

Course Information Document: Undergraduate

For students starting in Academic Year 2018/2019

1. Course Summary

Names of programme(s) and award title(s)	Master in Natural Sciences (MSci) Master in Natural Sciences (MSci) with International Year (see Annex A for details)
Award type	Integrated Masters
Mode of study	Full time
Framework of Higher Education Qualification (FHEQ) level of final award	Level 7
Duration	4 years 5 years with International Year
Location of study	Keele University – main campus
Accreditation (if applicable)	Not applicable
Regulator	Higher Education Funding Council for England (HEFCE)
Tuition Fees	UK/EU students: Fee for 2018/19 is £9,250* International students: Fee for 2018/19 is £15,480** The fee for the international year abroad is calculated at 15% of the standard year fee
Additional Costs	Refer to section 15

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.

2. What is an Integrated Masters Programme?

Integrated master's awards - which are common in science, mathematics and engineering - are delivered through a programme that combines study at the level of a bachelor's degree with honours with study at Master's level. As such, a student graduates with a master's degree after a single four-year programme of study. The Integrated Masters programme described in this document builds upon the three year Single Honours

* 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/>

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programme in Natural Sciences by adding a fourth year in which students study modules in their chosen science subject at an advanced level.

The MSci Natural Sciences programme is only available to students who have studied the following science subjects as core in the three-year programme and wish to pursue that subject to an advanced level: **Chemistry, Earth Sciences, Environmental Science and Forensic Science**. These specifications refer solely to the MSci Natural Sciences route which requires a minimum of 480 credits in Natural Sciences. Students seeking further information on the 3-year BSc Honours Natural Sciences route, or the 4-Year BSc Honours Natural Sciences with International Year, are advised to consult the relevant programme specifications. Progression to the MSci Natural Sciences programme requires an average of at least 60% at Level 5. If you do not attain this average, you will be transferred automatically to the 3-year BSc Natural Sciences degree programme.

3. Overview of the Programme

The MSci degree programme in Natural Sciences provides you with the opportunity to pursue the study of one of your core science subjects to an advanced level. MSci students follow the BSc Natural Sciences programme in Years 1-3. The first year gives students a sound basis and understanding of their selected core science subjects; whilst in later years students can choose to specialize in their preferred scientific discipline, or to maintain a broad science-based portfolio. In Year-4, the MSci Natural Sciences programme offers you the opportunity to develop your subject specific knowledge, and research, problem-solving and communication skills. Through choice of a 60-credit research project and accompanying subject-specific modules focussing on advanced topics, you will have the opportunity to tailor your final year to suit your interests and aspirations. The MSci programme is designed to enable you to enhance your employability through the development of advanced level problem-solving, presentational and communication skills, as well as developing your research skills and your capacity to learn independently.

4. Aims of the Programme

The broad aims of the programme are to:

- develop a systematic understanding of knowledge, and a critical awareness of current issues and debates, much of which is at the forefront of their academic disciplines;
- develop, to an advanced level, skills in laboratory and/or field work, evaluate new methods of investigation or analysis and appropriate and place these within the context of current research debates in that field of science;
- show originality in the application of knowledge via undertaking cutting-edge 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

In addition, **MSci Natural Sciences students** will be able to demonstrate knowledge and understanding of:

- their chosen science to an advanced level, including the knowledge base of their advanced-level research project, and be able to place this within the context of current research debates in their field of study

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

In addition, **MSci Natural Sciences students** will be able to:

- deal with complex data both systematically and creatively, make sound judgments in the absence of complete data, and communicate conclusions clearly to a specialist audience
- critically evaluate current research and methodologies in their chosen field of study

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

In addition, **MSci Natural Sciences students** will be able to:

- deal with complex data both systematically and creatively, make sound judgments in the absence of complete data, and communicate conclusions clearly to a specialist audience
- work in a self-directed fashion in tackling and solving problems, and act autonomously in planning and implementing tasks associated with the project

The full range of intended learning outcomes that will be achieved by students taking the MSci Natural Sciences degree programme will be highly dependent upon which combination of sciences* that they choose to study as core and supporting' during Years 1-3, alongside the choice of subject in Year-4. 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 Section 8).

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
- 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 MSci 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/>

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 course to course, 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 May.

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 this 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.

The interdisciplinary nature of the MSci Natural Sciences degree programme means that different students will take different combinations of compulsory, optional and elective modules depending on their chosen pathway through the Natural Sciences programme. Full details are shown in the Tables below. All MSci Natural Sciences students take the following compulsory modules which are bespoke to the BSc and MSci Natural Sciences degree programmes:

Year	Compulsory Modules (for all students)	Credits
1	NAT-10001: Science and Society	15
2	NAT-20001: Research Skills for Natural Scientists	15
3	NAT-30001: Grand Challenges in Society	15
	NAT-30002: Natural Sciences Research Project	30
4	NAT-40002: Advanced Research Training	15
	ESC-40045: Generic Research Skills	15
	NAT-40001: MSci Research Project	60

In addition, students studying MSci Natural Sciences take two science subjects as core (45-credits per subject) plus EITHER a third science subject as a 'supporting' science (15-credits) in Years 1 and 2 OR an elective module (15 credits). In Year 3, students choose optional modules, subject to pre-requisites, from the range available within their core science subjects. Entry to Year-3 of the MSci Natural Science programme requires an average of 60% in all modules at Year-2. Students who wish to progress onto the MSci Natural Science programme should be aware that there may be specific requirements for them to take certain options modules in Year-3, in order to ensure that they have appropriate background for some Year-4 modules.

The exact combination of subjects available to students wishing to progress onto the MSci programme is dependent upon timetabling restrictions and the availability of Level-7 modules (Table 1). **The MSci Natural Sciences programme is only available to students who have studied the following science subjects as core in the three-year programme and wish to pursue that subject to an advanced level: Chemistry, Earth Sciences, Environmental Science, and Forensic Science.**

Table 1: Possible core and supporting science subject combinations available as part of the MSci Natural Sciences degree programme. *Students may choose to study a 15-credit elective module in Years 1 and 2 instead of a third science subject if desired.

Core Science 1 (45 credits)	Core Science 2 (45 credits)	Possible 'Supporting Science Subjects' (students choose one subject) (15 credits)*	4-Year MSci Available?
Chemistry	Biology	<i>Earth Sciences <u>OR</u> Environmental Science <u>OR</u> Forensic Science</i>	<i>Yes – but students must specialise in Chemistry in Year-4</i>
Chemistry	Environmental Science	<i>Biology</i>	<i>YES – students must specialise in either core science in Year-4</i>
Chemistry	Earth Sciences	<i>Biology</i>	<i>YES – students must specialise in either core science in Year-4</i>
Chemistry	Forensic Science	<i>Biology</i>	<i>YES – students must specialise in either core science in Year-4</i>
Physical Geography	Biology	<i>Earth Sciences <u>OR</u> Environmental Science <u>OR</u> Forensic Science</i>	<i>NO</i>
Physical Geography	Forensic Science	<i>Biology</i>	<i>Yes – but students must specialise in Forensic Science in Year-4</i>
Physical Geography	Earth Sciences	<i>Biology</i>	<i>Yes – but students must specialise in Earth Science in Year-4</i>
Physical Geography	Environmental Science	<i>Biology</i>	<i>Yes – but students must specialise in Environmental Science in Year-4</i>
Biology	Forensic Science	<i>Computer Science <u>OR</u> Psychology <u>OR</u> Physical Geography</i>	<i>Yes – but students must specialise in Forensic Science in Year-4</i>
Biology	Earth Sciences	<i>Computer Science <u>OR</u> Psychology <u>OR</u> Physical Geography</i>	<i>Yes – but students must specialise in Earth Science in Year-4</i>
Biology	Environmental Science	<i>Computer Science <u>OR</u> Psychology <u>OR</u> Physical Geography</i>	<i>Yes – but students must specialise in Environmental Science in Year-4</i>
Mathematics	Physics	<i>Computer Science <u>OR</u> Psychology <u>OR</u> Physical Geography</i>	<i>NO</i>
Mathematics	Biology	<i>Computer Science <u>OR</u> Psychology <u>OR</u> Physical Geography</i>	<i>NO</i>
Mathematics	Astrophysics	<i>Computer Science <u>OR</u> Psychology <u>OR</u> Physical Geography</i>	<i>NO</i>
Mathematics	Chemistry	<i>Biology</i>	<i>Yes – but students must specialise in Chemistry in Year-4</i>
Mathematics	Physical Geography	<i>Biology</i>	<i>NO</i>

The table below provides a summary of the content of Years 1, 2 and 3 of the MSci Natural Science programme. Further information about specific modules can be found online.

Core Science (students choose two)	Year 1 (Level 4)	Year 2 (Level 5)	Year 3 (Level 6) options
Chemistry	<p>45-credits of compulsory modules:</p> <p>CHE-10063: Chemical Structure and Reactivity CHE-10057: Practical and Professional Chemistry Skills for Natural Sciences</p>	<p><i>Students choose to follow EITHER a Materials Chemistry pathway, OR a Medicinal Chemistry pathway as follows (45-credits compulsory modules in either pathway):</i></p> <p><u>Materials Chemistry pathway:</u> CHE-20067: Molecular Chemistry and Reactions (Natural Sciences) CHE-20061: Spectroscopy and Analysis CHE-20065: Physical and Structural Chemistry</p> <p><u>Medicinal Chemistry pathway:</u> CHE-20067: Molecular Chemistry and Reactions (Natural Sciences) CHE-20061: Spectroscopy and Analysis CHE-20027: Medicinal and Biological Chemistry 1</p>	<p>The following optional modules are available to students at Level-6 and are dependent upon the Chemistry pathway studied at Level-5:</p> <p>*Indicates that students intending to progress onto the MSci specialising in Chemistry MUST take these modules in order to ensure suitable subject background for master's level study in Chemistry.</p> <p><u>Materials Chemistry pathway:</u> <u>Available Optional modules:</u> CHE-30037: Topics in Chemistry CHE-30038: Chemical Kinetics, Photochemistry & Inorganic Reaction Mechanisms* CHE-30039: Advanced Inorganic Chemistry* CHE-30042: Inorganic, Physical and Solid State Chemistry CHE-30043: Materials Chemistry and Catalysis* CHE-30050: Chemistry/Medicinal Chemistry Research Project* CHE-30051: Chemistry/Medicinal Chemistry Dissertation</p> <p><u>Medicinal Chemistry pathway:</u> <u>Available Optional modules:</u> CHE-30038: Chemical Kinetics, Photochemistry & Inorganic Reaction Mechanisms* CHE-30039: Advanced Organic Chemistry* CHE-30044: Topics in Medicinal Chemistry CHE-30047: Medicinal and Biological Chemistry 2* CHE-30050: Chemistry/Medicinal Chemistry Research Project* CHE-20051: Chemistry/Medicinal Chemistry Dissertation</p>

Earth Sciences	45-credits of compulsory modules: ESC-10036 Planet Earth ESC-10047: Data Visualisation ESC-10048: the Earth System	45-credits of compulsory modules ESC-20036: Palaeoclimate and Quaternary Studies* ESC-20084 Geology and Society (30-credits)* <i>*Both of these modules are associated with a one-day field course which usually take place during semester one.</i>	Available optional modules are: ESC-30009: Natural Hazards ESC-30036: Exploration Geophysics ESC-30018: Global Environmental Change ESC-30006: Glaciers and Glacial Geomorphology ESC-30022: Hydrological and Engineering Geology ESC-30020: Water Resources ESC-30027: Coastal Environments
Environmental Science	45-credits of compulsory modules: ESC-10045: Introductory Geology for the Environmental Sciences CHE-10044: Introductory Environmental Chemistry* ESC-10043: Greening Business: Employability and Sustainability *Students taking Chemistry as a core science replace CHE-10044 with ESC-10044: People and the Environment	45-credits of compulsory modules: ESC-20017: Human Impacts on the Environment (C) ESC-20079: Research Skills (30-credits) ¹ ¹ This module is associated with a week-long residential field course, which usually takes place during the Easter vacation of Year-2.	Available optional modules are: ESC-30045: Contemporary Topics in Environmental Science ESC-30040: Clean Technology ESC-30018: Global Environmental Change ESC-30020: Water Resources ESC-30027: Coastal Environments
Forensic Science	45-credits of compulsory modules: CHE-10039:Forensic Science Principles CHE-10037:Forensic Analysis CHE-10042:Forensic identification	45-credits of compulsory modules: CHE-20011: Spectroscopy and advanced analysis CHE-20010: Criminalistic methods CHE-20012: Drugs of abuse	Available optional modules are: CHE-30010:Forensic toxicology CHE-30033:Evaluation of evidence CHE-30024 Forensic Geoscience CHE-30035 Topics in Forensic Analysis

Physical Geography	45-credits of compulsory modules: ESC-10039: Fundamentals of Physical Geography ESC-10041: People and Environment ESC-10032: Global warming or a new ice age?	45-credits of compulsory modules: ESC-20050: Dynamic Geographies (<i>15 credit, Physical Geography options only</i>) ESC-20030: Regional Landscapes GEG-20018: Concepts and Debates (<i>Physical Geography route</i>)	Available optional modules are: ESC-30006: Glaciers & Glacial Geomorphology ESC-30018: Global Environmental Change ESC-30020: Water Resources ESC-30027: Coastal Environments
Mathematics	45-credits of compulsory modules: MAT-10046: Calculus (30-credits)MAT-10045: Introduction to Algebra	45-credits of compulsory modules: MAT-20008: Differential Equations MAT-20016: Mathematical Modelling MAT-20025: Abstract Algebra	Available optional modules are: MAT-30002: Nonlinear Differential Equations MAT-30003: Partial Differential Equations MAT-30022: Number Theory MAT-30029: Professional Mathematics MAT-30001: Graph Theory MAT-30014: Medical Statistics MAT-30023: Mathematical Biology
Biology	45-credits of compulsory modules: LSC-10077: Introduction to the Biological Sciences (45-credit module)	Students choose 45-credits of optional modules from the following list:	<i>Students can further specialise in either Neuroscience, Biology or Human Biology (or choose any mixture thereof) by selecting any from the following optional modules:</i>
		LSC-20071: Animal Adaptations LSC-20055: Life at the Extremes ⁺ LSC-20056: Research and Analytical Skills LSC-20052 Nutrition and Energy Balance ⁺ This module is associated with an 8-day residential field course which usually takes place during the summer vacation between Years 2 and 3 of the programme.	Available optional modules are: LSC-30003: Applied Insect Ecology LSC-30043 Conservation Biology LSC-30006: Applied Fish Biology LSC-30017: Trees in their Environment LSC-30030: Human Evolution

All modules are 15-credits unless otherwise stated. For modules which are available as part of more than one core science pathway, students will only gain credits for that module in one of their core sciences (i.e., the same module cannot be counted more than once in terms of credits).

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.).

The following table lists the subjects which can be taken as a **supporting science** and the specific modules students will be required to take:

Supporting Science Subject	Year 1 (Level 4)	Year 2 (Level 5)
Biology	LSC-10042: Sex and Survival	LSC-20055: Life at the Extremes ⁺ <i>OR</i> <i>LSC-20055: Animal Adaptations</i> <i>⁺ This module is associated with an 8-day residential field course which usually takes place during the summer vacation between Years 2 and 3 of the programme.</i>
Computer Science	CSC-10024: Programming 1	CSC-20023: Computational Intelligence 1
Psychology	PSY-10034 Introduction to biological and cognitive psychology	PSY-20045, Biological and Cognitive Psychology
Earth Sciences	ESC-10045: Introductory Geology for the Environmental Sciences	ESC-20037: Geoscience and Society
Environmental Science	ESC-10053: Greening Business	ESC-20017: Human Impacts on the Environment
Forensic Science	CHE-10039: Forensic Science Principles	CHE-20010: Criminalistic Methods
Physical Geography	ESC-10039: Fundamentals of Physical Geography	ESC-20030: Regional Landsystems

Year-4 (Level-7):

At Year-4 MSci Natural Sciences students take the following compulsory modules:

NAT-40002: Advanced Research Training (15-credits)

ESC-40045: Generic Research Skills (15-credits)

NAT-40001: MSci Research Project (60-credits)

Plus two optional modules from within their chosen specialist science subject (30-credits)

Specialist Subject	Modules
Chemistry	CHE-40033: Applied Chemistry Topics for Natural Sciences CHE-40024: Research Chemistry Topics
Earth Sciences	ESC-40018: MGeoscience - Global Environmental Change+ ESC-40015: MGeoscience - Natural Hazards+ ESC-40038: MGeoscience: Exploration Geophysics for the Hydrocarbon Industry+ ESC-40020: MGeoscience - Hydrological and Engineering Geology+ ESC-40019: MGeoscience - Water Resources+ ESC-40040: MGeoscience - Coastal Environments+
Environmental Science	ESC-40018: MGeoscience - Global Environmental Change+ ESC-40015: MGeoscience - Natural Hazards+ ESC-40019: MGeoscience - Water Resources+ ESC-40040: MGeoscience - Coastal Environments+
Forensic Science	CHE-40032: Research Skills for Analytical Science CHE-40030: Analytical Science - Principles and Practice (30 Credits) CHE-40025: Forensic Evidence - At the Crime Scene and in the Court

+ Students cannot take these modules if they have already taken the Level 6 equivalent modules.

For further information on the content of modules currently offered please visit:

www.keele.ac.uk/recordsandexams/az

9. Final and intermediate awards

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

(MSci) Masters in Natural Sciences	480 credits	You will require at least 120 credits at levels 4, 5, 6 and 7
(BSc) 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

Master in Natural Sciences (MSci) with International Year: in addition to the above students must pass a module covering the international year in order to graduate with a named degree in Natural Sciences with

International Year. Students who do not complete, or fail the international year, will be transferred to the four-year MSci Natural Sciences programme.

10. How is the Programme assessed?

The wide variety of assessment methods used within Natural Sciences 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 within Natural Sciences:

- **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	Year 1 (Level 4)	Year 2 (Level 5)	Year 3 (Level 6)	Year 4 (Level 7)
Scheduled learning and teaching activities	36%	29%	17%	15%
Guided independent Study	64%	71%	83%	85%
Placements	0%	0%	0%	0%

12. Accreditation

This programme does not have accreditation from an external body.

13. 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/>

A student who has completed a semester abroad will not normally be eligible to transfer onto the International Year option.

14. Other learning opportunities

Study abroad (semester)

Students on the MSci Natural Science programme have the potential opportunity to spend a semester abroad in their second year studying at one of Keele's international partner universities.

Exactly which countries are available depends on the student's choice of degree subjects. An indicative list of countries is on the website (<http://www.keele.ac.uk/studyabroad/partneruniversities/>); however this does not guarantee the availability of study in a specific country as this is subject to the University's application process for studying abroad.

No additional tuition fees are payable for a single semester studying abroad but students do 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 to 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

Whilst students are studying abroad any Student Finance eligibility will continue, where applicable students may be eligible for specific travel or disability grants. Students studying in Erasmus+ destinations may be eligible for grants as part of this programme. Students studying outside of this programme may be eligible for 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.

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 at Annex A.

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.

15. 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 LSC-20055	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-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-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 undergraduate programme.

16. Document Version History

Date of first approved version (v1.0): 8th December 2017

Revision history

Version number¹	Author	Date	Summary of and rationale for changes
2.0	Katie Szkornik	16.04.18	Addition of International Year option (annex A) [Major change: reissued]

¹ 1.1, 1.2 etc. are used for minor changes and 2.0, 3.0 etc. for major changes (as defined in the University's Guidance on processes supporting curriculum changes)

Annex A

Master in Natural Sciences (MSci) with International Year

International Year Programme
<p>Students registered for the MSci Natural Sciences may either be admitted for or apply to transfer during their period of study at Level 5 to the 'Master in Natural Sciences (MSci) with International Year'. Students accepted onto this programme 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 MSci Natural Sciences 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 'Master in Natural Sciences (MSci) with International Year'.</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
<p>Students may apply during Level 5. Admission to the International Year is subject to successful application, interview and references from appropriate staff.</p> <p>The criteria to be applied are:</p> <ul style="list-style-type: none">• Academic Performance (an average of 60% across all modules at Level 5 is normally required)• 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)
Student Support
<p>Students will be supported whilst on the International Year via the following methods:</p> <ul style="list-style-type: none">• 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
<p>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:</p> <ol style="list-style-type: none">a. Describe, discuss and reflect upon the cultural and international differences and similarities of different learning environmentsb. Discuss the benefits and challenges of global citizenship and internationalisationc. Explain how their perspective on their academic discipline has been influenced by locating it within

an international setting.

In addition, students who complete 'Master in Natural Sciences (MSci) with International Year' will be able to:

- i) apply their experiences abroad to the specific Graduate Attributes associated with their Natural Sciences degree programme;
- ii) integrate, apply and develop interdisciplinary principles and perspectives to solve global-scale problems.

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.

Course Regulations

Students registered for the 'Master in Natural Sciences (MSci) with International Year' are subject to the course 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 Natural Sciences module with significant overlap to Level 6 modules to be studied 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.