinary, drawing on the expertise of scientists in the fields of Biology, Mathematics, Psychology, Forensic Science, Chemistry, Physics, Computer Science, Environmental Science, Earth Science, and Geography. It is in keeping with Keele's commitment to offer a broad undergraduate degree programme, whilst providing opportunity for students to develop increased specialisation, or to maintain a broad science-based portfolio, within the structure of a Single Honours programme. Thus it enables students to gain, and be able to demonstrate, a distinctive range of graduate attributes.

3. Overview of the Programme

The BSc (Hons) degree programme in Natural Sciences provides you with the opportunity to combine your interests in multiple sciences, within the structure of a Single Honours degree programme. It aims to provide students with the scientific skills and expertise required to tackle many of the world's most pressing scientific and societal problems. The course at Keele draws on the expertise of scientists from within the Schools of Life Sciences; Chemical and Physical Sciences; Geography, Geology and the Environment; Psychology; and Computing and Mathematics, but also has close links with Keele's BA Liberal Arts programme providing students with opportunity for cross-faculty, interdisciplinary debates about topical world issues. The degree structure is designed to cater for students who wish to continue to study multiple science subjects in an integrated manner at degree level and who are open minded, creative, inquiring and excited by the challenge of solving complex problems. It aims to produce graduates who have the interdisciplinary background, communication and problem-solving skills to address complex scientific problems in a changing world.

You will choose one core discipline as a named route, accounting for half of your learning, that ensures you have a solid grounding in an established discipline. The remaining half of your learning is through an even mix of programme-specific interdisciplinary modules that cover the full range of disciplines offered by the programme and your own choice of elective modules that allows you to mix and match different subjects. The programme-specific interdisciplinary sessions include shared learning with interdisciplinary Liberal Arts students to enable you to apply Natural Sciences effectively within the wider society in which we live and work. Each of the core disciplines offers modules from their programmes to Natural Sciences students as electives, giving you the opportunity to study any of the disciplines we cover (subject to timetabling restrictions).

At the end of your first year, there is flexibility to transfer between certain core discipline routes. You are also able to move over to a Single Honours degree in your core discipline if you decide you want to fully focus on that one discipline. Depending on the modules you have taken as electives, you may also be able to transfer onto a Combined Honours programme.

Similarly, any first year student on Combined or Single Honours programme at Keele that is available as a core Natural Sciences discipline is also welcome to transfer into the second year of Natural Sciences.

4. Aims of the programme

The broad aims of the programme are to:

- provide students with a sound scientific understanding of their selected 'core' science disciplines and the ability to apply this knowledge to help solve complex problems;
- gain a wide-range of laboratory and field-based skills, as appropriate to the student's chosen core science subjects, including the ability to carry out independent research;
- integrate scientific knowledge, and an awareness of social, economic and ethical issues, to address some of the World's most pressing societal concerns such as understanding the origins of the Universe, avoiding antibiotic drug resistance, mitigating climate change and providing long term food security;
- develop to a high professional standard, a broad range of employability skills including problem-solving, team work, independent research, communication and presentation skills.

5. What you will learn

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

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

Subject knowledge and understanding

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

- the benefits of an interdisciplinary approach to science;
- the role Natural Scientists can play in the resolution of major challenges facing society;
- interdisciplinary perspectives on world/societal issues.

Subject specific skills

Successful students will be able to:

- effectively search and critically review the academic literature relating to a current interdisciplinary debate/discourse;
- recognise and make choices between the different methodological approaches to interdisciplinary research;
- frame research questions, aims and objectives, and design effective and achievable research/ experimental projects;
- apply their knowledge, skills and experience to an aspect of current scientific research, through the use of established analytical scientific methods, literature review, data collection and interpretation;
- use a variety of evidence-based approaches to solve problems;
- apply reflection and critical skills to a wide range of issues;
- work with others to discover creative, innovative solutions to complex issues.

Key or transferable skills (including employability skills)

Successful students will be able to:

- locate, evaluate and make effective use of a wide range of university-level information sources;
- communicate clearly and effectively using appropriate scientific language and conventions in both written and oral forms;
- communicate complex ideas to lay audiences in a variety of forms;
- communicate reflective and critical ideas through advanced written and oral presentation skills.

The full range of intended learning outcomes that will be achieved by students taking the Natural Sciences degree programme will be highly dependent upon which combination of sciences* that they choose to study as 'core' and 'supporting'. Individual module specifications should be consulted for information on knowledge and understanding and skills obtained from optional modules within the degree programme, and for those modules taken as a supporting science. *The exact combination of subjects which can be taken as core and supporting is dependent upon timetabling restrictions (see 'What is the Structure of the Programme').

Keele Graduate attributes

Engagement with this programme will enable you to develop your intellectual, personal and professional capabilities. At Keele, we call these our ten Graduate Attributes and they include independent thinking, synthesizing information, creative problem solving, communicating clearly, and appreciating the social, environmental and global implications of your studies and activities. Our educational programme and learning environment is designed to help you to become a well-rounded graduate who is capable of making a positive and valued contribution in a complex and rapidly changing world, whichever spheres of life you engage in after your studies are completed.

Further information about the Keele Graduate Attributes can be found here: <http://www.keele.ac.uk/journey/>

6. How is the programme taught?

Learning and teaching methods used on the programme vary according to the subject matter and level of the module. They include the following:

- Lectures
- Tutorials
- Laboratory Classes
- Problem-solving classes and workshops
- Screencasts
- Pre-laboratory and post-laboratory exercises
- Research projects
- IT instruction (spreadsheets, word-processing, chemical structure drawing, databases, textbook resources, information retrieval and literature searching)
- Group work
- Seminars with pre- and post-seminar discussions
- Interdisciplinary debates (links with BA Liberal Arts students)
- Self and peer-assessment for learning
- Information literacy activities
- Computer-aided learning (simulations and animations, online activities and exercises)
- Case studies
- Use of e-learning/the Keele Learning Environment (KLE)

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

These learning and teaching methods enable students to achieve the learning outcomes of the programme in a variety of ways.

7. Teaching Staff

As Natural Sciences is such an interdisciplinary subject, staff from across the Faculty of Natural Sciences make contributions to the degree programme. The teaching and research profiles of the staff that deliver and support the Natural Sciences programme can be found at:

School of Geography, Geology and the Environment: <http://www.keele.ac.uk/gge/people/>

School of Chemical and Physical Sciences: <http://www.keele.ac.uk/chemistry/staff/>

School of Life Sciences: <http://www.keele.ac.uk/lifesci/people/>

School of Computing and Mathematics: <https://www.keele.ac.uk/scm/staff/>

School of Psychology: <https://www.keele.ac.uk/psychology/people/academic-stafflist/>

The University will attempt to minimise changes to our core teaching teams, however, delivery of the programme depends on having a sufficient number of staff with the relevant expertise to ensure that the programme is taught to the appropriate academic standard.

Staff turnover, for example where key members of staff leave, fall ill or go on research leave, may result in changes to the programme's content. The University will endeavour to ensure that any impact on students is limited if such changes occur.

8. What is the structure of the Programme?

The academic year runs from September to June and is divided into two semesters. The number of weeks of teaching will vary from programme to programme, but you can generally expect to attend scheduled teaching sessions between the end of September and mid-December, and from mid-January to the end of April. Our degree courses are organised into modules. Each module is usually a self-contained unit of study and each is usually assessed separately with the award of credits on the basis of 1 credit = 10 hours of student effort. An outline of the structure of the programme is provided in the tables below.

There are three types of module delivered as part of your programme. They are:

- Compulsory modules - a module that you are required to study on this course;
- Optional modules - these allow you some limited choice of what to study from a list of modules;
- Elective modules - a free choice of modules that count towards the overall credit requirement but not the number of subject-related credits.

For further information on the content of modules currently offered, including the list of elective modules, please visit:

<https://www.keele.ac.uk/recordsandexams/modulecatalogue/>

Module Lists

Level 4

Compulsory modules	Module Code	Credits	Period
Science & Society	NAT-10001	15	Semester 1-2
Applied Interdisciplinary Science Case Studies	NAT-10005	15	Semester 1-2

Level 5

Compulsory modules	Module Code	Credits	Period
Research Skills for Natural Scientists	NAT-20001	15	Semester 1-2
Interdisciplinary Perspectives on Wicked Problems	NAT-20007	15	Semester 1-2

Level 6

Compulsory modules	Module Code	Credits	Period
Grand Challenges in Society	NAT-30001	15	Semester 1-2
Natural Sciences Interdisciplinary Research Project	NAT-30004	15	Semester 1-2

In addition, students studying BSc Natural Sciences choose one core discipline from the following options as their named route through the programme:

School within the Faculty of Natural Sciences	Core discipline available (60 credits per year)*
School of Chemical and Physical Sciences	Chemistry Forensic Science Physics Astrophysics
School of Computing and Mathematics	Computer Science Mathematics
School of Geography, Geology and the Environment	Environmental Science Geology Human Geography Physical Geography
School of Life Sciences	Biology

* module diet as per the Combined Honours programme in that discipline

Table 1. Core disciplines available as named routes within the BSc Natural Sciences programme

The table below provides a summary of the content of the Natural Science programme for those science

The location of field courses is subject to change depending on factors such as staff availability, staff changes, staff expertise, costs, student numbers, other factors outside of our control (earthquakes, volcanic eruptions etc.).

Core discipline modules (as per the relevant Combined Honours programme)

Core discipline	Level 4 (60 credits)	Level 5 (60 credits)	Level 6 (60 credits) dissertations / projects in bold
School of Chemical and Physical Sciences			

Chemistry	<p>Core 60 credits</p> <p>CHE-10063 Chemical Structure and Reactivity (30) Sem1-2</p> <p>CHE-10061 Practical and Professional Chemistry Skills (30) Sem1-2</p>	<p>Core 60 credits</p> <p>CHE-20055 Molecular Chemistry and Reactions (30) Sem1-2</p> <p>CHE-20061 Spectroscopy and Analysis (15) Sem1-2</p> <p>CHE-20065 Physical and Structural Chemistry (15) Sem1-2</p>	<p>Core 15 credits</p> <p>CHE-30037 Topics in Chemistry (15) Sem2</p> <p>Choose one (15 credits) as either:</p> <p>CHE-30050 Chemistry/Medicinal Chemistry Research Project (15) Sem1-2</p> <p>CHE-30051 Chemistry/Medicinal Chemistry Dissertation (15) Sem1-2</p> <p>30 credits (two modules) from:</p> <p>CHE-30038 Chemical Kinetics, Photochemistry & Inorganic Reaction Mechanisms (15) Sem1</p> <p>CHE-30039 Advanced Organic Chemistry (15) Sem1</p> <p>CHE-30042 Inorganic, Physical & Solid State Chemistry (15) Sem1</p>
Forensic Science	<p>Core 60 credits</p> <p>CHE-10039 Forensic Science Principles (15) Sem1</p> <p>CHE-10038 Chemical Science Principles (15) Sem1</p> <p>CHE-10037 Forensic Analysis (15) Sem1</p> <p>CHE-10042 Forensic Identification (15) Sem2</p>	<p>Core 60 credits</p> <p>CHE-20011 Spectroscopy and Advanced Analysis (15) Sem1</p> <p>CHE-20021 Forensic Genetics (15) Sem1</p> <p>CHE-20012 Drugs of Abuse (15) Sem2</p> <p>CHE-20010 Criminalistic Methods (15) Sem2</p>	<p>CHE-30033 Evaluation of Evidence: Explosives and Arson (15) Sem1</p> <p>CHE-30010 Forensic Toxicology (15) Sem2</p> <p>CHE-30011 Forensic Science Team Project (15) Sem1-2</p> <p>15 credits of Options from:</p> <p>CHE-30035 Advanced Topics in Forensic Science (15) Sem1</p> <p>CHE-30034 Forensic Geoscience (15) Sem2</p>

Physics	<p>Core 60 credits</p> <p>PHY-10022 Mechanics, Gravity and Relativity (15) Sem1</p> <p>PHY-10024 Nature of Matter (15) Sem1</p> <p>PHY-10020 Oscillations and Waves (15) Sem2</p> <p>PHY-10021 Electricity and Magnetism (15) Sem2</p>	<p>Core 60 credits</p> <p>PHY-20006 Quantum Mechanics (15) Sem1</p> <p>PHY-20027 Optics and Thermodynamics (15) Sem1</p> <p>PHY-20026 Statistical mechanics and Solid State Physics (15) Sem2</p> <p>PHY-20009 Nuclear and Particle Physics (15) Sem2</p>	<p>PHY-30007 Physics Project (15) Sem1-2</p> <p>PHY-30012 Electromagnetism (15) Sem1</p> <p>30 credits of Options from</p> <p>PHY-30001 Cosmology (15) Sem1 or Sem2</p> <p>PHY-30002 Physics of the Interstellar Medium (15) Sem2</p> <p>PHY-30003 The Physics of Compact Objects (15) Sem2</p> <p>PHY-30009 Quantum Physics of Atoms and Molecules (15) Sem2</p> <p>PHY-30010 Polymer Physics (15) Sem1 or Sem2</p> <p>PHY-30033 Particle Physics and Accelerators (15) Sem1 or Sem2</p> <p>PHY-30024 Binary Stars and Extrasolar Planets (15) Sem1 or Sem2</p> <p>PHY-30025 Life in the Universe (15) Sem1 or Sem2</p> <p>PHY-30026 Computational Methods in Physics and Astrophysics (15) Sem1 or Sem2</p> <p>PHY-30027 Data Analysis and Model testing (15) Sem2</p> <p>PHY-30028 The Physics of Galaxies (15) Sem1 or Sem2</p> <p>PHY-30029 Quantum Mechanics II (15) Sem2</p> <p>PHY-30030 Physics of Fluids (15) Sem2</p> <p>PHY-30031 Atmospheric Physics (15) Sem2</p> <p>PHY-30032 Plasma Physics (15) Sem2</p>
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Astrophysics	<p>Core 60 credits</p> <p>PHY-10022 Mechanics, Gravity and Relativity (15) Sem1</p> <p>PHY-10024 Nature of Matter (15) Sem1</p> <p>PHY-10020 Oscillations and Waves (15) Sem2</p> <p>PHY-10023 Electricity and Stellar Structure (15) Sem2</p>	<p>Core 60 credits</p> <p>PHY-20006 Quantum Mechanics (15) Sem1</p> <p>PHY-20027 Optics and Thermodynamics (15) Sem1</p> <p>PHY-20026 Statistical mechanics and Solid State Physics (15) Sem2</p> <p>PHY-20002 Stellar Astrophysics (15) Sem2</p>	<p>Core 30 credits</p> <p>PHY-30006 Group Project and Science Communication (15) Sem1-2</p> <p>PHY-30012 Electromagnetism (15) Sem1</p> <p>30 credits of Options from</p> <p>PHY-30001 Cosmology (15) Sem1 or Sem2</p> <p>PHY-30002 Physics of the Interstellar Medium (15) Sem2</p> <p>PHY-30003 The Physics of Compact Objects (15) Sem2</p> <p>PHY-30009 Quantum Physics of Atoms and Molecules (15) Sem2</p> <p>PHY-30010 Polymer Physics (15) Sem1 or Sem2</p> <p>PHY-30033 Particle Physics and Accelerators (15) Sem1 or Sem2</p> <p>PHY-30024 Binary Stars and Extrasolar Planets (15) Sem1 or Sem2</p> <p>PHY-30025 Life in the Universe (15) Sem1 or Sem2</p> <p>PHY-30026 Computational Methods in Physics and Astrophysics (15) Sem1 or Sem2</p> <p>PHY-30027 Data Analysis and Model testing (15) Sem2</p> <p>PHY-30028 The Physics of Galaxies (15) Sem1 or Sem2</p> <p>PHY-30029 Quantum Mechanics II (15) Sem2</p> <p>PHY-30030 Physics of Fluids (15) Sem2</p> <p>PHY-30031 Atmospheric Physics (15) Sem2</p> <p>PHY-30032 Plasma Physics (15) Sem2</p>
School of Computing and Mathematics			

<p>Computer Science</p>	<p>Core 45 credits</p> <p>CSC-10029 Fundamentals of Computing (15) Sem1</p> <p>CSC-10024 Programming I - Programming Fundamentals (15) Sem1</p> <p>CSC-10034 Requirements, Evaluation and Professionalism 15 2</p> <p>15 credits Option from:</p> <p>CSC-10035 Natural Computation (15) Sem2</p> <p>CSC-10040 Introduction to Interaction Design (15) Sem2</p> <p>CSC-10026 Computer Animation and Multimedia (15) Sem2</p> <p>CSC-10033 Systems and Architecture (15) Sem1</p> <p>CSC-10025 Cybercrime (15) Sem1</p>	<p>Core 15 credits</p> <p>CSC-20022 Software Engineering (15) Sem2</p> <p>45 credits Options from:</p> <p>CSC-20037 Programming II - Data Structures and Algorithms (15) Sem1</p> <p>CSC-20038 Mobile Application Development (15) Sem1</p> <p>CSC-20021 Web Technologies (15) Sem1</p> <p>CSC-20043 Computational and Artificial Intelligence I (15) Sem1</p> <p>CSC-20002 Database Systems (15) Sem2</p> <p>CSC-20004 Advanced Programming Practices (15) Sem2</p> <p>CSC-20047 Individual Study Topic in Computer Science (15) Sem2</p> <p>CHE-20024 Digital Forensics (15) Sem2</p>	<p>Core 30 credits:</p> <p>CSC-30014 30-credit Project (30) Sem1-2</p> <p>30 credits Options from:</p> <p>CSC-30016 Software Engineering Project Management (15) Sem1</p> <p>CSY-30001 Advanced Information Systems (15) Sem1</p> <p>CSC-30019 Games Computing (15) Sem1</p> <p>CSC-30022 Bioinformatics (15) Sem1</p> <p>CSC-30023 Evolution of Complex Systems (15) Sem1</p> <p>CSC-30002 Advanced Databases and Applications (15) Sem2</p> <p>CSC-30027 Computational and Artificial Intelligence II (15) Sem2</p> <p>CSC-30012 Communications and Networks (15) Sem2</p> <p>CSC-30025 Advanced Web Technologies (15) Sem2</p>
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<p>Mathematics</p>	<p>Core 60 credits</p> <p>MAT-10047 Algebra (30) Sem1-2</p> <p>MAT-10046 Calculus (30) Sem1-2</p>	<p>Core 15 credits</p> <p>MAT-20008 Differential Equations (15) Sem1</p> <p>Choose three 15 credit Option from</p> <p>MAT-20023 Probability (15) Sem1</p> <p>MAT-20035 Exploring Algebra and Analysis (15) Sem1</p> <p>MAT-20031 Computational Mathematics (15) Sem1</p> <p>MAT-20004 Complex Variable I and Vector Calculus (15) Sem2</p> <p>MAT-20016 Mathematical Modelling (15) Sem2</p> <p>MAT-20025 Abstract Algebra (15) Sem2</p> <p>MAT-20005 Dynamics (15) Sem2</p> <p>MAT-20027 Linear Statistical Models (15) Sem2</p> <p>MAT-20029 Analysis II (15) Sem2</p> <p>MAT-20032 Introduction to Mathematics Education (15) Sem2</p>	<p>60 credits of Options from*:</p> <p>MAT-30002 Nonlinear Differential Equations (15) Sem1</p> <p>MAT-30003 Partial Differential Equations (15) Sem1</p> <p>MAT-30013 Group Theory (15) Sem1</p> <p>MAT-30028 Number Theory and Cryptography (15) Sem1</p> <p>MAT-30029 Professional Mathematics (15) Sem1</p> <p>MAT-30039 Financial Mathematics (15) Sem1</p> <p>MAT-30033 Applied Time Series (15) Sem1</p> <p>MAT-30037 Linear Algebra (15) Sem1</p> <p>MAT-30001 Graph Theory (15) Sem2</p> <p>MAT-30004 Fluid Mechanics (15) Sem2</p> <p>MAT-30030 Metric Spaces and Topology (15) Sem2</p> <p>MAT-30011 Waves (15) Sem2</p> <p>MAT-30014 Medical Statistics (15) Sem2</p> <p>MAT-30023 Mathematical Biology (15) Sem2</p> <p>MAT-30034 Introduction to Mathematics Teaching (15) Sem2</p> <p>MAT-30016 Project (15) Sem1-2</p> <p>MAT-30032 Medical Statistics Project (30) Sem1-2</p> <p>* - availability depends on modules taken at Level 5</p>
<p>School of Geography, Geology and the Environment</p>			

Physical Geography	<p>Core 60 credits</p> <p>ESC-10039 Fundamentals of Physical Geography (15) Sem1</p> <p>ESC-10035 Geographical Skills (15) Sem1-2</p> <p>ESC-10041 People and Environment (15) Sem2</p> <p>ESC-10038 The Practice of Physical Geography (15) Sem2</p>	<p>Core 60 credits</p> <p>ESC-20029 Practical Physical Geography (15) Sem1</p> <p>ESC-20030 Regional Landscapes (15) Sem1</p> <p>ESC-20050 Dynamic Geographies (15) Sem2</p> <p>GEG-20009 Geographical Research Training (15) Sem2</p>	<p>60 credits of Options from:</p> <p>GEG-30006 Geography Double Dissertation (30) Sem1-2*</p> <p>GEG-30008 Geography Single Dissertation (15) Sem1-2*</p> <p>ESC-30006 Glaciers and Glacial Geomorphology (15) Sem1</p> <p>ESC-30018 Global Environmental Change (15) Sem1</p> <p>ESC-30020 Water Resources (15) Sem2</p> <p>ESC-30027 Coastal Environments (15) Sem2</p> <p>ESC-30044 Applied GIS (15) Sem1</p> <p>GEG-30014 Inspirational Landscapes (15) Sem2</p> <p>ESC-30009 Natural Hazards (15) Sem1</p> <p>* cannot take both these modules</p>
Human Geography	<p>Core 60 credits</p> <p>GEG-10013 Human Geographies (15) Sem1</p> <p>ESC-10035 Geographical Skills (15) Sem1-2</p> <p>GEG-10012 Practising Human Geography (15) Sem2</p> <p>ESC-10041 People and the Environment (15) Sem2</p>	<p>Core 60 credits</p> <p>ESC-20050 Dynamic Geographies (15) Sem2</p> <p>GEG-20010 Practical Human Geography (15) Sem1</p> <p>GEG-20009 Geographical Research Training (15) Sem2</p> <p>GEG-20015 Space & Society (15) Sem1</p>	<p>60 credits of Options from:</p> <p>ESC-30044 Applied GIS (15) Sem1</p> <p>GEG-30006 Double Dissertation* (30) Sem1-2</p> <p>GEG-30008 Single Dissertation* (15) Sem1-2</p> <p>GEG-30014 Inspirational Landscapes (15) Sem2</p> <p>GEG-30015 Postcolonialism in South Asia (15) Sem1</p> <p>GEG-30021 Animals and Society (15) Sem1</p> <p>GEG-30020 Rural Geographies (15) Sem2</p> <p>PIR-30139 Sustainability and Social Justice (15) Sem1</p> <p>SOC-30032 Home, Belonging, Locality and Material Culture (15) Sem2</p> <p>* cannot take both these modules</p>

<p>Geology</p>	<p>Core 60 credits</p> <p>ESC-10063 Minerals, Rocks and Fossils (30) Sem1-2</p> <p>ESC-10062 Earth Structure and History (30) Sem1-2</p>	<p>Core 60 credits</p> <p>ESC-20082 Petrology (30) Sem1-2</p> <p>ESC-20083 Field Techniques (30) Sem1-2</p>	<p>ESC-30039 Independent Fieldwork Project (15) Sem1</p> <p>45 credits of Options from</p> <p>ESC-30009 Natural Hazards (15) Sem1</p> <p>ESC-30028 Economic Geology (15) Sem1</p> <p>ESC-30036 Exploration Geophysics for Hydrocarbons (15) Sem1</p> <p>ESC-30034 Advanced Topics in Sedimentology (15) Sem2</p> <p>ESC-30008 Structure and Geodynamics (15) Sem2</p> <p>ESC-30025 Micropalaeontology: Principles and Applications (15) Sem2</p> <p>ESC-30022 Hydrological and Engineering Geology (15) Sem2</p>
<p>Environmental Science</p>	<p>Core 45 credits</p> <p>ESC-10061 Studying the Environment (15) Sem1-2</p> <p>ESC-10045 Introductory Geology for the Environmental Sciences (15) Sem1</p> <p>CHE-10044 Introductory Environmental Chemistry (15) Sem2</p> <p>15 credits Optional from:</p> <p>ESC-10039 Fundamentals of Physical Geography (15) Sem 1</p> <p>ESC-10041 People and the Environment (15) Sem 2</p> <p>ESC-10043 Greening Business (15) Sem 2</p>	<p>Core 60 credits</p> <p>ESC-20017 Human Impacts on the Environment: Scientific Perspectives (15) Sem1</p> <p>ESC-20080 Environmental and Sustainability Impact Assessment (15) Sem1</p> <p>ESC-20081 Research and fieldwork planning (15) Sem2</p> <p>ESC-20032 Environmental Analytical Methods (15) Sem2</p>	<p>ESC-30050 Dissertation (15) Sem1-2</p> <p>45 credits of Options from</p> <p>ESC-30045 Contemporary topics in environmental science (15) Sem1</p> <p>ESC-30040 Clean Technology (15) Sem1</p> <p>LSC-30017 Trees in their Environment (15) Sem2</p> <p>LSC-30003 Applied Insect Ecology (15) Sem1</p> <p>LSC-30006 Applied Fish Biology (15) Sem2</p> <p>LSC-30043 Conservation Biology (15) Sem1</p> <p>ESC-30009 Natural Hazards (15) Sem1</p> <p>ESC-30018 Global Environmental Change (15) Sem1</p> <p>ESC-30044 Applied GIS (15) Sem1</p> <p>ESC-30027 Coastal Environments (15) Sem2</p> <p>ESC-30020 Water Resources (15) Sem2</p> <p>ESC-30006 Glaciers and Glacial Geomorphology (15) Sem1</p>
<p>School of Life Sciences</p>			

Biology	<p>Core 60 credits</p> <p>LSC-10074 Physiology and Anatomy (30) Sem1-2</p> <p>LSC-10085 Fundamentals of Biology (30) Sem1-2</p>	<p>Core 30 credits</p> <p>LSC-20097 Environmental Biology (15) Sem1*</p> <p>LSC-20073 Microbes Viruses & Parasites (15) Sem1</p> <p>LSC-20056 Research and Analytical Skills (15) Sem2</p> <p>30 credits of Options from</p> <p>ESC-20017 Human Impact on the Environment, scientific perspectives (15) Sem1</p> <p>SC-20074 Current Topics in Biology (15) Sem1</p> <p>LSC-20093 Biodiversity Crisis (15) Sem2</p> <p>PTY-20020 Health and the Environment (15) Sem2</p> <p>* - field course takes place during the summer before Year 2 - students need to have made this module choice before the end of Year 1</p>	<p>(15 credits) Choose one of:</p> <p>LSC-30019 Single Applied Life Sciences Placement (15) Sem1*</p> <p>LSC-30048 Single Experimental Project (15) Sem1-2</p> <p>LSC-30050 Dissertation (15) Sem1-2</p> <p>* - only available to students taking Work Placement Year</p> <p>45 credits of Options from</p> <p>ESC-30056 Ecotoxicology and Risk Assessment (15) Sem1</p> <p>LSC-30036 Human Parasitology (15) Sem1</p> <p>LSC-30043 Conservation Biology (15) Sem1</p> <p>LSC-30051 Case Studies in Biotechnology (15) Sem1</p> <p>LSC-30066 Tropical Biology Field Course (15) Sem1 **</p> <p>LSC-30070 Insect Ecology and Pest Management (15) Sem2</p> <p>LSC-30030 Human Evolution (15) Sem2</p> <p>LSC-30061 Cancer Biology (15) Sem2</p> <p>LSC-30076 Plant Science and Sustainability (15) Sem2</p> <p>** - summer field course to Malaysia takes places between Levels 5 and 6</p>
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Learning Outcomes

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

Level 4

The tables below set out what students learn in each year of the Programme, the modules in which that learning takes place, and the main ways in which students are assessed on their learning. In Year 1 (Level 4) and Year 2 (Level 5) and Year-3 (Level-6) these learning outcomes are achieved in the compulsory modules which all students are required to take. Note that the interdisciplinary nature of the Natural Sciences degree programme means that different students will take different combinations of core, optional and elective modules depending on their chosen pathway through the Natural Sciences programme. As such, only the learning outcomes for the compulsory, bespoke Natural Sciences modules (NAT-10001, NAT-20001, NAT-30001, and NAT-30002) are included here. For learning outcomes relating to other compulsory, optional and elective modules please visit: www.keele.ac.uk/recordsandexams/az

Subject Knowledge and Understanding	
Learning Outcome	Module in which this is delivered
the benefits of an interdisciplinary approach to science;	Science & Society - NAT-10001
the role Natural Scientists can play in the resolution of major challenges facing society;	Science & Society - NAT-10001

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
effectively search and critically review the academic literature relating to a current interdisciplinary debate/discourse;	Applied Interdisciplinary Science Case Studies - NAT-10005

Key or Transferable Skills (graduate attributes)	
Learning Outcome	Module in which this is delivered
locate, evaluate and make effective use of a wide range of university level information sources;	Science & Society - NAT-10001
communicate clearly and effectively using appropriate scientific language and conventions in both written and oral forms;	Science & Society - NAT-10001

Level 5

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
effectively search and critically review the academic literature relating to a current interdisciplinary debate/discourse;	Research Skills for Natural Scientists - NAT-20001
recognise and make choices between the different methodological approaches to interdisciplinary research;	Research Skills for Natural Scientists - NAT-20001
frame research questions, aims and objectives, and design effective and achievable research/experimental projects	Research Skills for Natural Scientists - NAT-20001

Level 6

Subject Knowledge and Understanding	
Learning Outcome	Module in which this is delivered
interdisciplinary perspectives on world/societal issues	NAT-30001

Subject Specific Skills	
Learning Outcome	Module in which this is delivered
apply their knowledge, skills and experience to an aspect of current scientific research, through the use of established analytical scientific methods, literature review, data collection and interpretation;	NAT-30004
use a variety of evidence-based approaches to solve problems;	NAT-30001
apply reflection and critical skills to a wide range of issues;	NAT-30001
work with others to discover creative, innovative solutions to complex issues.	NAT-30001

Key or Transferable Skills (graduate attributes)	
Learning Outcome	Module in which this is delivered
communicate complex ideas to lay audiences in a variety of forms;	NAT-30001
communicate reflective and critical ideas through advanced written and oral presentation skills.	NAT-30001

The interdisciplinary nature of the BSc Natural Sciences degree programme means that different students will take different combinations of core, optional and elective modules depending on their chosen pathway through the Natural Sciences programme. Full details are shown in the Tables below. All Natural Sciences students take the following compulsory modules, which are bespoke to the BSc Natural Sciences degree programme (15 credits at each level specific to the BSc Natural Sciences cohort and 15 credits at each level shared with the aligned BA Liberal Arts programme):

Interdisciplinary modules for BSc Natural Sciences

Cohort	Level 4	Level 5	Level 6
Natural Sciences only	NAT-10005 Applied Interdisciplinary Science Case Studies (15) Sem1-2	NAT-20001 Research Skills for Natural Scientists (15) Sem1-2	NAT-30004 Natural Sciences Interdisciplinary Research Project (15) Sem1-2
With Liberal Arts	NAT-10001 Science and Society (15) Sem1-2	NAT-20007 Interdisciplinary Perspectives on Wicked Problems (15) Sem1-2	NAT-30001 Grand Challenges in Society (15) Sem1-2

9. Final and intermediate awards

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

Honours Degree	360 credits	You will require at least 120 credits at levels 4, 5 and 6
Diploma in Higher Education	240 credits	You will require at least 120 credits at level 4 or higher and at least 120 credits at level 5 or higher
Certificate in Higher Education	120 credits	You will require at least 120 credits at level 4 or higher

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

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

10. How is the Programme Assessed?

The wide variety of assessment methods used on this programme at Keele reflects the broad range of knowledge and skills that are developed as you progress through the degree programme. Teaching staff pay particular attention to specifying clear assessment criteria and providing timely, regular and constructive feedback that helps to clarify things you did not understand and helps you to improve your performance. The following list is representative of the variety of assessment methods used on your programme:

- **Unseen closed and open book examinations** in different formats test students' knowledge and understanding of the subject. Examinations may consist of essay, short answer and/or multiple choice questions, and paper comprehension.
- **Assessed Problem Sheets** assess the student's skills in solving numerical and other problems within the discipline by drawing on their scientific understanding and knowledge, and experience of experimental techniques
- **Essays** allow you to demonstrate your ability to articulate ideas clearly using argument and reasoning skills and with close reference to the contexts and critical concepts covered in the modules. Essays also develop and demonstrate research and presentation skills (including appropriate scholarly referencing).
- **Laboratory reports** - structured proformas and full lab reports are formal summaries of work carried out in the laboratory and test students' understanding of the practical aspects of the programme and develop the skills necessary to enable students to present and analyse their results.
- **Class tests** taken either conventionally or online via the Keele Learning Environment (KLE) assess students' subject knowledge and their ability to apply it in a more structured and focused way.
- **Technical reports** are formal, structured summaries of work that test students' understanding of the practical aspects of the programme and develop the skills necessary to enable students to present and analyse their results.
- **Information retrieval exercises** require students to locate and analyse information of different types from the internet, various databases, scientific publications and textbooks. The information is then presented in a prescribed written format.
- **IT assignments and computer-based exercises** (e.g. spreadsheets exercises) - various activities designed to assess students ability to use software to retrieve, analyse and present scientific data in a variety of formats.
- **Dissertations** enable students to explore in depth an area of particular interest through a substantial piece of focused research and writing, and test their ability to formulate and answer research questions.
- **Field course notebook and portfolios** assess work that has been carried out in the field, and typically include field notebooks, research proposals, short quizzes and both oral and written presentations. The specific assessment portfolio will vary according to the field course destination and subject focus.
- **Short reports** for which students are required to write up their own account of small group studies and discussions on particular topics.
- **Research projects and reports** test student's knowledge of different research methodologies and the limits and provisional nature of knowledge. They also enable students to demonstrate their ability to formulate research questions and to answer them using appropriate methods.
- **Oral and poster presentations and reports** assess individual students' subject knowledge and understanding. They also test their ability to work effectively as members of a team, to communicate what they know orally and visually, and to reflect on these processes as part of their own personal development.
- **Portfolios** may consist of a range of different pieces of work but routinely include a requirement that students provide some evidence of critical reflection on the development of their own learning.
- **Peer assessment:** In some cases students will be involved in marking other students' work, usually with a prescriptive marking guide. This helps students to appreciate where marks are gained and lost and gives them the opportunity to see the common mistakes made by other students.
- **Reviews** of other scholars' work test students' ability to identify and summarise the key points of a text and to evaluate the quality of arguments and the evidence used to support them. In the case of work based on empirical research, reviews also assess students' knowledge of research methodologies and their ability to make critical judgements about the appropriateness of different strategies for collecting and analysing data.
- **Video/screencast presentations** require students to produce a short video or screencast on a given topic and assess students' knowledge and understanding, and ability to communicate what they know orally and visually, and to reflect on these processes as part of their own personal development.

- **Experimental projects** test students' knowledge of research methodologies and their ability to carry them out. They also enable students to demonstrate their ability to formulate research questions, design experiments, carry them out and analyse the results.

Marks are awarded for summative assessments designed to assess your achievement of learning outcomes. You will also be assessed formatively to enable you to monitor your own progress and to assist staff in identifying and addressing any specific learning needs. Feedback, including guidance on how you can improve the quality of your work, is also provided on all summative assessments within three working weeks of submission, unless there are compelling circumstances that make this impossible, and more informally in the course of tutorial and seminar discussions.

11. Contact Time and Expected Workload

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

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

Activity

	Scheduled learning and teaching activities	Guided independent Study	Placements
Year 1 (Level 4)	35%	65%	0%
Year 2 (Level 5)	27%	73%	0%
Year 3 (Level 6)	14%	86%	0%

12. Accreditation

This programme does not have accreditation from an external body.

13. University Regulations

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

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

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

See the relevant course page on the website for the admission requirements relevant to this programme:

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

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

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

Please note: All non-native English speaking students are required to undertake a diagnostic English language assessment on arrival at Keele, to determine whether English language support may help them succeed with their studies. An English language module may be compulsory for some students during their first year at Keele.

Recognition of Prior Learning (RPL) is considered on a case-by-case basis and those interested should contact the Programme Director. The University's guidelines on this can be found here: <http://www.keele.ac.uk/ga/accreditationofpriorlearning/>

15. How are students supported on the programme?

Personal Tutors: All students are allocated a Personal Tutor for the duration of their studies as part of the University's Personal Tutor

system. The role of the Personal Tutor is to meet formally with their tutees at least once per semester to discuss progress and performance, and to offer support and advice. In addition, to a personal tutor allocated to the student, students are encouraged to seek support from any of the Natural Sciences teaching and administrative staff. Students can make arrangements to see their Personal Tutor or other staff at any time.

Use of e-learning/the Keele Learning Environment (KLE): All modules are supported by learning materials that are accessible to students via the KLE. The School supports the University's policy on module support on the KLE.

Health and Safety: All students admitted to the programme receive detailed training on health and safety in the laboratory, as appropriate for the Science subjects they are studying. Students studying Earth Sciences, Environmental Science or Physical Geography are expected to abide by the rules and regulations governing the efficient working, safety and welfare of all members both within the University and in the field.

Students with disabilities: Students with disabilities or medical problems, who are admitted onto the Natural Science degree programme, will meet with a member of the University's Disability Services at the very start of the course in order to discuss any special requirements. Procedures will then be implemented according to the nature of the student's disability or medical problem. These procedures can range, for example, from allowing extra examination time for students diagnosed as dyslexic, to allocating additional staff or demonstrators to field classes to help students with mobility problems.

16. Learning Resources

The School of Chemical and Physical Sciences is housed in Lennard Jones Building, which contains well-equipped undergraduate Physics teaching laboratories and a dedicated PC laboratory supporting both Windows and Linux. There are rooms available in the building for the students to work and socialise with their peers. There are dedicated boxes located in the building for submission of the problem sheets and laboratory reports. In addition, the School Office is open continuously during the week from 9am to 5pm to answer student queries.

Chemistry at Keele is based in the Lennard-Jones building, which houses excellent, well-equipped teaching and research laboratory facilities. Each module has a site within the university's virtual learning environment (the Keele Learning Environment or KLE), which hosts teaching materials (lecture notes/slides, laboratory scripts, assessments, past examination papers, on-line quizzes, videos, screencasts and audio clips) and useful links. The KLE is accessible on or off campus and is also used for online submission and return of assessments. Each module has a module guide or specification which contains details of the specific intended learning outcomes, Graduate Attributes and assessments.

The School of **Geography, Geology and Environment** has its own building (the William Smith Building) that contains well-equipped laboratories and lecture theatres. The foyer provides pleasant surroundings for students to meet and socialise with their peers. The Office is currently open during the week from 8.45am to 5.00pm to answer student queries and deal with administrative tasks.

Biology is taught in modern teaching rooms across the University, almost all of which are equipped with computers, internet access and electronic whiteboards or projection equipment. The School of Life Sciences has recently benefited from £10 million of investment to expand its teaching and research areas. Rooms may be arranged either in traditional lecture format or more informally to allow students to work together in small groups. Practical sessions are held in dedicated teaching laboratories within the School of Life Sciences, which have places for a total of 210 students. The learning resources available to students on the Programme include:

- The extensive collection of books and journals relevant to undergraduate study held in the University Library. Much of this material is also accessible online to Keele students from anywhere in the world with a University username and password.
- A smaller collection of biological publications and materials held in the Undergraduate Resource Room in the School of Life Sciences. The Resource Room is open at regular times during teaching periods and the resources are specifically related to the needs of students on Biology programmes.
- The Keele Learning Environment (KLE) which provides easy access to a wide range of learning resources including lecture notes, electronic materials available in a repository maintained by the University Library and other resources - video, audio and text-based - accessible from external providers via the internet.

Mathematics is taught in lecture theatres equipped with whiteboards and projection equipment. There is also a large computer laboratory containing state-of-the-art computers and monitors. There is also a room within the Division which exclusively for use by students for private study. The learning resources available to students on the Programme include:

- The extensive collection of books and journals relevant to undergraduate study held in the University Library. Much of this material is also accessible online to Keele students from anywhere in the world with a University username and password.
- Detailed printed notes and other paper resources supplied in certain modules.
- A smaller collection of Mathematics texts available to students held in the Division's Reading Room.
- The Keele Learning Environment (KLE) which provides easy access to a range of learning resources including some lecture notes and past examination papers, and other resources accessible from external providers via the internet.

17. Other Learning Opportunities

Study Abroad (International Year)

A summary of the International Year, which is a potential option for students after completion of year 2 (Level 5), is provided in the Annex for the International Year.

Work Placement Year

A summary of the Work Placement Year, which is a potential option for students after completion of year 2 (Level 5), is provided in the Annex for the Work Placement Year.

Other opportunities

Fieldwork

Fieldwork is an essential part of a scientist's training in Biology, Earth Science, Physical Geography and Environmental Science, providing both the opportunity to acquire and practice field-based skills, to develop skills of observation and recording and to work as effective members of a team.

Keele is ideally located to be able to integrate a large component of field work into its environmental science programmes with a wide range of habitats in easy reach, including the Keele campus itself with its lake system and extensive woodlands, in addition to the mining and industrial heritage of the local area providing ideal opportunities for the study of the impact of these activities on the environment.

18. Additional Costs

Biology - Field Course Costs

Students taking Biology as a core or supporting science, who choose to take module LSC-20055, will do an 8-day compulsory field course accommodated at Bangor University during the summer vacation between the first and second years. The School of Life Sciences meets the cost of this, but the student will be expected to pay for their own travel to Bangor, and maintenance costs during the field course (for example food, appropriate clothing, etc.).

Environmental Science - Field Course Costs

Students taking Environmental Science as a core science will do a compulsory field course, chosen from the range available, as part of module ESC-20079. The School of Geography, Geology and the Environment meets the travel and accommodation costs of this field course but students should note that field courses may be fully or only partly catered for, depending on the field course chosen. Others field courses are entirely self-catered and students are expected to purchase meals (e.g. lunch and/or evening meal).

All Natural Sciences students undertake an independent research project in their final year. For some students, this MAY include additional field work that is normally carried out during the summer vacation between years 2 and 3. Students are responsible for organising their own transport and accommodation as well as paying any costs incurred whilst carrying out fieldwork. These costs are extremely variable as they are dependent on the nature of a student's project and where the student chooses to carry out their project. Costs are minimal if the project work is undertaken in the students' local area.

IMPORTANT: Students are expected to have adequate clothing for field trips. We reserve the right to change the venues of field courses due to both cost and academic considerations.

Activity	Estimated Cost
Field courses - compulsory for students taking module LSC-20055 (8-day residential field course hosted at Bangor University and paid for by the School of Life Sciences).	£0
Travel - compulsory travel to Bangor University for students taking module LSC20055	Variable
Field courses - compulsory for students taking module ESC-20079 (week-long residential field course paid for by the School of Geography, Geology and the Environment)	£0
Field courses - compulsory for students taking module ESC-10061 (weekend residential field course semester 1 paid for by the School of Geography, Geology and the Environment)	£0
Field courses - compulsory for students taking module ESC-10061 (5 day Easter vacation residential field course semester 2 paid for by the School of Geography, Geology and the Environment); packed lunches to be bought by students	Variable - expect £15-25
Field courses - compulsory for students taking module ESC-20036 (one-day field course paid for by the School of Geography, Geology and the Environment)	£0
Field courses - compulsory for students taking module ESC-20037 (one-day field course paid for by the School of Geography, Geology and the Environment)	£0
Field courses - compulsory for students taking module ESC-20084 (one-day field course paid for by the School of Geography, Geology and the Environment).	£0
Equipment - waterproof clothing and suitable footwear for field courses if taking Biology, Environmental Science or Earth Sciences as a core science.	£150
Total estimated additional costs	Variable - depends on student's pathway through the Natural Sciences programme

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

As to be expected there will be additional costs for inter-library loans and potential overdue library fines, print and graduation. We do not anticipate any further costs for this programme.

19. Quality management and enhancement

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

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

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

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

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

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

Information about current external examiner(s) can be found here:
<http://www.keele.ac.uk/qa/externalexaminers/currentexternalexaminers/>

20. The principles of programme design

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

- a. UK Quality Code for Higher Education, Quality Assurance Agency for Higher Education: <http://www.qaa.ac.uk/quality-code>
- b. QAA Subject Benchmark Statements:

Biosciences (2015): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=biosciences&wordsMode=AllWords>

Chemistry (2014): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=chemistry&wordsMode=AllWords>

Computing (2016): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=computing&wordsMode=AllWords>

Earth Sciences, Environmental Sciences and Environmental Studies (2014): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=earth%20sciences&wordsMode=AllWords>

Geography (2014): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=geography&wordsMode=AllWords>

Mathematics, Statistics and Operational Research (2015): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=mathematics&wordsMode=AllWords>

Physics, Astronomy and Astrophysics (2016): <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements?indexCatalogue=document-search&searchQuery=physics&wordsMode=AllWords>

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

21. Annex - International Year

Natural Sciences with International Year

International Year Programme
<p>Students registered for this Single Honours programme may either be admitted for or apply to transfer during their period of study at Level 5 to the International Year option. Students accepted onto this option will have an extra year of study (the International Year) at an international partner institution after they have completed Year 2 (Level 5) at Keele.</p> <p>Students who successfully complete both the second year (Level 5) and the International Year will be permitted to progress to Level 6. Students who fail to satisfy the examiners in respect of the International Year will normally revert to the standard programme and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.</p> <p>Study at Level 4, Level 5 and Level 6 will be as per the main body of this document. The additional detail contained in this annex will pertain solely to students registered for the International Year option.</p>
International Year Programme Aims
<p>In addition to the programme aims specified in the main body of this document, the international year programme of study aims to provide students with:</p> <ol style="list-style-type: none">1. Personal development as a student and a researcher with an appreciation of the international dimension of their subject2. Experience of a different culture, academically, professionally and socially
Entry Requirements for the International Year

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

The criteria to be applied are:

- Academic Performance (an average of 60% across all modules in Semester 1 at Level 5 is normally required. Places on the International Year are then conditional on achieving an average mark of 54% across all Level 5 modules with no module fails. Where no Semester 1 marks have been awarded performance in 1st year marks and ongoing 2nd year assessments are taken into account)
- General Aptitude (to be demonstrated by application for study abroad, interview during the 2nd semester of year 2 (Level 5), and by recommendation of the student's personal tutor, 1st and 2nd year tutors and programme director)

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

Student Support

Students will be supported whilst on the International Year via the following methods:

- Phone or Skype conversations with Study Abroad tutor, in line with recommended Personal Tutoring meeting points.
- Support from the University's Global Education Team

Learning Outcomes

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

1. Describe, discuss and reflect upon the cultural and international differences and similarities of different learning environments
2. Discuss the benefits and challenges of global citizenship and internationalisation
3. Explain how their perspective on their academic discipline has been influenced by locating it within an international setting.
4. Apply their experiences abroad to the specific Graduate Attributes associated with their Natural Sciences degree programme;
5. Integrate, apply and develop interdisciplinary principles and perspectives to solve global-scale problems.

In addition, students who complete the International Year will be able to:

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

Regulations

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

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

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

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

Additional costs for the International Year

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

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

Students studying in Erasmus+ destinations may be eligible for grants as part of this programme. Students studying outside of this programme may be eligible income dependent bursaries at Keele.

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

22. Annex - Work Placement Year

Natural Sciences with Work Placement Year

Work Placement Year summary

Students registered for this programme may either be admitted for or apply to transfer during their studies to the 'with Work Placement Year' option (NB: for Combined Honours students the rules relating to the work placement year in the subject where the placement is organised are to be followed). Students accepted onto this programme will have an extra year of study (the Work Placement Year) with a relevant placement provider after they have completed Year 2 (Level 5) at Keele.

Students who successfully complete both the second year (Level 5) and the Work Placement Year will be permitted to progress to Level 6. Students who fail to satisfactorily complete the Work Placement Year will normally revert to the 3-year programme and progress to Level 6 on that basis. The failure will be recorded on the student's final transcript.

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

Work Placement Year Programme Aims

In addition to the programme aims specified in the main body of this document, the Work Placement Year aims to provide students with:

1. Substantial experience of work with a relevant placement provider, including familiarisation with the professional working environment;
2. The opportunity to apply academic theory to real situations in the work place and to expand employability skills.

Entry Requirements for the Work Placement Year

To proceed to the Work Placement Year, students must normally achieve an average of 55% across all Year-1 and Year-2 Semester 1 modules. If students do not meet these requirements, they will revert to the 3-year programme. Students have the opportunity to apply directly for the 4-year 'with work placement year' degree programme, or to transfer onto the 4-year programme at the end of Year-1 and in Year-2 at the end of Semester 1. Students who are initially registered for the 4-year degree programme may transfer onto the 3-year degree programme at any point in time, prior to undertaking the year-long work placement. Students who fail to pass the work placement year, and those who fail to meet the minimum requirements of the work placement year module (minimum 30 weeks full time (1,050 hours), or equivalent, work placement), will be automatically transferred onto the 3-year degree programme.

The criteria to be applied are:

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

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

Student Support

Students will be supported whilst on the Work Placement Year via the following methods:

- Regular contact between the student and a named member of staff who will be assigned to the student as their University supervisor. The University supervisor will be in regular contact with the student throughout the year, and be on hand to provide advice (pastoral or academic) and liaise with the Placement supervisor on the student's behalf if required.
- Two formal contacts with the student during the placement year: the University supervisor will visit the student in their placement organization at around the 5 weeks after placement has commenced, and then visit again (or conduct a telephone/video call tutorial) at around 15 weeks into the placement.
- Weekly supervision sessions will take place with the placement supervisor (or his/her nominee) throughout the duration of the placement.

Learning Outcomes

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

1. evaluate their own employability skills (via a SWOT analysis);
2. create Intended Learning Outcomes for their placement in order to develop the skills areas which they have identified as needing further enhancement;
3. develop, through practice in the work place, the work-related skills identified through their SWOT
4. analysis and Intended Learning Outcomes;
5. apply academic theory learned as part of their taught degree to real situations in the work place;
6. reflect on their work placement activities and evaluate the impact on their own employability skills;
7. explain how the sector of the placement operates and identify the skills required to pursue careers within the sector.

These learning outcomes will be assessed through the non-credit bearing Work Placement Year module (ESC-30042) which involves:

1. the submission of a mid-placement portfolio comprising a SWOT analysis, action plan and an evaluation of the student's performance based on the placement supervisor's initial report;
2. the submission of a final placement report comprising a reflective diary and an evaluation of the student's performance based on the placement supervisor's final report.

Regulations

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

- Students undertaking the Work Placement Year must successfully complete the zero-credit rated module ESC-30042
- In order to ensure a high quality placement experience, each placement agency will sign up to a placement contract (analogous to a service level agreement).
- Once a student has been accepted by a placement organisation, the student will make a pre-placement visit and a member of staff identified within the placement contract will be assigned as the placement supervisor. The placement supervisor will be responsible for ensuring that the placement experience meets the agreed contract agreed with the University.
- The placement student will also sign up an agreement outlining his/her responsibilities in relation to the requirements of each organisation.

Students will be expected to behave professionally in terms of:

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

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

Additional costs for the Work Placement Year

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

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

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

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

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

Version History

This document

Date Approved: 13 May 2020

Previous documents

Version No	Year	Owner	Date Approved	Summary of and rationale for changes
1	2019/20	ADAM MOOLNA		